



TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER Graduate School *of* Biomedical Sciences

30th Annual Student Research Week March 20-23, 2018 Texas Tech University Health Sciences Center (TTUHSC) Lubbock, Texas

The Graduate School of Biomedical Sciences 2018 Student Research Week Committee

Director: Antonia Stuebler Vice Director of Marketing: Riccay Elizondo Vice Director of Poster Competition: Derek Fleming Vice Director of Operations & Judging: Whitni Redman

Website design and maintenance: Danny Boren, Graduate School of Biomedical Sciences Communications and social media: Suzanna Cisneros and Amy Skousen, Office of Communications Marketing; Cheryl Shaffer, Graduate School of Biomedical Sciences; Deidra Satterwhite, Office of Student Services Speaker travel arrangements: Cheryl Shaffer, Graduate School of Biomedical Sciences Abstract book design: Deidra Satterwhite, Office of Student Services Student Research Week Banquet: Bojana Ristric, Graduate School of Biomedical Sciences Graduate Student Association; KayLeigh Shannon, Graduate School of Biomedical Sciences

The 2018 Student Research Week Committee would like to extend their warmest thanks to the following for their contributions and support in making Student Research Week a great success this year:

The Graduate School of Biomedical Sciences staff: Cheryl Shaffer, Pam Johnson and KayLeigh Shannon The Office of Student Services: Deidra Satterwhite The Office of Communications and Marketing: Suzanna Cisneros, Amy Skousen, Zach Tijerina and Kami Hunt The Office of the President: Didit Martinez The School of Medicine Office of the Dean: Charity Donaldson Educational Media Services: Neal Hinkle The departments of cell biology and biochemistry, pharmacology and neuroscience, immunology and molecular microbiology, cell physiology and molecular biophysics, medical education and graduate medical education; Graduate School of Biomedical Sciences at Lubbock, Abilene, and Amarillo, the School of Medicine, the School of Nursing, the School of Health Professions, the School of Pharmacy, the Office of Interprofessional Education, and Texas Tech University.

We also are very grateful to all the TTUHSC faculty and staff for their guidance and support.

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Information about TTUHSC, including information about the Graduate School of Biomedical Sciences, can be found at www.ttuhsc.edu.

## **KEYNOTE LECTURES**

Jane S. Richardson, DScHon

Time: 11:00 a.m. - 12:00 p.m.

Francisco Bezanilla, Ph.D.

Time: 1:00 - 2:00 p.m.

## **STUDENT SPEAKERS**

Time: 9:30 - 11:00 a.m.

Characterizing novel patient-derived cell lines with the alternative lengthening of telomeres phenotype for sensitivity to ATR inhibitors

> Shawn Macha, Graduate Student, Lubbock

Next Science Coated Urinary Tract Catheters Prevent Biofilm Development by Urinary Tract Pathogens

> Stephany Navarro, Graduate Student, Lubbock

Glycoside Hydrolases Degrade Polymicrobial Biofilms in Chronic Wounds

Derek Fleming, Graduate Student, Lubbock

Tannic Acid Downregulates Angiotensin Type 1 Receptor in Aortic Smooth Muscle Cells Through EGFR Dependent Phosphoinositide 3-kinase Pathway

> Laxmi Iyer, Graduate Student, Amarillo

Tumor cells activate small GTPase RhoA in endothelial cells to facilitate transendothelial migration during cancer metastasis

Md Sanaullah Sajib, Graduate Student, Amarillo

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- 31 Graduate Students 3 Years +
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### TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER.

#### Greetings!

It is my great pleasure to welcome everyone to the 2018 Student Research Week on March 20th-23rd. The theme for this year's 30th Annual Student Research Week event is **"Protein Chronicles: From Unknown Structures to Essential Functions."** We are extremely proud this year to host two outstanding and highly distinguished keynote speakers: **Jane Richardson, DScHon**, a MacArthur Fellow, a member of the National Academy of Science and Medicine, and a James B. Duke Professor of Biochemistry at Duke; and **Francisco Bezanilla, Ph.D.**, a member of the National Academy of Sciences and a Lillian Eichelberger Cannon Professor at the University of Chicago.

I am extremely indebted to the 2018 Student Research Week Organizing Committee: Antonia Stuebler, Riccay Elizondo, Whitni Redman, and Derek Fleming. I am particularly grateful for the hard work and assistance from Cheryl Shaffer, Pam Johnson, Deidra Satterwhite, Suzanna Cisneros, Esmeralda Yanez, the Department of Cell Physiology and Molecular Biophysics, and the entire GSBS staff. They have all done a terrific job! Also special thanks to Dr. Guillermo Altenberg, the host department chair, and Dr. Jones for coordinating activities with the School of Medicine, all faculty, staff, and GSBS students for their efforts and time. Finally, I would like to thank President Mitchell, Dean Berk, Dean Evans, Dean Smith, Dean Rice-Spearman, and Drs. Varma, Prien, Ganapathy, Altenberg, Byrd, Philips, Grisham, Thekkumkara, Neugebauer, Abbruscato, Reddy, Dissanaike, Jumper, and Bergeson for their support that has made this event possible.

In addition, the GSBS and the GSA are very excited about hosting the fifth annual Student Research Week Banquet. Funds raised from donations and a silent auction will be used to support student scholarships. Special thanks to all donors for their help in making this special event possible. Our guest speakers will once again treat us with their "Reflections on Graduate Studies," with music, entertainment and dancing to follow! Special thanks to the GSA committee, especially GSA president Bojana Ristic, for organizing and hosting the event this year.

In conclusion, our event kicks off with the Vendor Show on Tuesday, March 20th. Please come and attend all the great presentations. It is a wonderful opportunity to meet our students, learn about their work, and discuss research in general. Let's greet all of our speakers and celebrate our 30th Annual Student Research Week with a fully packed lecture hall. Thanks much and all the best!

Brandt L. Schneider, Ph.D. Dean of the Graduate School of Biomedical Sciences



### TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER.

#### Greetings,

Welcome to the 30th Anniversary of the annual Student Research Week (SRW)! This is an annual event that is organized and run by graduate students at the Texas Tech University Health Sciences Center (TTUHSC) Graduate School of Biomedical Sciences, Lubbock Campus. SRW brings together students from different TTUHSC schools and campuses and gives them a chance to showcase their research and projects they have worked on all year. During SRW, students will be able to visit with biomedical vendors, share a poster about their research, and learn about some of the latest scientific developments from distinguished visiting scholars.

Each year, SRW features a theme to highlight advances in a certain area of biomedical research. This year's theme is "Protein Chronicles: From Unknown Structures, To Essential Functions" and is hosted by the Department of Cell Physiology and Molecular Biology. Two outstanding biomedical scientists will give keynote seminars on March 23rd, which will highlight this topic. Jane Richardson is a James B. Duke Professor at Duke University. She and her husband, David, have worked together for over 50 years on research to understand the 3D structure of protein and RNA molecules, which includes their description, determinants, folding, evolution, and control. Professor Richardson pioneered ribbon drawings for representing protein structures and first described many of the common features of overall protein folds and their local motifs. Dr. Francisco Bezanilla is an Emeritus Professor at the University of Chicago. Bezanilla is a pathfinder in the use of fluorescent labeling techniques for studying dynamic rearrangement in channel proteins, and codiscoverer of gating current in sodium channels. Additionally, his work focuses in ion channel gating and other voltage dependent phenomena. These two scientists are outstanding researchers, and we encourage everyone to attend their seminars and participate in the coffee session on Friday for interactive discussions about basic science and other related topics.

The SRW poster competition gives students the opportunity to present and discuss their research in a conference-like atmosphere. It has participation from several different TTUHSC schools and campuses, and we are proud to say that 224 students have signed up to participate this year. We recommend that everyone attend the open poster sessions from 12 – 1pm on Wednesday and Thursday in the ACB lobby to learn about ongoing basic and clinical research projects and to identify research opportunities at different TTUHSC schools across multiple TTUHSC campuses.

SRW would not be possible without the tireless efforts of people working behind the scenes to make it a success. We would like to thank the faculty and staff of the Graduate School of Biomedical Sciences, the Offices of Student Services and Marketing and Communications, the School of Medicine, and the Department of Cell Physiology and Molecular Biology, and last but not least, Jessica Smith. We would also like to thank President Mitchell and Drs. Schneider, Prien, Altenberg, and Berk. Lastly, thanks to you, a participant in the 30th annual Student Research Week. The ideas you share and the knowledge you gain are what make this event a success.

Sincerely,

The 30th Annual Student Research Week Committee

Antonia Stuebler, Riccay Elizondo, Whitni Redman, Derek Fleming

## **30<sup>TH</sup> ANNUAL TTUHSC STUDENT RESEARCH WEEK SCHEDULE**

### TUESDAY, MARCH 20, 2018

9:00am - 12:00pm	Vendor Show	5th Floor BC
WEDNESDAY, MARCH 2	?1, 2018	

8:00am - 12:00pm	Poster Session I	ACB Lobby
12:00pm - 1:00pm	Open Poster Exhibit I	ACB Lobby
1:30pm - 4:30pm	Poster Session II	ACB Lobby

### THURSDAY, MARCH 22, 2018

8:00am - 12:00pm	Poster Session III	ACB Lobby
12:00pm - 1:00pm	Open Poster Exhibit II	ACB Lobby
1:30pm - 4:30pm	Poster Session IV	ACB Lobby
6:30pm	SRW Banquet	McKenzie-Merket Alumni Center

### FRIDAY, MARCH 23, 2018

9:00am - 9:25am	Continental Breakfast	ACB 100
9:30am - 11:00am	Select Student Presentations	ACB 100
11:00am - 12:00pm	Jane Richardson, DScHon	ACB 100
12:00pm - 1:00pm	Lunch	ACB Lobby
1:00pm - 2:00pm	Francisco Bezanilla, Ph.D.	ACB 100
2:15pm - 3:15pm	Awards Ceremony	ACB 100
3:30pm - 4:30pm	Students' Coffee with the Speakers	ACB 100



Jane S. Richardson, DScHon James B. Duke Professor, Department of Biochemistry, Duke University

Jane Richardson and her husband David have worked together for over 50 years on research to understand the 3D structure of protein and RNA molecules, including their description, determinants, folding, evolution, and control. They were among the early groups doing protein crystallography, helped to start the field of protein de novo design, and developed the popular molecular graphics system of "kinemages". More recently they developed a new method that calculates hydrogen-atom contacts to visualize and quantify the details of packing interactions inside and between molecules. Its principal application is to improving the accuracy of experimental structures of protein and RNA molecules, as implemented on their MolProbity structure-validation web service and within the Phenix software system for crystallography & cryoEM.

Prof. Richardson pioneered ribbon drawings for representing protein structures, first described many of the common features of overall protein folds and their local motifs (such as Greek key beta barrels, righthanded crossovers, helix caps, cis Pro touch-turns, vicinal disulfides) and has worked to spread molecular 3D literacy to students and colleagues at Duke and around the world. From a Swarthmore B.A. in philosophy she has become a biophysicist, a MacArthur Fellow, a member of the National Academies of Sciences & of Medicine, and a James B. Duke Professor of Biochemistry at Duke, and she now has three honorary degrees to fill in for her lack of a PhD. For more details, see Ann. Rev. Biophysics (2013) 4:1-28.



### Francisco Bezanilla, Ph.D. Lillian Eichelberger Cannon Professor,

Department of Biochemistry and Molecular Biology, The University of Chicago

Francisco Bezanilla is a biophysicist whose advanced experiments on neurons and ion channels earned his election to the National Academy of Sciences in 2006. In addition to his work on ion channel gating, Bezanilla is a pathfinder in the use of fluorescent labeling techniques for studying dynamic rearrangement in channel proteins, and codiscoverer of gating current in sodium channels. Since the beginning of his scientific career he has been interested in voltage dependent phenomena in cell Physiology. These include the description of the biophysical events of channel function that generate the nerve impulse and the adaptation of these channels to maintain the function of the nervous system in environment where organisms live for. His present interest is the understanding of the dynamics of the molecular correlates of the function in voltage-modulated membrane transport proteins.

Bezanilla received his B.S. in Biology in Chile, followed by a Master's and Ph.D. in Biophysics, before he moved to the United States for his Postdoc.

Dr. Bezanilla is now a Rockefeller Foundation and AAAS Fellow, a member of the Latin and US Academy of Sciences, a Lillian Eichelberger Cannon Professor at the University of Chicago, and he served as the President of the Biophysical Society in 2013-2014. For his full Biography, view PNAS 105 (46) 17597-17599.

## JUDGES

Sharilyn Almodovar, Ph.D. Immunology and Infectious Diseases

**Duke Appiah, Ph.D.** *Public Health* 

Frank Babb, M.D., FAAFP Medicine

**Cody Beaver, M.D.** Orthopaedic Surgery

Muhittin Berlirgen, M.D. Pediatrics

**Susan Bergeson, Ph.D.** *Pharmacology and Neuroscience* 

**Pushpak Bhattacharjee, Ph.D.** Cell Biology and Biochemistry

**Kishor Bhende, M.D.** *Pediatrics* 

Yangzom D. Bhutia, Ph.D., D.V.M. Cell Biology and Biochemistry

**Michael Blanton, Ph.D.** *Pharmacology and Neuroscience* 

Madhura Bose Internal Medicine

Jean-Michel Brismee, ScD, PT Physical Therapy

**Theresa Byrd, Dr.P.H.** *Public Health* 

**Maira Carrillo, Ph.D.** *Obstetrics and Gynecology* 

Ramachandra Chemitganti, M.D. Internal Medicine

**Beverly Chilton, Ph.D.** *Biochemistry, Cellular and Molecular Biology* 

**Jeff Dennis, Ph.D.** *Public Health*  **Quynh Hoa Do, Ph.D.** Cell Biology and Biochemistry

**Daina Dreimane, M.D.** *Pediatrics* 

**Jannette Dufour, Ph.D.** *Cell Biology and Biochemistry* 

**Stephanie Filleur, Ph.D.** *Urology* 

Mariana Fiori, Ph.D. Cell Physiology and Molecular Biophysics

**Kushal Gandhi, Ph.D.** *Obstetrics and Gynecology* 

**Gordon Gong** *Rural and Community Health* 

**Dinesh Gowda, Ph.D.** *Pediatrics* 

**Petar Grozdanov, Ph.D.** *Cell Biology and Biochemistry* 

Lan Guan, M.D., Ph.D. Cell Physiology and Molecular Biophysics

**Josee Guindon, Ph.D., DVM** *Pharmacology and Neuroscience* 

Abdul Hamood, Ph.D. Immunology and Molecular Microbiology

George I. Henderson, Ph.D. Pharmacology and Neuroscience

**Aveline Hewetson, Ph.D.** *Cell Biology and Biochemistry* 

Ebtesam Islam, M.D., Ph.D. Internal Medicine

Ramesh Kandimalla, Ph.D. Garrison Institute on Aging

**Audrey Karamyshev, Ph.D.** *Cell Biology and Biochemistry* 

JUDGES

**Gurvinder Kaur, Ph.D.** *Cell Biology and Biochemistry* 

Michelle Keyel, Ph.D. Cell Biology and Biochemistry

Hafiz Khan, M.R., Ph.D. Public Health

Cassie Kruczek, Ph.D., M.S. Medical Education

**Subodh Kumar, Ph.D.** *Garrison Institute on Aging* 

Neeraj Kumar, Ph.D., NCS Physical Therapy

Josh Lawrence, Ph.D. Pharmacology and Neuroscience

SueAnn Lee, Ph.D., CCC-SLP School of Health Professions

**Fatma Levent, M.D.** *Pediatrics* 

Lluis Lopez, Ph.D. Cell Biology and Biochemistry

Hairong Ma, Ph.D. Cell Physiology and Molecular Biophysics

Adebayo Molehin, Ph.D. Internal Medicine

**Volker Neugebauer, M.D., Ph.D.** *Pharmacology and Neuroscience* 

Hariharan Parameswaran, Cell Physiology and Molecular Biophysics

**Isabel Castro-Piedras, Ph.D.** *Immunology and Molecular Microbiology* 

**Lisa Popp, Ph.D.** *Medical Education* 

Wendy Pruitt, Ph.D. Immunology and Molecular Microbiology

**Courtney Queen** *Public Health*  **Sabarish Ramachandran, Ph.D.** *Cell Biology and Biochemistry* 

**Catherine Reppa, M.D.** *Opthalmology* 

Ana M. Rivas Mejia, M.D. Internal Medicine

**Rial Rolfe, Ph.D., MBA** Office of Academic Affairs

**Catherine Ronaghan, M.D.** *Surgery* 

**Toshihiro Sato, Ph.D.** *Cell Biology and Biochemistry* 

Sathish Sivaprakasam, Ph.D. Cell Biology and Biochemistry

**Annette Sobel, M.D., M.S.** *Graduate Medical Sciences, Strategic Partnerships* 

Leslee Taylor, Ph.D., ATC, LAT Athletic Training

Lukman Tijani, M.D. Internal Medicine

**Elena Tikhonova, Ph.D.** *Cell Biology and Biochemistry* 

**Phat Tran,** *Opthalmology* 

Ina Urbatsch, Ph.D. Cell Biology and Biochemistry

Irfan Warraich Pathology

**Shengping Yang** *Pathology* 

Yang Soo Yoon, Ph.D. School of Health Professions

**Raul Martinez-Zaguilan, Ph.D.** *Cell Physiology and Molecular Biology* 

**Mimi Zumwalt, M.D.** *Orthopaedic Surgery* 

## **CRITERIA FOR CASE PRESENTATIONS**

### SIGNIFICANCE/ INTRODUCTION:

- 1. Case history is clearly defined.
- 2. Sufficient patient background and literature is presented for understanding the medical problem.
- 3. Significance of the problem under investigation and rationale for reporting the case is clearly indicated. Uniqueness of the case study is clearly explained.

### **METHODS:**

- 1. Clinical tests used are clearly explained. Any unusual tests performed include the laboratory's ranges of normal values.
- 2. Approach to the problem presented by this patient is appropriate.
- Thought process of determining appropriate diagnosis, including differential diagnoses, is explained.

### **RESULTS**:

- 1. Patient clinical results presented are pertinent and clearly presented.
- 2. Diagnosis presented is sufficiently addressed by results/future clinical work.

### CONCLUSIONS/DISCUSSION:

- 1. Conclusions are clearly described.
- 2. Conclusions are supported by observations and literature background.
- 3. Recommended treatment and outcome of treatment are discussed (if applicable).
- 4. Directions for future investigation or management of similar cases are indicated.

### PRESENTATION / RESPONSE TO QUESTIONS:

- 1. Overall style of the presentation is effective (delivery/eye contact).
- 2. Presenter uses time effectively.
- 3. Presenter answers questions in an organized, concise, and accurate fashion.
- 4. Presenter offers additional insight to discussion.

## CRITERIA FOR SCIENTIFIC RESEARCH

### SIGNIFICANCE/ INTRODUCTION:

- 1. Current hypothesis is clearly defined.
- 2. Sufficient background is presented for understanding of the study.
- 3. Significance of the problem under investigation is clearly indicated.
- 4. Hypothesis is clearly stated.

### **METHODS**:

- 1. Methods utilized are clearly explained.
- 2. Experimental design is valid for question addressed. (Are there any methods that would be better utilized?)

### **RESULTS**:

- 1. Results are clearly stated.
- 2. Controls are addressed and appropriate.
- 3. Figures/tables clearly convey intended information.
- 4. Presented hypothesis has been sufficiently addressed by results and/or future experiments. (All needed experiments have been mentioned.)

### CONCLUSIONS/DISCUSSION:

- 1. Conclusions are clearly described.
- 2. Conclusions are supported by observations and literature background.
- 3. Directions for future investigation or management of similar cases are indicated/discussed.

### PRESENTATION / RESPONSE TO QUESTIONS:

- 1. Overall style of the presentation is effective (delivery/eye contact).
- 2. Presenter uses time effectively.
- 3. Presenter answers questions in an organized, concise, and accurate fashion.
- 4. Presenter offers additional insight to discussion.

## PARTICIPANTS

GS1-2	Bass, Kevin
GS1-2	Blanton, Henry
GS1-2	Brown, Timothy
GS1-2	Hein, Matthew
GS1-2	Kader, Sarah
GS1-2	Korac, Ksenija
GS1-2	Macha, Shawn
GS1-2	Mazzitelli, Mariacristina
GS1-2	McDaniel, Brianyell
GS1-2	Pirayesh, Elham
GS1-2	Redman, Whitni
GS1-2	Sharma, Monica
GS1-2	Thamarai Kannan, Kavya
GS1-2	Young, Victoria
GS1-2	Zahra, Fatema Tuz
GS3+	Beasley, Kellsie
GS3+	Bounds, Kayla
GS3+	Bui, Anthony
GS3+	Elizondo, Riccay
GS <b>3</b> +	Elmassry, Moamen
GS3+	Fleming, Derek
GS3+	Harsini, Faraz
GS3+	lyer, Laxmi
GS3+	Jarvis, Courtney
GS <b>3</b> +	Koneru, Balakrishna
GS3+	Lee, YoonJung
GS3+	Meyer, Dylan
GS <b>3</b> +	Mueller, Karl
GS3+	Nguyen, Thinh
GS <b>3</b> +	Page, Shyanne
GS3+	Pedroza, Diego
GS <b>3</b> +	Ristic, Bojana
GS <b>3</b> +	Sajib, Md Sanaullah
GS3+	Sikder, Mohd Omar Faruk
GS3+	Smith, Jessica
GS3+	Stuebler, Antonia
GS3+	Suthe, Sreedhar Reddy
GS <b>3</b> +	Vartak, David
GS3+	Verlekar, Dattesh
GS <b>3</b> +	Wright, Kandis
GS3+	Zhao-Fleming, Hannah
GSBS M	Blakely, Summre
GSBS M	Brock, Joshua
GSBS M	Bunch, James

Coats, McKenna

GSBS M	Curtis, Samantha
GSBS M	Duggan, Paul
GSBS M	Fletcher, Alexandria
GSBS M	Garcia, Jose
GSBS M	Gregoire, Paola
GSBS M	Haq, Hridoy
GSBS M	John, Dijo
GSBS M	Loy, Sydney
GSBS M	Lucio, Christine
GSBS M	Merida Morales, Noriko
GSBS M	Navarro, Stephany
GSBS M	O'Dell, Christopher
GSBS M	Ojo, Desiree
GSBS M	Owoade, Damilola
GSBS M	Quesada, Kandi
GSBS M	Rasmussen, Drew
GSBS M	Rhoden, Kristin
GSBS M	Samad, Jaffer
GSBS M	Scruggs, Caroline
GSBS M	Sherrill, Kinzie
GSBS M	Tapaswi, Anagha
GSBS M	Torres, Tiffany
GSBS M	Villalpando, Nathan
GSBS M	Xie, Min
MS1-2	Abraham, Kelavna
MS1-2	Ahmed, Ali
MS1-2	Ahnood, Elmira
MS1-2	Ali, Fahad
MS1-2	Alonzo, Ryan
MS1-2	Asad, Usman
MS1-2	Bacon, Luke
MS1-2	Banerjee, Avantika
MS1-2	Bouffard, Emily
MS1-2	Brogan, Joshua
MS1-2	Buckholz, Abigail
MS1-2	Buie, John
MS1-2	Byrd, Alyssa
MS1-2	Caldwell, Joseph
MS1-2	Carlsen-Landy, David
MS1-2	Causey, Jordan
MS1-2	Cole, Caleigh
MS1-2	Deleon, Sabrina
MS1-2	Effendi, Maleeh
MS1-2	Esquivel, Esteban
MS1-2	Faheid, Mohamed
MS1-2	Farmer, Reed

MS1-2 Fillmore, Tyson MS1-2 Francisco, Roshirl MS1-2 Gabrilska, Rebecca MS1-2 Gartman, Grace MS1-2 Gavin, Meredith MS1-2 Gonzalez, Alan MS1-2 Green, William MS1-2 Gudenkauf, Brent MS1-2 Hanson, Keith MS1-2 Helton, Tyler MS1-2 Herrmann, Joseph MS1-2 Hsu, Chia MS1-2 Judd, Adam MS1-2 Kelley, John MS1-2 Kirk, Declan MS1-2 Kirkpatrick, Carson MS1-2 Kong, Lydia MS1-2 Kow, Sean MS1-2 Le, Audrey MS1-2 Lear, Michelle MS1-2 Littlejohn, Margaret MS1-2 Littlejohn, Jackson MS1-2 Lung, John MS1-2 Lunney, Austin MS1-2 Lyuksyutova, Anna MS1-2 Martin, Livingston MS1-2 McCarty, Brandon MS1-2 McKinney, Jordan MS1-2 Mende, Sarah MS1-2 Miller, Mary (Katie) MS1-2 Mitchell, Diana MS1-2 Nair, Arya MS1-2 Nguyen, Quang MS1-2 Ortiz, Priscilla MS1-2 Park DeWitt, Judy MS1-2 Patel, Raj MS1-2 Pham, Andrew MS1-2 Pham, Theophilus MS1-2 Pillutla, Pranati MS1-2 Polackal, Sharon MS1-2 Presto, Peyton MS1-2 Rajan, Aditya MS1-2 Ruppert, Misty MS1-2 Saa, Lisa MS1-2 Sanchez, Asley MS1-2 Sarayusa, Adam MS1-2 Smith, Jake

GSBS M

MS1-2	Streseman, Ashley	1
MS1- <b>2</b>	Tangella, Nikita	Ι
MS1-2	Thomas, Jaxson	Ι
MS1-2	Urias, Eduardo	
MS1-2	Wagner, Clayton	١
MS1- <b>2</b>	Weaver, Amanda	١
MS1- <b>2</b>	Wilson, Sarah	١
		١
MS <b>3</b> -4	Ahmed, Ahsen	١
MS3-4	Alkul, Suzanne	١
MS3-4	Amodeo, Matthew	١
MS3-4	Attaluri, Pradeep	
MS <b>3</b> -4	Aziz, Ben	F
MS <b>3</b> -4	Behrens, Emily	F
MS <b>3</b> -4	Benhammuda, Mohamed	F
MS <b>3</b> -4	Burton, Erin	F
MS <b>3</b> -4	Castillo, Austin	F
MS3-4	Choi, Simon	F
MS3-4	Chuecos, Marcel	F
MS <b>3</b> -4	Dang, TuyongVy	F
MS3-4	Dasaraju, Anudeep	F
MS3-4	Deitrick, Jena	F
MS3-4	Dennison, Joel	F
MS3-4	Garcia, Kyle	F
MS3-4	Ghosh, Niloy	F
MS3-4	Jameson, Robert	F
MS <b>3</b> -4	Kanani, Hassan	F
MS3-4	Karimi, Karen	F
MS <b>3</b> -4	Kim, Hyunyoung	F
MS <b>3</b> -4	King, Erin	F
MS <b>3</b> -4	Lee, Jeannie	F
MS <b>3</b> -4	Lee, Suheung "Steven"	F
MS3-4	Lindgren, Taylor	F
MS3-4	Lyuksyutova, Maria	F
MS <b>3</b> -4	McCoy, Colton	F
MS3-4	Moon, Jeremy	F
MS3-4	Mortensen, Zachary	
MS <b>3</b> -4	Nguyen, Daniel	5
MS <b>3</b> -4	Noor, Rabiya	5
MS <b>3</b> -4	Parikh, Niki	5
MS <b>3</b> -4	Pham, Hannah	
MS <b>3</b> -4	Quezada, Morgan	l
MS3-4	Ruiz, Christina	l
MS3-4	Santucci, Margaret	l
MS <b>3</b> -4	Schmidt, Kyra	l
MS <b>3</b> -4	Singer, Justin	ι
MS <b>3</b> -4	Stephens, Mark	l
MS3-4	Tan, Michael	l
MS3-4	Thompson, Jeremv	l
MS <b>3</b> -4	Torres, Harrison	

MS <b>3</b> -4	Trevino, Sorleen
MS <b>3</b> -4	Walker, Kendra
MS <b>3</b> -4	Wan, Steven
NURSE	Bumpus, Serena
NURSE	Brown, Kristi
NURSE	Carr, R.
NURSE	Gibson, Michelle
NURSE	Thrash, Nicholas
NURSE	Stevens, Cvnthia
NURSE	White, Ashlev
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R&CF	Atkins, Randy
R&CF	Avnampudi. Achuta
R&CF	Bartels. Heather
R&(F	Rhakta Suhani
R&(F	Rokaie Hassan
RRCF	Chalia Ankita
RRCF	Grand Rohert
RRCF	Halfmann Sara
	Harnandaz Farnanda
Rece	Horak Joramy
	Kaur Manindor
	Kuul, Mullilluel Kallingra Pamya
	Kompuru, Kumyu Modway, Allon
	Meuwuy, Alleli Morgan, Mickinzio
N&CF DØ/E	Moryun, Mickinzie Nanthan Amy
K&LF Døcr	Nullillull, Alliy
K&(F D0/E	Fliulii, leresiu Quirch Migual
K&LF Døcr	QUITCH, MIGUEI Diverse Deberte
	KIVERA, KODERIO Dablia a Cathan
	Robbins, Esther
	KUIZ, ANASTASIA
	Stanley, Russell
	lhein, Kyaw
K&CF	Vallabhaneni, Anuhya
K&CF	Vorakunthada, Yuttiwat
	., .,
SHL	Kapila, Jeegisha
SHP	Murphy, Brandi
SHP	Strickland, Kevin
	C : L CI
Undg	Cristy, Shane
Undg	Gaither, Brittany
Undg	Hoang, Brittney
Undg	McCord, Jon
Undg	Smith, DaNeisha
Undg	Spontarelli, Kerri
Undg	Ward, Weston
Undg	Welch, Garrett

#### Judging Group 1A - Wednesday, March 21, 2018 (All the following times are AM!)

Poster	Time	Name
W1	9:15-9:30	O'Dell, Christopher
W2	9:30-9:45	Blakely, Summre
W3	9:45-10:00	Curtis, Samantha
W4	10:00-10:15	Haq, Hridoy
W5	10:15-10:30	John, Dijo
	BREAK	
W6	10:45-11:00	Ojo, Desiree
W7	11:00-11:15	Owoade, Damilola
W8	11:15-11:30	Quesada, Kandi
W9	11:30-11:45	Rasmussen, Drew
W10	11:45-12:00	Samad, Jaffer

### Judging Group 2A - Wednesday, March 21, 2018

#### (All the following times are AM!)

Poster	Time	Name
W11	8:30-8:45	Korac, Ksenija
W12	8:45-9:00	McDaniel, Brianyell
W13	9:00-9:15	Redman, Whitni
W14	9:15-9:30	Navarro, Stephany
	BREAK	
W15	9:45-10:00	Beasley, Kellsie
W16	10:00-10:15	Bounds, Kayla
W17	10:15-10:30	Elizondo, Riccay
W18	10:30-10:45	Elmassry, Moamen
	BREAK	
W19	11:00-11:15	Fleming, Derek
W20	11:15-11:30	Mueller, Karl
W21	11:30-11:45	Wright, Kandis
W22	11:45-12:00	Zhao-Fleming, Hannah

#### Judging Group 3A -Wednesday, March 21, 2018 (All the following times are AM!)

Poster	Time	Name
W23	8:00-8:15	Ahmed, Ahsen
W24	8:15-8:30	Alkul, Suzanne
W25	8:30-8:45	Amodeo, Matthew
W26	8:45-9:00	Attaluri, Pradeep
W27	9:00-9:15	Aziz, Ben
	BREAK	
W28	9:30-9:45	Benahmmud, Mohamed
W29	9:45-10:00	Burton, Erin
W30	10:00-10:15	Castillo, Austin
W31	10:15-10:30	Choi, Simon
	BREAK	
W32	10:45-11:00	Dang, TuongVy
W33	11:00-11:15	Dasaraju, Anudeep
W34	11:15-11:30	Garcia, Kyle
W35	11:30-11:45	Jameson, Robert
W36	11:45-12:00	King, Erin

#### Judging Group 4A - Wednesday, March 21, 2018 (All the following times are AM!)

Poster	Time	Name
W37	8:00-8:15	Lee, Jeannie
W38	8:15-8:30	Lindgren, Taylor
W39	8:30-8:45	Lyujsyutova, Maria
W40	8:45-9:00	Mortensen, Zachary
W41	9:00-9:15	Noor, Rabiya
W42	9:15-9:30	Parikh, Niki
	BREAK	
W43	9:45-10:00	Quezada, Morgan
W44	10:00-10:15	Ruiz, Christina
W45	10:15-10:30	Santucci, Margaret
W46	10:30-10:45	Schmidt, Kyra
	BREAK	
W47	11:00-11:15	Singer, Justin
W48	11:15-11:30	Stephens, Mark
W49	11:30-11:45	Tan, Michael
W50	11:45-12:00	Thompson, Jeremy

#### Judging Group 5A - Wednesday, March 21, 2018 (All the following times are AM!)

Poster	Time	Name
W51	8:30-8:45	Atkins, Randy
W52	8:45-9:00	Aynampudi, Achuta
W53	9:00-9:15	Bartels, Heather
	BREAK	
W54	9:30-9:45	Bhakta, Suhani
W55	9:45-10:00	Bokaie, Hassan
W56	10:00-10:15	Chalia, Ankit
W57	10:15-10:30	Grand, Robert
	BREAK	
W58	10:45-11:00	Halfmann, Sara
W59	11:00-11:15	Nanthan, Amy
W60	11:15-11:30	Horak, Jeremy
W61	11:30-11:45	Kaur, Maninder
W62	11:45-12:00	Medway, Allen

#### Judging Group 3B - Wednesday, March 21, 2018

#### (All the following times are PM!)

Time	Name
1:30-1:45	Sanchez, Asley
1:45-2:00	Sarayusa, Adam
2:00-2:15	Smith, Jake
2:15-2:30	Streseman, Ashley
2:30-2:45	Tangella, Nikita
2:45-3:00	Thomas, Jaxson
BREAK	
3:15-3:30	Urias, Eduardo
3:30-3:45	Wagner, Clayton
3:45-4:00	Weaver, Amanda
4:00-4:15	Wilson, Sarah
4:15-4:30	Coats, McKenna
	Time1:30-1:451:45-2:002:00-2:152:15-2:302:30-2:452:45-3:00BREAK3:15-3:303:30-3:453:45-4:004:00-4:154:15-4:30

#### Judging Group 4B - Wednesday, March 21, 2018 (All the following times are PM!)

Poster	Time	Name
W93	1:30-1:45	Brock, Joshua
W94	1:45-2:00	Bunch, James
W95	2:00-2:15	Duggin, Paul
W96	2:15-2:30	Fletcher, Alexandria
	BREAK	
W97	2:45-3:00	Garcia, Jose
W98	3:00-3:15	Loy, Sydney
W99	3:15-3:30	Morales, Noriko
W100	3:30-3:45	Rhoden, Kristin
W101	4:45-4:00	Scruggs, Caroline

#### Judging Group 1B - Wednesday, March 21, 2018 (All the following times are PM!)

Poster	Time	Name
W63	1:30-1:45	Cristy, Shane
W64	1:45-2:00	Gaither, Brittany
W65	2:00-2:15	Hoang, Brittney
W66	2:15-2:30	McCord, Jon
	BREAK	
W67	2:45-3:00	Smith, Daneisha
W68	3:00-3:15	Spontarelli, Kerri
W69	3:15-3:30	Ward, Weston
W70	3:30-3:45	Welch, Garret

#### Judging Group 2B - Wednesday March 21, 2018 (All the following times are PM!)

Poster	Time	Name
W71	1:30-1:45	Patel, Raj
W72	1:45-2:00	Pham, Theophilus
W73	2:00-2:15	Pham, Andrew
W74	2:15-2:30	Pillutla, Pranati
W75	2:30-2:45	Polackal, Sharon
	BREAK	
W76	3:00-3:15	Ruppert, Misty
W77	3:15-3:30	Rajan, Aditya
W78	3:30-3:45	Presto, Peyton
W79	3:45-4:00	Saa, Lisa
W80	4:00-4:15	Torres, Tiffany
W81	4:15-4:30	Villalpando, Nathan

#### Judging Group 5B - Wednesday, March 21, 2018 (All the following times are PM!)

Poster	Time	Name
W102	1:30-1:45	Morgan, Mickinzie
W103	1:45-2:00	Hernandez, Fernando
W104	2:00-2:15	Pham, Teresia
W105	2:15-2:30	Quirch, Miguel
W106	2:30-2:45	Rivera, Roberto
	BREAK	
W107	3:00-3:15	Robins, Esther
W108	3:15-3:30	Ruiz, Anastasia
W109	3:30-3:45	Stanley, Russel
W110	3:45-4:00	Thein, Kyaw
W111	4:00-4:15	Vallabhaneni, Anuhya
W112	4:15-4:30	Vorakunthada, Yuttiwat

#### Judging Group 6A - Thursday, March 22, 2018 (All the following times are AM!)

Poster	Time	Name
T1	8:30-8:45	Bass, Kevin
T2	8:45-9:00	Pirayesh, Elham
Т3	9:00-9:15	Kannan, Kavya
	BREAK	
T4	9:30-9:45	Young, Victoria
T5	9:45-10:00	Gregoire, Paola
T6	10:00-10:15	Bui, Anthony
Τ7	10:15-10:30	Harsini, Faraz
	BREAK	
T8	10:45-11:00	Meyer, Dylan
Т9	11:00-11:15	Smith, Jessica
T10	11:15-11:30	Stuebler, Antonia
T11	11:30-11:45	Tuz Zahra, Fatema
T12	11:45-12:00	lyer, Laxmi

#### Judging Group 7A - Thursday, March 22, 2018 (All the following times are AM!)

#### Poster Time Name T13 8:00-8:15 Abraham, Helayna T14 8:15-8:30 Ahmed, Ali T15 Ahnood, Elmira 8:30-8:45 BREAK T16 9:00-9:15 Ali, Fahad T17 9:15-9:30 Alonzo, Ryan Asad, Usman T18 9:30-9:45 T19 9:45-10:00 Bacon, Luke Banerjee, Avantika T20 10:00-10:15 BREAK T21 10:30-10:45 Bouffard, Emily Brogan, Joshua T22 10:45-11:00 Buchholz, Abigail T23 11:00-11:15 T24 Buie, John 11:15-11:30 T25 11:30-11:45 Byrd, Alyssa T26 11:45-12:00 Caldwell, Joseph

#### Judging Group 8A - Thursday, March 22, 2018 (All the following times are AM!)

Poster	Time	Name
T27	8:00-8:15	Carlsen-Landy, David
T28	8:15-8:30	Causey, Jordan
T29	8:30-8:45	Cole, Caleigh
T30	8:45-9:00	Deleon, Sabrina
T31	9:00-9:15	Effendi, Maleeh
	BREAK	
T32	9:30-9:45	Esquivel, Esteban
Т33	9:45-10:00	Faheid, Mohamed
T34	10:00-10:15	Farmer, Reed
T35	10:15-10:30	Fillmore, Tyson
T36	10:30-10:45	Francisco, Roshirl
	BREAK	
T37	11:15-11:30	Gabrilska, Rebecca
T38	11:30-11:45	Gartman, Grace
Т39	11:45-12:00	Gavin, Meredith
T40	11:45-12:00	Gonzalez, Alan

#### Judging Group 9A - Thursday, March 22, 2018 (All the following timings are AM!)

Poster	Time	Name
T41	8:00-8:15	Green, William
T42	8:15-8:30	Gudenkauf, Bren
T43	8:30-8:45	Hanson, Keith
T44	8:45-9:00	Helton, Tyler
T45	9:00-9:15	Herrmann, Joseph
T46	9:15-9:30	Hsu, Chia
	BREAK	
T47	9:45-10:00	Judd, Adam
T48	10:00-10:15	Kelley, John
T49	10:15-10:30	Kirk, Declan
T50	10:30-10:45	Kirkpatrick, Carson
T51	10:45-11:00	Kong, Lydia
	BREAK	
T52	11:15-11:30	Le, Audrey
T53	11:30-11:45	Lear, Michelle
T54	11:45-12:00	Littlejohn, Margaret

#### Judging Group 10A- Thursday, March 22, 2018 (All the following timings are AM!)

Poster	Time	Name
T55	8:00-8:15	Littlejohn, Jackson
T56	8:15-8:30	Lung, John
T57	8:30-8:45	Lunney, Austin
T58	8:45-9:00	Lyuksyutova, Anna
	BREAK	
T59	9:15-9:30	Martin, Livingston
T60	9:30-9:45	McCarty, Brandon
T61	9:45-10:00	McKinney, Jordan
T62	10:00-10:15	Mende, Sarah
T63	10:15-10:30	Miller, Mary
	BREAK	
T64	10:45-11:00	Mitchell, Dianna
T65	11:00-11:15	Nair, Arya
T66	11:15-11:30	Nguyen, Quang
T67	11:30-11:45	Ortiz, Priscilla
Т68	11:45-12:00	Park Dewitt, Judy

#### Judging Group 6B - Thursday, March 22, 2018 (All the following timings are PM!)

Poster	Time	Name
T69	1:30-1:45	Blanton, Henry
T70	1:45-2:00	Hein, Matthew
T71	2:00-2:15	Kader, Sarah
	BREAK	
T72	2:30-2:45	Mazzitelli, Mariachristina
T73	2:45-3:00	Sherrill, Kinzie
T74	3:00-3:15	Lee, Yoonjung
T75	3:15-3:30	Page, Shyanne

#### Judging Group 7B - Thursday, March 22, 2018 (All the following timings are PM!)

Poster	Time	Name
T76	1:30-1:45	Brown, Timothy
T77	1:45-2:00	Macha, Shawn
T78	2:00-2:15	Sharma, Monica
T79	2:15-2:30	Tapaswi, Anagha
T80	2:30-2:45	Jarvis, Courtney
T81	2:45-3:00	Koneru, Balakrishna
	BREAK	
T82	3:15-3:30	Ristic, Bojana
T83	3:30-3:45	Sikder, Mohd
T84	3:45-4:00	Nguyen, Thinh
T85	4:00-4:15	Vartek, David
T86	4:15-4:30	Verlekar, Dattesh

### Judging Group 8B - Thursday, March 22, 2018

#### (All the following timings are PM!)

Poster	Time	Name
T87	1:30-1:45	Xie, Min
T88	1:45-2:00	Pedroza, Diego
T89	2:00-2:15	Sanaullah, Md
Т90	2:15-2:30	Reddy Suthe, Sreedhar

#### Judging Group 9B - Thursday, March 22, 2018 (All the following timings are PM!)

Poster	Time	Name
T91	1:30-1:45	Behrens, Emily
T92	1:45-2:00	Cheucos, Marcel
Т93	2:00-2:15	Deitrick, Jena
Т94	2:15-2:30	Dennison, Joel
Т95	2:30-2:45	Ghosh, Niloy
	BREAK	
Т96	3:00-3:15	Kanani, Hassan
Т97	3:15-3:30	Karimi, Karen
Т98	3:30-3:45	Ghandhi, Krushal
Т99	3:45-4:00	Kapila, Jeegisha
T100	4:00-4:15	Murphy, Brandi
T101	4:15-4:30	Strickland, Kevin

#### Judging Group 10B - Thursday, March 22, 2018 (All the following timings are PM!)

Poster	Time	Name
T102	1:30-1:45	Trevino, Sorleen
T103	1:45-2:00	Walker, Kendra
T104	2:00-2:15	Kim, Hyunyoung
T105	2:15-2:30	Kollipara, Ramya
	BREAK	
T106	2:45-3:00	Lee, Suheung "Steven"
T107	3:00-3:15	Moon, Jeremy
T108	3:15-3:30	Nguyen, Daniel
T109	3:30-3:45	Torres, Harrison
T110	3:45-4:00	Pham, Hannah
T111	4:00-4:15	Wan, Steven
T112	4:15-4:30	Lucio, Christine
T113	4:30-4:45	McCoy, Colton

## **POSTER LOCATIONS**



**POSTER LOCATIONS** 



## **GRADUATE STUDENTS YEARS 1-2**

### GS1-2 BASS, KEVIN

Signal Recognition Particle (SRP) Biogenesis in Human Cells

Kevin Bass, Paul D'Cunha, Elena B. Tikhonova, Andrey L. Karamyshev

Signal Recognition Particle (SRP) is responsible for membrane and secretory protein targeting.

SRP is a multiprotein complex comprising six subunits attached to an RNA backbone: SRP9, SRP14, SRP19, SRP54, SRP68, and SRP72. This complex interacts with the N-terminal signal peptide of translated protein emerging from the ribosome and targets the ribosome-nascent chain complex to the endoplasmic reticulum (ER). Previously, it was shown that when such interactions are disrupted due to mutation in signal sequence of secreted protein or the lack of SRP54 subunit, Regulation of Aberrant Protein Production (RAPP) is activated, causing degradation of translating mRNA. However, it is not known if other SRP subunits play a role in protein targeting and how they affect the activity of RAPP pathway. We hypothesize that SRP subunits affect each other's biogenesis and that all subunits are necessary for initiation of RAPP, but to different degrees. To test this hypothesis, we used RNA interference to knockdown each SRP subunit and analyzed their mRNA and protein levels. We found a striking correlation between SRP9/SRP14 heterodimer biogenesis. Knockdown of each of the two subunits reduced the protein expression of the other. The same phenomenon was observed for another pair, SRP68 and SRP72. None of the SRP subunit knockdowns had an effect on the transcription of any other subunit. Next, we measured how the absence of each SRP subunit affected the expression of two secretory proteins, CD248 and PDIA3. We found that only the lack of SRP54, SRP19 and SRP68/SRP72 resulted in significant decrease of secretory protein mRNA, which indicates an activation of RAPP pathway. Further studies are necessary to elucidate the precise role of each subunit of SRP in protein secretion.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### **GS1-2 BLANTON, HENRY**

Sex-differences in early stage HIV-induced neuropathy

Henry Blanton, Seth Brauman, Kelsey Donckels, Khalid Benamar, Josee Guindon

It is well-established that introducing gp120 into the nervous system induces neuropathic pain similar to Distal Sensory Polyneuropathy (DSP) symptoms found in HIV patients. The purpose of this study is to establish a novel DSP model using both male and female mice using intrathecal injection of gp120. Male and female mice were divided into four groups differing in gp120 concentration: inactive, 50 ng active, 100 ng, and 200 ng. Gp120 was given on day 1, 3 and 7. Mechanical and cold allodynia were evaluated using (digital von Frey and acetone). We also follow the estrous cycle by assessing cytology of vaginal smear on a daily basis throughout the experiments. Injections were done on days 1, 3, and 7. Mechanical and cold allodynia testing was evaluated from day 1 until day 24. Our results demonstrate that each concentration of gp120 shows increase in mechanical and cold pain sensitivity in both male and female relative to control group. However, female mice demonstrate significantly lower mechanical and higher cold pain values starting on day 1 through day 24. The estrous cycle is also shift to the estrus phase starting on day 8 through day 12. Our results suggest estrous cycle dependent sex-specific difference in mechanical allodynia and thermal sensitivity in female mice. Our findings are clinically relevant and emphasize the importance of studying the involvement of hormonal changes in pain sensitivity in animal models. A better understanding of hormonal effect on pain sensitivity will lead to improve treatment and novel therapies to treat chronic pain.

### GS1-2 BROWN, TIMOTHY

Autocrine and Paracrine Role of Tumor-Derived Lactic Acid in Tumor Growth and Metastasis and in Tumor-Cell Nutrition

#### Timothy Brown, Sabarish Ramachandran, Vadivel Ganapathy

Cancer cells display a unique phenomenon in which, even in the presence of oxygen, cells switch from oxidative phosphorylation to glycolysis as the primary source of ATP with consequent production of lactic acid. This phenomenon, called the Warburg Effect, is a hallmark of cancer. Lactic acid has long been considered as the necessary end product of this metabolic switch, where Lactic acid is effluxed out of tumor cells to prevent intracellular acidification. Recent evidence however suggests that lactate and the excess protons in the tumor microenvironment play an active role in tumor growth. In particular, lactate has been shown to function as an agonist for GPR81, a G-protein-coupled receptor expressed on the surface of tumor cells. This autocrine signaling of lactate promotes tumor growth and metastasis, as well as angiogenesis and immune evasion. The present study assesses whether tumor cell-derived lactate has any paracrine role via its receptor in non-cancer cells present in the tumor microenvironment, and also if the lactic acidinduced extracellular acidification has any role in tumor-cell nutrition. To address the first issue, we generated MMTV-PyMT-Tg mice, a spontaneous model for breast cancer, on Gpr81+/+ and Gpr81-/- backgrounds. The absence of Gpr81 reduced the mammary tumor incidence, delayed mammary tumor progression, and reduced lung metastasis. These data demonstrate the essential role of GPR81 in breast cancer growth and metastasis; but does not differentiate between Gpr81 in tumor cells versus Gpr81 in the tumor microenvironment. We then used the syngeneic transplant of the mouse mammary tumor cell line AT-3 into the mammary fat pads of wild type and Gpr81-/- mice to assess the involvement of Gpr81 in the microenvironment. The growth of the transplanted tumor cells was significantly reduced in Gpr81-/- mice than in wild type mice. We conclude that lactate can promote tumor growth and metastasis in the tumor microenvironment via GPR81 signaling.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS1-2 HEIN, MATTHEW

Amygdala cannabinoid CB1 modulation of pain behaviors in a rodent model of arthritis pain

Matthew A. Hein, Takaki Kiritoshi, Jeremy M. Thompson, Vadim Yakhnitsa, Volker Neugebauer

Pain is an unpleasant sensory experience with significant emotional affective components. The amygdala is a limbic structure that is involved in emotional affective aspects of pain. The cannabinoid receptor 1 (CB1), a G i/o protein-coupled receptor, is expressed on GABAergic interneurons in the basolateral amygdala (BLA). Preclinical studies have demonstrated antinociceptive effects of CB1 receptor activation, however selective activators have failed in clinical trials. The BLA is involved in amygdala fear and pain neurocircuitry, and BLA activity positively correlates with pain. However, nociceptive effects of CB1 receptor activation caused by disinhibition of GABAergic interneurons in the BLA have not yet been assessed. Here we test the hypothesis that CB1 receptor activation in the BLA increases pain behaviors and inhibition inhibits pain behaviors in a rodent model of acute arthritis pain. Audible and ultrasonic vocalizations evoked by brief, noxious stimulation of the left knee, withdrawal thresholds measured at the left knee, and synaptically evoked responses of BLA neurons measured via calcium imaging were determined before and 6 h after intra-articular injection of kaolin and carrageenan into the left knee joint for acute arthritis pain induction. Stereotaxic application of the CB1 receptor agonist ACEA into the BLA had no effect under normal or arthritis conditions. The same application of the CB1 receptor antagonist AM251 into the BLA showed facilitation of vocalizations under normal conditions, but reduced vocalizations in arthritic rats. Withdrawal thresholds were unaffected in either group under normal and arthritic conditions. Calcium imaging revealed an inhibition of synaptically evoked responses upon application of AM251 under arthritis conditions, and ACEA under both conditions. These data suggest that CB1 receptors are endogenously activated under normal and pain conditions, but shift from an inhibitory to an excitatory tone in the pain state.

### GS1-2 KADER, SARAH

#### Protein-Protein Interactions in Parkinson's Disease

Sarah Kader, Kristen Baca, Elena B. Tikhonova, Andrey L. Karamyshev

Parkinson's disease (PD) is a neurodegenerative disorder. It is associated with intracellular aggregation of the protein alpha-synuclein (aSyn). However, despite many studies, the exact mechanism of its aggregation is unknown. Our hypothesis is that aggregation of aSyn is caused by alteration or loss of its interactions with natural partners during translation. According to this hypothesis, aSyn may lose interactions with its partners because of mutations in aSyn (familial PD) or because of defects in its binding factors (sporadic PD). To test this hypothesis, we studied co-translational interactions of aSyn by developing an in vitro translation system for aSyn and optimizing the technology for site-specific incorporation of photo-crosslinking probes into aSyn. Our data demonstrate that aSyn can be successfully expressed in vitro using rabbit reticulocyte lysate translation system and aSyn was observed in association with several partners during translation. We will identify proteins that interact with aSyn during its translation for both wild-type and clinically-relevant aSyn mutants. Alternatively, we studied expression of aSyn in cultured human cells, in conditions, when potential interacting partners are depleted. In these experiments, we conducted RNAi knockdowns of Signal Recognition Particle (SRP). As we demonstrated earlier, SRP, in addition to its targeting factor function, plays an important role in protein quality control, protecting mRNAs during translation. Remarkably, depletion of SRP54 in cultured human cells leads to a decrease in aSyn mRNA levels that suggests possible in vivo interactions between aSyn and SRP. aSyn interacting partners may be used as potential pharmacological targets for the disease treatment or serve as markers of the early detection of PD in the future.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS1-2 KORAC, KSENIJA

Role of Lysine Deacetylation in D52 Vaccine Induced Tumor Immunity

Ksenija Korac, C. Riccay Elizondo, Jennifer D. Bright, and Robert K. Bright

Vaccine induced immunity against tumor protein D52 has proven to be effective against cancer cells without inducing autoimmunity against healthy tissues; however, complete protection has not been obtained yet. While putting various strategies to test in order to improve the efficiency of the vaccine, an interesting question arose  $\hat{a} \in \mathbb{C}^{+}$  could histone deacetylases play an important role in developing a durable vaccine induced tumor immunity? Histone deacetylases are enzymes that catalyze the removal of acetyl groups. Certain HDAC family members are shown to be aberrantly expressed in tumors. A normal form of tumor protein D52 has acetyl groups at various locations. Based upon previous studies, the malignant form of tumor protein D52 may be acetyl group free or may have acetyl groups at different locations when compared to the normal form. We tested the hypothesis that overexpression of certain HDACs and SIRT1 may be the reason why T-cells are capable of recognizing only the malignant form of tumor protein D52 without inducing autoimmunity. To test our hypothesis, we selected several HDAC members (HDAC2, HDAC3, HDAC5, HDAC10 and HDAC11) as well as SIRT1 and examined their expression in 3T3, 3T3mD52 and 4T1 cell lines. Endpoint RT-PCT at 20 and 25 cycles showed that certain HDACs and SIRT1 are more expressed in tumor cells vs the normal cells. Further studies will provide more information on which specific HDAC members as well as SIRT1 could be responsible for the T-cell ability to recognize only the malignant form of oncogenic tumor protein D52.

### GS1-2 MACHA, SHAWN

Characterizing novel patient-derived cell lines with the alternative lengthening of telomeres phenotype for sensitivity to ATR inhibitors

Shawn Macha<sup>1</sup>,2, Balakrishna Koneru<sup>1</sup>,2, Cody Eslinger<sup>5</sup>, C. Patrick Reynolds<sup>1</sup>,2,3,4,5

Background: Most cancers use telomerase to enable continual proliferation, but some cancers do not express telomerase and employ an alternative lengthening of telomeres (ALT) maintenance mechanism. It has been reported (using a limited number of ALT cell lines) that ALT cells are hypersensitive to ATR inhibition compared to those which maintain telomeres with telomerase (Science. 2015 Jan 16; 347(6219): 273–277).

Methods: The ALT phenotype was identified by detecting extrachromosomal telomeric DNA repeats (c-circles) using qPCR and slot-blotting. TERT mRNA expression was measured using qPCR, cytotoxicity via DIMSCAN, ALT associated promyelocytic leukemia bodies (APBs) by immunofluorescence + fluorescence in situ hybridization (IF-FISH). The ATR pathway inhibitors (ATRis) used were VE-821, AZD6738, AZD7762, and LY2603618.

Results: We assessed 165 patient-derived cancer cell lines and identified as ALT (i.e. positive for C-circles) -5 neuroblastoma, 3 rhabdomyosarcoma, 1 osteosarcoma, 1 leiomyosarcoma, 1 lymphoma, and 2 leukemia, cell lines. Consistent with previous studies, these cell lines had very low TERT mRNA expression and were positive for APBs. Cytotoxicity of ATRis in ALT cell lines was not different than that seen in telomerase-positive cell lines (IC50 and IC90; P= n.s). ALT cell lines showed resistance to ATR inhibitors (i.e.IC90 was higher than clinically achievable doses). ATR inhibitors were highly cytotoxic for fibroblasts at concentrations used for ALT cell lines.

Conclusion: We have identified ALT patient-derived cell lines across a variety of cancer types, including cancers (rhabdomyosarcoma and leukemia/lymphoma) for which ALT has not been previously reported. Contrary to previously published data, ATR inhibition did not show high activity in ALT cell lines relative to telomerase-positive cancer cells or non-malignant cells. Our panel of cell lines provides models for identifying novel therapeutics for ALT cancers.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS1-2 MAZZITELLI, MARIACRISTINA

Optogenetic stimulation of amygdala CRF neurons and BLA-CeA projections modulates spinal nociceptive processing in an arthritis pain model.

Mariacristina Mazzitelli and Volker Neugebauer

The central nucleus of amygdala (CeA) plays an important role in emotional-affective aspects of pain and modulation of pain sensitivity. The CeA receives pain-related information through projections from the basolateral amygdala (BLA) and the brainstem. A subset of CeA neurons are "projection neurons†that contain corticotropin releasing factor (CRF); one of their targets is the descending pain modulatory system that regulates spinal nociceptive processing, but the effect of amygdala output on the activity of spinal neurons remains to be shown. Here we focused on the effects of optogenetic activation or silencing of CRF-CeA neurons and BLA-CeA projections on spinal neurons.

Extracellular single unit recordings were made from spinal (L2-4) wide dynamic range (WDR) neurons, which respond to innocuous and noxious stimuli, in adult normal rats and arthritic rats (5-6 h postinduction of a kaolin/carrageenan-monoarthritis in the left knee). For optogenetic activation or silencing of CRF neurons, a Cre-inducible viral vector (DIO-AAV) encoding channel rhodopsin 2 (ChR2) or enhanced Natronomonas pharaonis halorhodopsin (eNpHR3.0) was injected stereotaxically into the right CeA of transgenic Crh-Cre rats. For optogenetic activation or silencing of BLA axon terminals in the CeA, a viral vector (AAV) encoding ChR2 or eNpHR3.0 under the control of the CaMKII promoter was injected stereotaxically into the right BLA of Sprague-Dawley rats. For wireless optical stimulation of ChR2 or eNpHR3.0 expressing CRF-CeA neurons or BLA-CeA axon terminals, an LED optic fiber was inserted into the CeA on the day of the experiment.

All spinal WDR neurons had receptive fields in the ipsilateral knee joint and responded more strongly to noxious than innocuous mechanical stimuli. Optical activation of CRF-CeA neurons or of BLA axon terminals in the CeA increased the responses of spinal WDR neurons under normal condition. Conversely, optical silencing of CRF-CeA neurons or of BLA axon terminals i

### GS1-2 MCDANIEL, BRIANYELL

Comparing Allogeneic vs. Xenogeneic Graft vs. Host Disease in Two Different Mouse Models

Brianyell McDaniel, Kathryn Furr, Kevin Bass, Josue Enriquez, and Matthew Grisham

Approximately 35-50% of patients undergoing allogeneic hematopoietic stem cell transplantation to treat severe hematological malignancies will develop acute graft vs. host disease. We have recently developed a novel mouse model of allogeneic graft versus host disease (aGVHD) that is induced by the adoptive transfer of allogeneic CD4<sup>+</sup> T cells into lymphopenic recipients. In this study, we compared this model to a humanized mouse model of xenogeneic GVHD (xGVHD). Acute GVHD was induced by injection (i.p.) of naÃ-ve allogeneic CD4^+CD62L^+CD25^- T cells (4 million/mouse) from Balb/c donors into NK cell-depleted C57Bl/6 RAG-1^-/- recipients. Elimination of NK cells in lymphopenic RAG-1-/- mice generates recipients that are devoid of T, B and NK cells thereby allowing for more robust engraftment of donor T cells. Xenogeneic GVHD was induced via injection (i.v.) of 10 million human peripheral blood lymphocytes (PBL) into T, B and NK cell-deficient NOD/scid/IL2rÎ3-/- (NSG) mice. Clinical signs of disease were quantified daily using an established scoring criterion that included weight loss, appearance, and behavior. When mice lost a‰¥20% of their original body weight they were classified as dead and sacrificed. Both groups exhibited signs of GVHD including reduced activity/lethargy, kyphosis, and skin inflammation. While we found that survival and the onset of xGVHD was more protracted than aGVHD, clinical and histological analysis revealed more extensive inflammation in mice with xGVHD. Indeed, mice with xGVHD exhibited more severe hair loss and more extensive inflammatory cell infiltration into the lungs, liver, skin and spleen than mice with aGVHD. Presence of disease (aGVHD) correlated well with increased serum levels of several different pro-inflammatory cytokines. Taken together, these data demonstrate that allogeneic CD4+ T cells are both necessary and sufficient to induce aGVHD and xenogeneic (human) PBLs induce more extensive inflammation in multiple organ systems.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS1-2 PIRAYESH, ELHAM

Identification of binding sites of chaperon protein RIC-3 on Intracellular domain of serotonin type 3A (5-HT3A-ICD). To bind or not to bind? That is the question!

Elham Pirayesh, Michaela Jansen

The serotonin type 3A (5-HT3A) receptor is a homopentameric cation-selective member of the pentameric ligand-gated ion channel (pLGIC) superfamily. Members of this superfamily assemble from five subunits, each of which consists of three domains, extracellular (ECD), transmembrane (TMD), and intracellular domain (ICD). Recently, we have shown that 5-HT3A-ICD fused to maltose binding protein (MBP) directly interacts with the chaperone protein resistance to inhibitors of choline esterase (RIC-3). Additionally, we have also demonstrated that 5-HT3A-ICD is required and sufficient for the interaction between 5-HT3A and RIC-3. To elucidate the molecular determinants of this interaction we developed different MBP-fused 5-HT3A-ICD constructs by deletion of large portions of its amino acid sequence. We have expressed two mutants (MBP-5-HT3A-ICD-Î''A and MBP-5-HT3A-ICD-Î''B) in Escherichia coli and purified them to homogeneity. Additionally, we have also purified RIC-3 to be utilized in protein-protein interaction experiments. Using RIC-3 affinity pull down, the interaction of MBP-5HT3A-ICD constructs and RIC-3 is investigated. Furthermore, we co-expressed 5-HT3A and RIC-3 in Xenopus oocytes to study the interaction in-vivo by two electrode voltage clamp (TEVC) recordings. Full-length 5-HT3A-ICD constructs rescue 5-HT3A mediated currents in the presence of RIC-3. Our results support the hypothesis that interaction of 5-HT3A-ICD and RIC-3 is mediated by specific segments of the 5-HT3A-ICD as opposed to the complete domain. Further studies are directed toward deciphering the molecular determinants of RIC-3 protein-protein interaction.

### GS1-2 REDMAN, WHITNI

Identification and Characterization of Sm-p80 Vaccine Induced Immune Signatures and Proteins

Whitni K. Redman, Arif J. Siddiqui, Garrett Welch, Pramodh Ganapathy, Rao Kottapolli, Adebayo J. Molehin, Weidong Zhang, and Afzal A. Siddiqui

Schistosomiasis is a major neglected tropical parasitic disease that affects over 250 million people worldwide. Clinical manifestations of the disease include hepatosplenomegaly, anemia, and fibrosis. Currently, there is no Schistosomiasis vaccine approved for human use. Sm-p80, the large subunit of Schistosoma mansoni calpain, is a promising vaccine candidate with proven therapeutic and prophylactic efficacy against schistosome infections. Our previous study using systems biology approach identified five unique genes (CSF2, HEBP1, S100A8, STAT1, and TLR4) associated with Sm-p80-mediated protection against schistosomiasis using a single vaccination strategy in a baboon model. In order to validate these genes and further identify other gene signatures and epistatic interactions associated with Sm-p80 vaccine immunogenicity and efficacy, we aim to utilize RNA-sequencing technology to identify unique gene-network interactions associated with the protection levels observed in immunized baboons following different vaccination strategies. Our results showed 38-58% protection against schistosomiasis in baboons immunized with Sm-p80-based vaccines. RNA-sequencing analysis to identify Sm-p80-specific immune signatures from these vaccination strategies is currently ongoing. These gene families and epistatic interactions identified by this present study could potentially provide a basis for predicting desirable outcomes for schistosomiasis vaccines as well as our overall understanding of vaccine-induced immune responses against schistosome infections.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS1-2 SHARMA, MONICA

Dishevelled proteins localize to CYP19A1 promoters and regulate aromatase expression.

Monica Sharma, Isabel Castro-Piedras, Deborah Molehin, Kevin Pruitt

In Wnt signaling pathway, Dishevelled (DVL) is known to be a critical cytoplasmic scaffold that promotes beta-catenin stabilization or cell migration. Recent studies have shown that DVL proteins translocate into the nucleus, however, the functional significance of nuclear DVL is poorly understood. Here, for the first time, our chromatin immunoprecipitation data demonstrates that DVL proteins localize to the multiple CYP19A1 tissue-specific promoters, including I.1 placental promoter in breast cancer cells. The CYP19A1 gene encodes aromatase, an enzyme required to convert androgen into estrogens. Aromatase is not only a key regulator of diverse biological processes but is overexpressed in various cancers and drives hormone-dependent tumor progression by increasing estradiol levels within tumors. Here in, we demonstrate that knockdown of specific DVL family members leads to altered CYP19A1 transcripts further demonstrating a novel role of DVL as a regulator of an estrogen producing gene, which has not been previously designated as a target of Wnt signaling pathway. Therefore, this study: 1) provides deeper insight into the nuclear role of DVL; 2) uncovers a new player that regulates CYP19A1 at the promoter which is poorly characterized and; 3) highlights a new connection between DVL and a critical driver of hormone dependent cancer.

### GS1-2 THAMARAI KANNAN, KAVYA

#### Protective Effects Of Mitochondria-Targeted Molecule Ss31 Against Diabetes In Tally-Ho Mice

Gurvinder Kaur1, Lea Ann Thompson1, Rachel Dziuk1, Karl Mueller1, Jannette M. Dufour1,2

Purpose of our project is to understand the protective effects of mitochondria-targeted molecule SS31 against diabetes in mice. To achieve our objective, we propose to use naturally occurring diabetic mice  $\hat{a}$  Tally-Ho mice. Our preliminary biochemical studies revealed that Tally-Ho mice developed hyperglycemia and hyper-lipedema at 8 weeks and diabetes at 16 weeks and disease progression with age. We also found mitochondrial abnormalities  $\hat{a}$  increased free radicals, lipid peroxidation and reduced mitochondrial ATP in Tally-Ho mice at 16 weeks and mitochondrial toxicity increased at 24 weeks. Our previous mitochondrial studies in mouse neuroblastoma (N2a) cells treated amyloid beta (Abeta) peptide, primary neurons from Alzheimer $\hat{a}$  ms disease (AD) mice and transgenic APP mice revealed that increased mitochondrial abnormalities and mitochondrial dysfunction. On the contrary, Abeta treated-N2a cells and APP mice treated with SS31 showed reduced mitochondrial dysfunction, excessive mitochondrial fragmentation and increased mitochondrial biogenesis, indicating that SS31 protect cells against diabetes in Tally-Ho mice. We treated Tally-Ho mice with SS31 for 4 weeks and studied protective effects of SS31 against diabetes in Tally-Ho mice. We treated Tally-Ho mice with SS31 for 4 weeks and studied protective effects of SS31 in TallyHo mice. We found decreased levels of mitochondrial fission genes, Drp1 and Fis1 and increased levels of fusion genes, Mfn1, Mfn2 and Opa1, indicating that mitochondrial dysfunction is reduced in Tally-Ho mice. These our observations indicate that SS31 is protective against diabetes in Tally-Ho mice. Mitochondrial dysfunction is reduced in Tally-Ho mice. These our observations indicate that SS31 is protective against diabetes in Tally-Ho mice.

School: Texas Tech University Campus: Lubbock

### **GS1-2 YOUNG, VICTORIA**

State-dependent Movement of the First External Loop of the Na/K pump  $\delta \check{z}^a$ -subunit

#### Victoria C. Young, Sukanyalakshmi Chebrolu, and Pablo Artigas

The Na/K pump and SERCA belong to the P-type 2 ATPase subfamily, which have 10 transmembrane segments (TM1-TM10) in their catalytic subunit. They alternate between phosphorylated and dephosphorylated forms, of cytoplasmic facing E1, and external facing E2 conformation. Inhibitor-locked E1 and E2 crystal structures indicate that TM1, TM2, and their connecting loop (L1-2) move significantly less in the Na/K pump than in SERCA. To study the movement of this region, we mutated the conserved residue R981 (in L9-10) to cysteine and concomitantly introduced another cysteine, one-at-a-time, from Q120 in TM1 to L134 within TM2. Double-cysteine mutants were expressed in Xenopus oocytes and functionally assessed with two-electrode voltage clamp, by measuring both, pump current (IP) activated by 10 mM K<sup>+</sup> o in 125 mM tetramethylammonium without Na<sup>+</sup> o), as well as the transient charge movement (QNa) that, in 125 mM Na<sup>+</sup> o without K<sup>+</sup> o, monitors the conformational change between E2P and E1P(3Na<sup>+</sup>). Spontaneous cysteine-pair crosslinking was evaluated by application of 1-10 mM TCEP (a reducing agent), which increased IP in E124C/R981C, E126C/R981C, P127C/R981C, Q128C/R981C, D130C/R981C and Y133C/R981C. After TCEP, application of 10 mM iodide (an oxidizing agent) diminished IP and altered QNa in all six mutants. Crosslinking of E124C/R981C, E126C/R981C, P127C/R981C, and Q128C/R981C right-shifted the Q-V curve, indicating E1P stabilization by the disulfide. Crosslinking of D130C/R981C, which dramatically reduced IP and QNa, was achieved in tetramethylammonium (a condition favoring E2P), but not in 125 mM Na<sup>++</sup> o at -90 mV (which favors E1P(3Na<sup>+</sup>). Similar effects were observed in Y133C/R981C. Thus, D130 and Y133 in the rigid helical part of TM2 approach R981 in E2 and separate in E1, while residues in the flexible L1-2 interact with R981 in E1. Voltage-clamp fluorometry analysis of TM1-TM2 single-cysteine mutants is underway.

### GS1-2 ZAHRA, FATEMA TUZ

Role of endothelial small GTPase RhoA in embryo development and retinal angiogenesis

Zahra F.T. 1, Sajib M.S. 1, Ichiyama Y. 3, Tullar P2., Kubota Y. 3, Mikelis C.M. 1

Angiogenesis, the formation of new blood vessels, is a highly orchestrated process requiring a well-regulated balance between pro-angiogenic and anti-angiogenic factors and corresponding signaling networks. Imbalanced angiogenesis is a characteristic of several diseases such as cancer, inflammation, rheumatoid arthritis, osteoarthritis and age-related macular degeneration. The Rho family of small GTPases play a central role in a variety of cellular processes involving cytoskeletal rearrangement, cell move-ment, microtubule dynamics, signal transduction, gene expression which are necessary for vascular development and angiogenesis. Among the small GTPases of Rho family, RhoA, Rac1 and Cdc42 are the best characterized. Although the role of endothelial Rac1 and Cdc42 in embryonic vascular development and retinal angiogenesis has been studied recently, the role of endothelial RhoA is yet to be explored. In this study, we aim to identify the role of endothelial RhoA in vascular development in vivo by generating endothelial RhoA deficiency through the Tie2-Cre and Cdh5-CreERT2 promoters. In vivo deletion of RhoA in embryonic endothelial cells leads to decreased survival of endothelial RhoA deficient mice. On the other hand, inducible RhoA deficiency in the retinal vessels in different developmental days did not affect the radial growth, the number of filopodia per area and the area with deep vascular plexus. In vitro, RhoA seems to be involved in endothelial cell migration, invasion and sprouting triggered by important angiogenesis inducers, such as Vascular Endothelial Growth Factor (VEGF) and Sphingosine-1 Phosphate (S1P). These ongoing experiments aim to provide a better understanding of the numerous functions regulated by the endothelial small GTPase RhoA in normal physiology and human diseases.

School: Graduate School of Biomedical Sciences Campus: Amarillo

### GRADUATE STUDENTS 3+ YEARS

### GS3+ BEASLEY, KELLSIE

During Bacteremia, Pseudomonas aeruginosa Adapts by Altering the Expression of Numerous Virulence Genes

Kellsie Beasley, Jane Colmer-Hamood, and Abdul Hamood

Pseudomonas aeruginosa is a Gram-negative opportunistic pathogen that causes serious infections in immunocompromised hosts including severely burned patients. After multiplying within the burn wound, P. aeruginosa translocate into the bloodstream causing sepsis and septic shock. While previous studies analyzed the influence of infection sites on P. aeruginosa virulence, little is known regarding the effect of blood during systemic infection. We hypothesize that human blood significantly alters the expression of P. aeruginosa genes. To address this, we used RNA-seq analysis to compare the global expression of the P. aeruginosa strain PAO1 that was grown to an early logarithmic phase in either a laboratory medium (Luria Bertani broth, LB) or whole blood from healthy volunteers. Compared with LB broth, the growth of PAO1 in whole blood significantly (q < 0.05) altered the expression of 769 genes. Among the genes whose expression was significantly reduced are the quorum sensing (QS) genes, including the phenazine operons that encode the virulence factor pyocyanin. These results showed on average a 218-fold significant decrease in the expression of the phenazine biosynthesis genes in the presence of blood. We confirmed these results using qRT-PCR. To determine if the effect resides within the serum fraction, we grew PAO1 to a late stationary phase in LB broth or LB containing 10% commerciallyavailable pooled adult human serum. Samples were collected every 2 h and the level of expression of selected genes was determined using qRT-PCR. At early log phase, serum significantly repressed the expression of different QS genes, including the phenazine operons. However, at late logarithmic and early stationary phases, serum significantly enhanced the expression of these genes. These results suggest that during sepsis, and depending on the stage of growth, serum differentially influences the expression of different P. aeruginosa virulence and virulence-related genes.

### GS3+ BOUNDS, KAYLA

The novel antimicrobial agent Next Science influences the wound healing process.

Kayla Bounds1, Jane Colmer-Hamood34, Matthew Myntti2, and Abdul Hamood45

Chronic wounds, which include pressure ulcers and diabetic foot ulcers, affect approximately 6.5 million persons with a high annual cost for treatment. We recently showed that Next Science (NS) wound gel, a novel antimicrobial agent, inhibits bacterial infection of chronic wounds. NS may also promote wound healing by influencing the host immune response. Using the murine model of wound infection, we examined the influence of NS on wound healing. Full-thickness wounds were generated and covered with sterile gauze (untreated wound, UTW), gauze coated with polyethylene glycol base (PEG-treated wound, PTW), or gauze coated with NS gel (NS-treated wound, NSTW). The wound bed and margins were excised at 1, 3, and 7 days post-wounding. Formalin-fixed tissues were processed and sectioned at 5.0  $\hat{l}$ /4m. The sections were stained with H&E for general histological observations. On day 1 post-injury, a neutrophilic infiltrate (PMNs) was present throughout the wound beds in all three treatment groups with a larger number of PMNs observed in the PTW and NSTW. By day 3, reepithelialization had begun at the margins of all three treatment groups. The UTW had a thin sanguineous crust with few PMNs visible except directly under the crust. Both the PTW and NSTW had much thicker sanguineous crusts with many more PMNs present under the crusts and at the wound margins; neovascularization was present in the wound beds. On day 7, reepithelialization had advanced in all three wounds and granulation tissue was present. Neovascularization was now present in the UTW, while healed tissue in the PTW and NSTW showed regeneration of hair follicles. A mononuclear infiltrate was move evident in the NSTW along with evidence of scar formation (fibrosis). These results suggest that keeping the wound moist (PTW and NSTW) appears to accelerate healing while the treatment with NS furthered the healing process.

School: Texas Tech University Campus: Lubbock

### GS3+ BUI, ANTHONY

Linkage of Domain Stability and Ligand Binding at the AD3 locus of Synaptotagmin I Domains

Anthony A. Bui, Faraz M. Harsini, Anne Rice, Souvic Karmakar, Kerry Fuson, R. Bryan Sutton

Synaptotagmin 1 (Syt1) is a member of a family of proteins that play a critical role in facilitating Ca2+-mediated vesicle fusion in neurotransmitter release. They are comprised of two tandem C2 domains, C2A and C2B, which are tethered to the membrane by a single transmembrane helix. Generally, the C2 domain motif is found in a broad range of proteins that bridge protein-membrane interactions. A single point mutation in a highly conserved locus of mostC2 domains of Syt1 has the ability to cripple Ca2+-mediated vesicle fusion, despite the proteinâ€<sup>TM</sup>s ability to fold correctly and target the membrane. Through the use of X-ray crystallography, ITC, and guanidine CD denaturation, we aim to elucidate the importance of the AD3 locus.

School: Texas Tech University Campus: Lubbock

### GS3+ ELIZONDO, RICCAY

In depth investigation of tumor immunity elicited by D52 vaccination

C. Riccay Elizondo, Jennifer D. Bright, and Robert K. Bright

Cancer immunotherapy is emerging as a powerful treatment tool. The next generation approach is led by vaccination against overexpressed tumor self-antigens in preclinical studies. Regulatory CD4+ T cells suppress tumor immunity to this class of antigen, and CD8+ T cell subsets may dampen complete immune protection. Investigations on the role of distinct subsets of CD8+ T cells in tumor immunity must be better expanded to improve cancer vaccine development and immunity to overexpressed, oncogenic, tumor-self antigens like tumor protein D52 (D52). We tested the hypothesis that divergent populations of CD8+ T cells elicited by D52 vaccination impact tumor immunity. To accomplish this, we immunized wild type (wt) C57BL/6J and interleukin-10 (IL-10) deficient with murine D52-DNA for four injections prior to tumor challenge. Tumor growth was determined in all groups by perpendicular measurements (axb2)/2, where b is the smaller of the two measurements. Individual mice that rejected the tumor challenge were challenged a second time 100 days post primary challenge to access vaccine durability against tumor recurrence. Interestingly, IL-10 deficient mice were 100% protected from secondary tumor challenge, indicating greater memory response compared to wt mice that had dampened recall against tumor recurrence. T cells from individual mice were analyzed by multiplex RT-PCR for cytokine transcripts. In a separate experiment, wt mice were immunized with and without antibiotic induced dysbiosis. Antibiotic induced dysbiosis altered tumor immunity. DNA from fecal samples from dysbiotic induced mice was isolated and analyzed for microbial content and compared to control mice. Treatment of antibiotics alone, vaccine alone, or both altered the makeup of the gut microbiome. Given these results, more investigation into the immune response elicited by D52 vaccination is required.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS3+ ELMASSRY, MOAMEN

Malonate-utilization operon contributes to the virulence of Pseudomonas aeruginosa

MoamenElmassry1,JaneColmer-Hamood2,3,MichaelSanFrancisco1,4,JohnGriswold5,SharmilaDissanaike5,andAbdulHamood2,5 1Department of Biological Sciences, TTU, Lubbock, TX; 2Department of Immunology and Molecular Microbiology, TTUHSC, Lubbock, TX; 3Department of Medical Education, TTUHSC; 4Honors College, TTU; 5Department of Surgery, TTUHSC

In the United States, more than 1 million individuals with severe sepsis are hospitalized annually. Trauma patients are susceptible to sepsis. The opportunistic pathogen Pseudomonas aeruginosa is a leading cause of trauma-related sepsis. P. aeruginosa produces numerous virulence factors. The organism regulates the production of these virulence factors through the cell-to-cell communication system, the quorum sensing (QS) system. Despite numerous studies, the pathogenesis of P. aeruginosa infection during trauma-induced sepsis is not defined. We recently showed that the growth of the P. aeruginosa strain UCBPP-PA14 (PA14) in blood from trauma patients significantly enhanced the expression of the malonate-utilization operon (MUO), compared with the growth of PA14 in blood from healthy volunteers. We hypothesized that the MUO contributes to P. aeruginosa virulence since malonate is important in the fatty acid metabolism and energy production. We compared the effect of growth of PA14 in M9, a minimal medium, containing either glycerol (GM9) or malonate (MM9), as a sole carbon source, on the expression/production of virulence factors. Compared with GM9, the growth of PA14 in MM9 significantly enhanced pyocyanin production and the expression of the phenazine operon. In contrast, the growth in MM9 significantly reduced pyoverdine production, the QS autoinducers (C12, C4, and PQS), as well as, LasA. Upon the growth of PA14 in MM9, and in contrast to its diffuse growth in GM9, PA14 formed aggregates of variable sizes. Scanning electron microscopy analysis of these aggregates revealed the formation of structures that resemble the biofilm-related extracellular polymeric substance (EPS). Since the main component of EPS is DNA, and to confirm the nature of this EPS-like material, we treated the aggregates with DNase, which promptly dissolved the aggregates. From these results we suggest that the utilization of malonate through the MUO uniquely contributes to PA14 virulence.

School: Texas Tech University Campus: Lubbock

### GS3+ FLEMING, DEREK

Glycoside Hydrolases Degrade Polymicrobial Biofilms in Chronic Wounds

Derek Fleming and Kendra Rumbaugh

The persistent nature of chronic wounds leaves them highly susceptible to invasion by a variety of pathogens that have the ability to construct an Extracellular Polymeric Substance (EPS). This EPS makes the bacterial population, or biofilm, up to one-thousand percent more antibiotic tolerant than planktonic cells, and makes wound healing extremely difficult. Thus, chemicals which have the ability to degrade the EPS of mono- and poly-species biofilms are highly sought-after for clinical applications. In this study, we examined the efficacy of two glycoside hydrolases (GHs), α-amylase and cellulase, which break down polysaccharides by hydrolyzing straight-chain glycosidic linkages, to eradicate Staphylococcus aureus (SA), Pseudomonas aeruginosa (PA), and SA+PA co-culture biofilms in clinically relevant in vitro and in vivo models. We hypothesized that GH therapy will significantly reduce EPS biomass, converting bacteria to their planktonic state and leaving them more susceptible to antibiotics. Treatment of SA, PA, and SA+PA in vitro, ex vivo, and in vivo biofilms with GHs resulted in significant reductions in biomass, and the dispersal of biofilm-dwelling bacteria, allowing for an increase in the effectiveness of antibiotic treatments. We also demonstrated that large-scale in vivo dispersal of motile biofilm bacterial can cause lethal septicemia in the absence of adjunctive antibiotic therapy. Lastly, we showed that GH therapy is deferentially effective against the biofilms of clinical, chronic wound debridement samples with varying bacterial loads. Current studies are focused on optimizing the application of GH therapy in vivo, examining the therapeutic efficacy against clinical strains and polymicrobial biofilms involving additional species, and evaluating the host response to GH-treated biofilms over time.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS3+ HARSINI, FARAZ

The Molecular Mechanism and Structural Analysis of Membrane Interaction via C2 domains in Ferlins Associated with Muscular Dystrophy and Cancer.

Faraz M. Harsini, Anthony A. Bui, Anne M. Rice, Sukanya Chebrolu1, Kerry L. Fuson, Andrei Turtoi, Edwin R. Chapman, and R. Bryan Sutton

Ferlins are a family of proteins involved in a variety of biological processes such as exocytosis, membrane repair mechanism, and other membrane fusion events.

Dysferlin and Myoferlin are two members of human Ferlins with the highest similarity. Dysferlin is involved in membrane repair mechanism, and lack of functional Dysferlin can cause two types of Muscular Dystrophy.

Although the role of myoferlin in membrane interaction has been proven, its main function is not well understood. It has been shown however that myoferlin is overexpressed in several types of cancer including Triple-Negative Breast Cancer (TNBC) and TNBC patients with overexpressed myoferlin show a worse overall survival.

Dysferlin and Myoferlin employ seven C2 domains to interact with the membrane in a Ca2+ dependent manner. C2A domain is believed to function as the main Ca2+ senser in Dysferlin and Myoferlin, playing an essential and indispensable role in their function. In this study, we solved the structure of Ca2+ bound Myoferlin C2A using X-ray crystallography and compared that to Dysferlin C2A structure which we previously solved. We also determined their specificities for Ca2+ and different lipid compositions. Finally, we identified residues that are critical in membrane interaction via these domains. Outcome of these experiments allowed us to develop a model for the membrane interaction via C2A domains of Dysferlin and Myoferlin. This will further advance our understanding of the molecular mechanism and function of these proteins and their relevance to human diseases.

### GS3+ IYER, LAXMI

Tannic Acid Downregulates Angiotensin Type 1 Receptor in Aortic Smooth Muscle Cells Through EGFR Dependent Phosphoinositide 3-kinase Pathway

Laxmi Iyer, Yong Zhang and Thomas Thekkumkara. Department of Biomedical Sciences

In this study, we aimed to investigate the role of tannic acid (TA), a hydrolysable polyphenol, on the angiotensin type 1 receptor (AT1R) a major hypertension target and its associated signaling pathways in primary rat aortic smooth muscle cells (ASMCs). In the presence of TA (10 1<sup>1</sup>/<sub>4</sub>g/ml for 20 h), cells exhibited down-regulation of AT1R specific [3H] angiotensin II (AngII) binding compared to untreated control (3628.32,  $\pm 289.42$  vs. 7244.66 i,  $\pm 40.26$  DPM/mg protein). TA mediated AT1R receptor downregulation in a dose dependent and a time-dependent manner, and was reversible. The reduction in AngII binding in TA-treated cells was due to decreased receptor density rather than a change in receptor affinity (Kd 1.302ï,±0.152nM TA treated vs. Kd 1.391ï,±0.048 nM untreated). Consistent with downregulation of AngII binding, AT1R mRNA was inhibited upon TA treatment. TA mediated AT1R downregulation was associated with phosphorylation of extracellular signal regulated kinases (ERKs) p42/44. Pretreatment with MEK inhibitor PD98059 blocked TA induced ERKs p42/44 phosphorylation and AT1R downregulation. Moreover, AG1478, an EGFR specific inhibitor, blocked TA mediated ERKs activation and down-regulation of AT1R. Under similar conditions, treating cells with EGF alone mediated ERKs activation and AT1R downregulation independent of TA. LY294002, an inhibitor of phosphoinositide 3-kinase (PI3K), inhibited TA and EGF mediated EGFR induced ERKs phosphorylation and reversed AT1R downregulation suggesting that TA mediated AT1R downregulation is through EGFR induced PI3K dependent ERK p42/44 pathway. Consistent with the receptor downregulation, quantitative calcium analysis revealed significant inhibition of AngII induced intracellular calcium release in TA treated cells, which was reversed with either MEK or EGFR inhibitor. Collectively, our study demonstrates for the first time that TA induced EGFR, PI3K - ERK p42/44 signaling axis is essential for downregulation of AT1R expression in ASMCs

School: Graduate School of Biomedical Sciences Campus: Amarillo

### GS3+ JARVIS, COURTNEY

#### Understanding and Overcoming Taxane Resistance in Metastatic Castration Refractory Prostate Cancer

Courtney Jarvis, Kameswara Rao Kottapalli, Ph.D, Thomas Nelius MD PhD, Stephanie Filleur PhD

Acquisition of chemotherapy resistance is a devastating and widespread phenomenon in Castration Refractory metastatic Prostate Cancer (mCRPC). Despite the recent approval of several new drugs, taxanes remains the main chemotherapeutic agents with survival benefits for mCRPC patients even as resistance emerges. Thus, a deeper understanding of taxanes' modes of action and resistance mechanisms is urgently needed. In this study, we compared the two taxane drugs docetaxel (Doc)and cabazitaxel (Cbz). Using CRPC cell lines we demonstrated that Cbz inhibits cell proliferation with a higher sensitivity compared to Doc in vitro. As expected, high-doses of taxanes blocked the cells in mitosis. Surprisingly, low-doses of Cbz induced more cell death than Doc mainly through apoptosis. In vivo, at 5mg/kg, Cbz was significantly more efficient in delaying tumor growth than Doc and this effect was increased when combined with Pigment Epithelium-Derived Factor. To explore Cbz resistance (CbzR), we have recently created an in vitro model of acquired resistance. As comparison, Doc resistant (DocR) and age-matched paired cells were also developed. We have validated DocR/CabR and demonstrated that CabR cells acquired an elongated morphology suggesting an Epithelial-Mesenchymal Transition. Using RNA-Seq to identify genes and signaling associated with taxane resistance, the non-canonical Wht b-catenin pathway was found exclusively activated in CbzR cells. Most importantly, we have showed that the Tyrosine Kinase Receptor Ror2, effector of the Wnt non-canonical pathway, was up-regulated in CabR cells. As a comparison, DocR cells showed upregulation in the canonical Wnt Î<sup>2</sup>-catenin pathway. Furthermore, inhibiting the Planar Cell Polarity and the Wnt Ca2+ pathway, both components of the non-canonical Wnt pathway regulated via ROR2, re-sensitized the CbzR cells to Cbz treatment. In future studies, gain/loss of function assays will be used to further determine ROR2 involvement in CbzR.

### GS3+ KONERU, BALAKRISHNA

Alternate telomere lengthening (ALT) neuroblastoma is a highly aggressive subgroup for which ATM kinase provides a novel therapeutic target.

Balakrishna Koneru, Gonzalo Lopez, Thinh Nguyen, Wan Hsi. Chen, Shawn J. Macha, Ahsan Farooqi, Ashly Hindle, Heather Davidson, Kristyn Mccoy, Shengping Yang, John M. Maris, C. Patrick Reynolds

Telomere maintenance is required for cancer growth and telomerase+ tumors express TERT mRNA. A non-telomerase mechanism, ALT is used by some cancers. Of 110 high-risk neuroblastoma primary tumors 25/110 were ALT+ had low TERT mRNA expression and were positive for ALT-specific telomeric DNA C-circles; 55/110 (50%) had high TERT expression, and 30/110 (27%) were low-TERT, C-circle-negative. Overall survival (10 years) was 23.5% for TERT-high C-circle negative tumors, 24.6% for ALT tumors, and 72.9% for C-circle-negative TERT-low tumors. Of 104 human neuroblastoma cell lines and 37 patent-derived xenografts (PDX) we identified 5 ALT cell lines and 4 ALT PDXs. ALT neuroblastoma cell lines had a significantly higher mean IC90 (P&It;0.001) for topoisomerase inhibitors relative to 79 comparator neuroblastoma cell lines. We observed numerous baseline DNA damage foci (>75% co-localized to telomeres) in the nuclei of ALT NB cells. We assessed activation of ATM/ATR kinases (involved in DNA damage signaling at telomeres) and observed a marked increase in phosphorylation of ATM in ALT but not in TERT+ NB cell lines. Transducing dominant-negative TRF2 (a shelterin protein that blocks ATM at telomeres) into 2 TERT+ p53 non-functional NB cell lines activated ATM at telomeres and induced high resistance to topoisomerase inhibitors. ATM inhibition using shRNA or the ATM inhibitor AZD0156 in ALT NB cell lines reduced C-circle content in vitro (p&lt:0.05) and in vivo (p&lt:0.05) and sensitized ALT NB cells to topoisomerase inhibitors (p<0.01). AZD0156 enhanced cytotoxicity of temozolomide+irinotecan, in ALT cell lines in vitro and in 4 neuroblastoma xenograft models in vivo, with most mice in complete response at 100 to 150 days compared to earlier progression in mice treated with only temozlomide+irinotecan (p<0.0001). Thus, ALT defines a distinct subset of high-risk neuroblastomas with de novo resistance to chemotherapy that can be reversed with AZD0156.

School: Graduate School of Biomedical Sciences Campus: Lubbock

### GS3+ LEE, YOONJUNG

Anticonvulsant effects of physical activity in a mouse chronic corneal kindling model

YoonJung Lee, Younghee Kwon, Alejandra Fernandez, James Stoll

New approaches are essential to mitigate drug-resistant seizures. Physical activity increased the resistance to pilocarpine-induced status epilepticus and increased the seizure (SZ) threshold in the 6 Hz model. A limitation of this study was that nonepileptic mice were used. Thus, we tested whether voluntary running reduced seizure frequency, severity, and duration in chronic corneal kindling, a model for human partial epilepsy. In kindling, mice receive twice daily subthreshold electrical stimuli for 21 days, which reduces the SZ threshold and elicits seizure after electrical stimulation. In the first experiment, we fully kindled the mice, then tested to measure the SZ threshold after 21 days of exercise using a crossover design where half of the mice had exercise wheels and the remaining mice were without exercise wheels in the first round, then were switched over repetitively in each corresponding round. In a fourth round, groups were switched again and measured after 10 days of exercise to test how quickly the exercise effect appears. In a second experiment, we repeated the first experiment to confirm the previous finding in fully kindled mice and added a third group to assess whether physical activity affected kindling. In both the first and second experiments, in each round, mice with wheels had a significantly increased SZ threshold (fewer SZ occurrences, severity, and duration) compared to sedentary mice, demonstrating that this is a robust effect. SZ resistance develops between the 10 days and 21 days that the SZ threshold became stable after 21 days of exercise. Mice that stop exercising lose beneficial effects, indicating that the effect of physical activity is reversible. In the second experiment, mice with wheels during kindling showed delayed kindling and an increased SZ threshold compared to kindled mice. These results show that physical activity increases the SZ threshold. Future studies will be directed to identify the mechanism(s) involved.
# GS3+ MEYER, DYLAN

*Na/K* pump  $\hat{I}\pm 1$ -subunit mutations contribute to Conn $\hat{a}\in \mathsf{TM}_S$  syndrome development by loss-of-function

#### Dylan J. Meyer, Craig Gatto, and Pablo Artigas

Primary aldosteronism, or Conn's syndrome, is often caused by an aldosterone-producing adenoma in the adrenal cortex which autonomously produces and secretes aldosterone in the absence of normal physiological triggers. Sequencing of aldosterone-producing adenoma genomes has identified somatic mutations to ATP1A1, which encodes the Na/K pump  $\hat{I}\pm 1$ -subunit. It was proposed that these Na/K pump mutants drive inappropriate aldosterone production from the adenoma by abnormal "gain-of-functionâ€ inward currents which depolarize the cellâ€<sup>™</sup>s resting membrane voltage and elevate Ca2+ signaling. Here we sought to determine whether inward currents through the primary aldosteronism-associated Na/K pump mutants L104R, V332G, delF100-L104, and EETA963S are large enough to induce cell depolarization of the cells that harbor them. By combining two-electrode voltage clamp with [3H]ouabain binding, we compared the turnover rates of inward currents through each human mutant pump to the turnover rate of outward current by human wild-type pumps. The turnover rates of the inward currents at -50 mV were (s-1) 22.8  $\hat{A}$  ± 1.9 for L104R, 63.4 Å $\pm$  6.2 for V332G, 522 Å $\pm$  120 for delF100-L104, and 19.7 Å $\pm$  1.5 for EETA963S, while the wild-type pumpâ $\in$ TMs turnover rate of outward current was 32.0 Å $\pm$  1.5. Thus, the  $\hat{a}\in \hat{\alpha}$  leak  $\hat{a}\in \hat{\alpha}$  currents through EETA963S and L104R are likely too small to induce significant cell depolarization. Additionally, inward currents were absent from G99R under many tested conditions, including at mammalian ion concentrations and body temperatures, and when co-expressed with FXYD1. Instead, outward currents were observed, but with significantly increased K0.5 $\hat{a}\in$ <sup>TM</sup>s for intracellular Na+ (13.4 ű 1.2 mM for wild-type and 32.5 ű 3.7 mM for G99R, at 0 mV) and extracellular K+ (1.1  $\hat{A} \pm 0.1$  mM for wild-type and 4.6  $\hat{A} \pm 0.2$  mM for G99R, at 0 mV). Taken together, our results point to "loss-of-function†as the common mechanism for the contribution of these Na/K pump mutants to Conn's syndrome.

School: Graduate School of Biomedical Sciences Campus: Lubbock

## GS3+ MUELLER, KARL

#### The Response of Endothelial Cells to Engineered Sertoli Cell Products in a High Glucose Diabetic Model

Karl Mueller, Jannette Dufour

Diabetes is a major health issue effecting millions of Americans with high morbidity and mortality. Current treatment includes insulin replacement therapy; however, physiologically in the human body insulin is secreted in equimolar amounts with C-peptide. Recently C-peptide has been shown to have beneficial effects in high glucose environments including those associated with diabetes. Gene therapy is a viable solution to deliver both insulin and C-peptide but has many potential dangers if when administered directly to patients. Cell based gene therapy is a suitable option; however, immunologic rejection must be overcome. Sertoli cells possess properties that allow them to survive immunologic rejection including transplantation across immune barriers such as allogeneic and xenogeneic grafts. Our lab has generated immune privileged Sertoli cells that secrete insulin and C-peptide. Our hypothesis is that these engineered cells will produce a media that contains insulin and c-peptide as well as Sertoli cell immunomodulatory factors that will benefit endothelial health in vitro. To test this hypothesis we performed a dose response curve looking at the expression of important endothelial cell genes in response to physiological concentrations of C-peptide, with media from the engineered cells, C-peptide, and Sertoli cells media alone. A time response curve with the media from the engineered cells, C-peptide, and Sertoli cell media alone was also performed. Our data suggests that engineered Sertoli cells have beneficial effects on endothelial cells in vitro, and may be superior to insulin protein replace therapy alone.

# GS3+ NGUYEN, THINH

Fenretinide (4-HPR), via NOXA induction, enhanced activity of the BCL-2 inhibitor ABT-199 in high BCL-2-expressing neuroblastoma PDX models

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Despite intensive treatment, many patients with high-risk neuroblastoma still die of the disease. The anti-apoptotic proteins protect cancer cells from apoptosis, with neuroblastoma mainly depending on MCL-1 and BCL-2 for survival. Fenretinide, a synthetic retinoid, has shown multiple complete responses in phase 1 neuroblastoma clinical trial. ABT-199 is a specific BCL-2 inhibitor with an FDA approved indication for CLL with 17p deletion. 4-HPR+ABT-199 showed stronger synergism in ABT-199-sensitive versus ABT-199 -resistant cell lines. ABT-199-sensitive cell lines express higher BCL-2 protein compared to ABT-199-resistant cell lines, suggesting that BCL-2 is a marker of ABT-199 and 4-HPR+ABT-199 response in neuroblastoma. 4-HPR+ABT-199+ketoconazole (a CYP3A4 inhibitor used to increase 4-HPR plasma concentration) significantly improved the event-free survival of mice relative to single agents in a high BCL-2-expressing patient-derived xenograft (PDX) but not in a low BCL-2-expressing PDX. In matched-pair cell lines (established at diagnosis (DX) and relapse (PD) from 10 patients), we observed that the BCL-2 expression in DX line was consistent with that of the PD model from the same patient. Our data suggest that BCL-2 expression at diagnosis and relapse are consistent and may provide a biomarker for neuroblastoma tumors likely to respond to 4-HPR+ABT-199. In a pair of PDX models established at DX and PD from the same patient, the PD PDX was resistant to cyclophosphamide+topotecan compared to the DX PDX, but both DX and PD PDXs were responsive to 4-HPR+ABT-199+ketoconazole. 4-HPR induced NOXA (a pro-apoptotic protein that inhibits MCL-1) expression in multiple neuroblastoma cell lines. NOXA knock-down abolished the synergy of 4-HPR+ABT-199 while overexpressing NOXA enhanced ABT-199-single-agent activity. Thus, 4-HPR enhanced ABT-199 activity via induction of NOXA, and the combination is highly active against high BCL-2 expressing neuroblastoma PDX models.

School: Graduate School of Biomedical Sciences Campus: Lubbock

## GS3+ PAGE, SHYANNE

Determining the effect of the WNT/Î<sup>2</sup>-catenin pathway on the ischemic blood-brain barrier using induced pluripotent stem cells

Shyanne Page, Mikaelan Cucciarre-Stulligross, Sarah Faress, Abraham Al-Ahmad

The blood-brain barrier (BBB) is a selectively permeable barrier made up of tight junctions formed by endothelial cells that separates the circulating blood from the brain extracellular fluid. The primary function of this barrier is to keep toxins, bacteria, viruses, and drugs from entering the brain. In the event of an ischemic stroke, the BBB becomes leaky due to the activation of hypoxia inducible factor 1-alpha (HIF1- $\hat{I}\pm$ ) and neurons become apoptotic. It is known that activation of the WNT pathway results in the production of B-catenin, which has been shown to enhance HIF1- $\hat{I}\pm$  mediated transcription, which promotes the survival of cells and their adaptation to hypoxia. Currently, there are no drugs that have been formulated to restore the BBB function as well as neuron survival following ischemic stress. The purpose of our study was to determine the effect of small molecules on the BBB/WNT pathway during ischemia/re-oxygenation. Brain microvascular endothelial cells (BMECs) derived from iPSCs and the immortalized human brain endothelial cell line, HCMEC/D3, were cultured and placed in ischemic stress for 6hrs, followed by a 24 hour period of re-oxygenation. At the time of re-oxygenation, cells were treated with small molecules CHIR99021, TWS (WNT activators), IWP-4, IWR, and XAV (WNT inhibitors) in order to determine the effect of the WNT pathway on cell survival. Transendothelial Electrical Resistance (TEER) and permeability were performed to assess the effect that the WNT pathway has barrier integrity following re-oxygenation. Further, MTT and ICC were performed to determine cell viability and tight junction expression, respectively. Preliminary results of this study have shown that inhibition of the WNT pathway during re-oxygenation results in upregulation of tight junction proteins and an increase in cell viability.

School: Graduate School of Biomedical Sciences Campus: Amarillo

# GS3+ PEDROZA, DIEGO

AG-205 disrupts PGRMC1 dependent cell proliferation by altering EGFR

Diego A Pedroza, Ramadevi Subramani, Adriana Galvez, Animesh Chatterjee, Rajkumar Lakshmanaswamy

Introduction: Increased expression of the Progesterone  $\hat{a} \in \mathbb{C}^{*}$  receptor membrane component 1 (PGRMC1), a heme  $\hat{a} \in \mathbb{C}^{*}$  binding protein with the ability to interact and stabilize epidermal growth factor receptor (EGFR) is frequently found in breast cancer tissue. Although Progesterone (P4) has been shown to stimulate and regulate cancer proliferation via PGRMC1, the basis of the signaling mechanisms on which P4/PGRMC1 exerts its function remains largely unknown. We, aim to investigate the potential of targeting PGRMC1 with a small molecule inhibitor in breast cancer cell lines to identify classical and non  $\hat{a} \in \mathbb{C}^{*}$  classical endocrine signaling mechanisms that can alter cell proliferation.

Materials and Methods: A panel of breast and breast cancer cell lines were cultured and screened for PGRMC1 expression and subsequently treated with P4 at different concentrations. These cells were also treated with AG-205 (a small molecule inhibitor of PGRMC1). MTS assay for cellular proliferation, qRT-PCR for gene expression, Western blot for protein expression and in silico analysis were performed.

Results: Increased PGRMC1 expression was observed in ZR-75-1 and MDA-MB-468 cells by both qRT-PCR gene expression and western blot, these results were validated and compared to microarray-based gene expression analysis of cell lines and breast tumor data sets. P4 treatment increased cell proliferation in a time and dose dependent manner while AG-205 decreased cell proliferation in a dose dependent manner while AG-205 decreased cell proliferation in a dose dependent manner while AG-205 decreased cell proliferation in a dose dependent manner while AG-205 decreased cell proliferation in a dose dependent manner while AG-205 decreased cell proliferation in a dose dependent manner while AG-205 decreased cell proliferation of P4 increased both mRNA relative PGRMC1 expression and protein expression; these results were in tandem with increased expression of the P4 receptor (PR). Interestingly treatment of AG-205 alters EGFR expression in a dose dependent manner.

Conclusion: Our data demonstrates that PGRMC1 plays a prominent role in regulating cell proliferation through the interaction of EGFR in both ER+ breast cancer and HR- metastatic breast cancer cells.

School: Graduate School of Biomedical Sciences Campus: El Paso

# GS3+ RISTIC, BOJANA

Downregulation of ABCG2 expression in colitis and colon cancer: Relevance to iron overload, hemochromatosis and p53, and therapeutic use of carbidopa to reverse the downregulation

B. Ristic, S. Sivaprakasam, V. Ganapathy

The efflux pump ABCG2 is a part of cellular defense and it effluxes dysplasia-promoting agents. Since cancer cells exposed to chemotherapeutics overexpress ABCG2 to remove these drugs, ABCG2 is considered a multidrug-resistance protein. However, its physiologic protective role in cancer initiation/progression has not received much attention. In numerous studies, ABCG2 is present in colon at lower levels in patients with colitis and chemotherapy-na $\tilde{A}$  ve colon cancer than in controls. We therefore hypothesized that the physiologic role of ABCG2 is to suppress colonic inflammation and colon cancer. To test this, we monitored ABCG2 levels in colon in experimental and genetic mouse models of colon cancer and colitis. Hfe^-/- mice were used as a model for hemochromatosis, a genetic iron-overload disease, to study the relationship between ABCG2 and known tumor promoter, iron. We exploited the ability of ABCG2 to export uric acid as a measure of its function. In vitro studies consisted of treatment of normal and colon cancer cells with ferric ammonium citrate (FAC) as in vitro iron-overload model, and Carbidopa, a drug identified as an aryl hydrocarbon receptor agonist. Compared to control colon, ABCG2 was present at lower levels in colonic polyps and colons from colitis model; the same trend was seen in colonic normal and cancer cells. Colons from Hfe^-/- mice had lower expression of ABCG2 and higher accumulation of uric acid, indicating that excess iron dictates ABCG2 levels in colon. Cells treated with FAC showed nuclear depletion of the tumor suppressor p53, and a decrease in ABCG2 expression. ABCG2 mRNA was undetectable in p53-null mouse embryonic fibroblasts, suggesting that ABCG2 is a p53 target. Furthermore, Carbidopa induced ABCG2 expression. In summary, ABCG2 is silenced in colon cancer and colitis, and might be dictated by the decreased amount of p53. Carbidopa could be used to reverse downregulation of ABCG2 as a prevention/treatment strategy for colon cancer.

# GS3+ SAJIB, MD SANAULLAH

#### Tumor cells activate small GTPase RhoA in endothelial cells to facilitate transendothelial migration during cancer metastasis

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Metastasis is the process through which tumor cells disseminate from the primary tumor and colonize in distant parts of the body. Two of the steps in the metastatic process are the trans-migration of cancer cells through the endothelial lining of blood and lymphatic vessels, during entrance (intravasation) and exit (extravasation) from the vascular system. We and others have shown that the endothelial RhoA pathway plays important role on endothelial permeability. Translating these findings in the metastasis context, we aim to explore the role of endothelial RhoA signaling pathway on cancer cell trans-endothelial migration and metastasis. Here we show that cancer cells activate endothelial RhoA by both cell-cell contact and paracrine signaling. To identify the role of this pathway in vitro, we have used a quantifiable, transwell-based, two-cell co-culture model of trans-endothelial migration, where GFP- or RFP-expressing cancer cells transmigrate through an endothelial monolayer. Pharmacological and molecular biology approaches were incorporated to dissect the role of endothelial RhoA signaling pathway in primary and immortalized endothelial cells from mouse and human origin. In all cases, blockade of the endothelial RhoA pathway inhibited cancer cell trans-endothelial migration. To pinpoint the role of endothelial RhoA on cancer cell trans-endothelial migration in vivo, endothelial specific RhoA deficient mice have been incorporated. Inoculation of B16 melanoma cells by both intracardiac and intravenous routes, resulted in significantly decreased metastatic nodules in the lungs of the endothelial RhoA deficient animals when compared to littermate controls. Furthermore, treatment with a clinically relevant molecular inhibitor of the RhoA pathway decreased metastatic colonization in experimental metastasis models. The above findings demonstrate that the endothelial RhoA pathway seems to have a pivotal role on cancer cell trans-endothelial migration and metastasis.

School: Graduate School of Biomedical Sciences Campus: Amarillo

# GS3+ SIKDER, MOHD OMAR FARUK

# Amino Acid Transporter SLC6A14: A Novel Drug Target for Colorectal Cancer & Colitis and Its Transcriptional Regulation by TCF4/Î<sup>2</sup>-catenin Pathway

Mohd Omar Faruk Sikder, Sathish Sivaprakasam, Vadivel Ganapathy

SLC6A14 is a Na+/Cl- -dependent amino acid transporter capable of transporting 18 of the 20. It is expressed at basal levels in normal colon but significantly upregulated in colorectal cancer (CRC) and colitis. However, the relevance of upregulation to disease progression and the mechanisms involved in the upregulation remain unknown. We postulated that deletion of SLC6A14 or pharmacological blockade of its function may suppress CRC and colitis. Since TCF4/β-catenin/Wnt signaling is activated in CRC, we postulated that TCF4/ $\beta$ -catenin might control the expression of SLC6A14. We tested these hypotheses in the present study. CRC cells treated in vitro with  $\alpha$ -methyl tryptophan, a selective blocker of SLC6A14, showed evidence of amino acid deprivation, decreased mTOR activity, and increased autophagy and apoptosis. In nude mouse xenografts with LS174T cells (a CRC cell line), silencing of SLC6A14 by shRNA markedly reduced tumor growth. Accordingly, Slc6a14-/- mice showed reduced tumor incident and tumor size compared to the wild type mice in AOM/DSS-induced colon cancer mouse model. Furthermore, Slc6a14-/- mice showed decreased disease progression in DSS colitis compared to wild type mice. In vitro treatment of LS174T cells with calphostin-C, a potent inhibitor of TCF4/β-catenin, dramatically reduced the expression of SLC6A14 mRNA and protein levels, whereas treatment of KM12L4 and KM12C cells with Wnt agonist AMBMP showed the opposite trend. Finally, ChIP assay demonstrated that TCF4/β-catenin complex directly regulates the expression of SLC6A14 in human CRC cells by binding with its promoter. We conclude that the increased b-catenin/Wnt signaling in CRC and colitis is responsible for the upregulation of SLC6A14 under these pathological conditions and that deletion of the transporter or its pharmacological blockade protects against colitis and CRC. These studies identify SLC6A14 as a novel drug target for the treatment of colonic inflammation and CRC.

# GS3+ SMITH, JESSICA

A Stressful Situation: SIR2 and Cell Growth Can Promote Longevity or Aging

Jessica T Smith, Jill White, Hui Hua, Isaiah Tates, Brandt L Schneider

Aging is a complex and multi-factorial process. Our lab uses budding yeastâ€<sup>™</sup>s replicative lifespan (RLS), measured by the number of daughters a mother cell produces in a lifetime, as a model for aging in higher organisms. In the lab, single cells can be easily, quickly, and inexpensively tracked for an entire lifespan. In so doing, researchers have identified several hundred longevity or aging genes, and the highly conserved SIR2 gene is perhaps the most impactful. SIR2 encodes a stress-responsive histone deacetylase that promotes longevity in part by silencing and stabilizing heterochromatic DNA. Environmental and nutritional signals are also important. Mild stresses, like glucose restriction or the non-steroidal anti-inflammatory drug ibuprofen, extend lifespan while concomitantly reducing cell size and growth rate. However, potential connections between cell size, cell growth, and SIR2 are not well understood. Furthermore, considerable size, growth, and lifespan variation is observed even in isogenic yeast populations held in uniform and constant conditions. Although the exact mechanisms responsible for this variation are not known, our observations suggest that cellular size, growth, and the level of SIR2 expression correlate with longevity. The Hormesis Theory of Aging suggests that low amounts of cellular stresses induce an adaptive response which promotes repair and cellular protection. In contrast, high levels of stress can promote aging and reduce longevity. Intriguingly, we determined that high levels of cell growth or SIR2 correlate with decreased lifespan. We also found that combinations of longevity-promoting treatments frequently have a negative effect on lifespan. Based on these results, we propose that while mild stresses promote longevity, inordinate stress promotes aging. Understanding the relationship between stress and longevity is vital to designing and implementing successful strategies to lengthen lifespan.

School: Graduate School of Biomedical Sciences Campus: Lubbock

## GS3+ STUEBLER, ANTONIA

Effects of 5-HT3A Intracellular Domain Modifications on Oligomerization – It's What's on the Inside that Matters

Antonia Stuebler, Michaela Jansen

The 5-Hydroxytryptamine type 3 (5-HT3) receptor is a cation-selective pentameric ligand-gated ion channel (pLGIC) that contributes to fast synaptic neurotransmission in the central and peripheral nervous system. Targeting these receptors could be a potential treatment for anxiety, depression, and an alternative to antipsychotics drugs. Two of the three eukaryotic pentameric domains, the extracellular and transmembrane domain of the 5-HT3A, have been studied and fully crystallized. However, the intracellular domain (ICD), which is the most divergent domain of the pLGIC superfamily, has only been partially resolved, and its function remains mainly unknown. The ICD of homomeric 5-HT3A has been shown to form a pentameric quaternary structure in the absence of the two other domains. When mutations are introduced into this domain, alterations in receptor conductance have been observed. Based on this knowledge, we investigated if such alterations would also alter the oligomeric state of the receptor, and ultimately, resolve its structure. Chimeras of the ICD were created and a modified maltose-binding protein (MBP) was attached to its N-terminus by a short alanine linker, expressed in Escherichia coli, and the resulting protein construct was purified using amylose column purification and size-exclusion chromatography (SEC). To further analyze the oligomeric state of the ICD, we employed SEC in line with Multi-Angle Light Scattering (SEC-MALS) to measure the absolute molecular weight. Additionally, the constructs are used for spectroscopic studies of their stability and secondary structure content (DSC, CD), as well as for high-throughput crystallization trials.

# GS3+ SUTHE, SREEDHAR REDDY

Development of A Novel RON Targeted Antibody-Drug Conjugates using Cysteine Bridging Technology for Potential Treatment of Pancreatic Cancer

Sreedhar Reddy Suthe, Hang-Ping Yao, Paul C. Trippier, and Ming-Hai Wang

Therapeutics targeting known oncoproteins have been applied for pancreatic cancer treatment but clinical outcomes are not promising. Hence, there is an urgent need to identify novel targets and develop effective drugs to improve pancreatic cancer therapeutic index. Antibody-drug conjugates (ADC) represent a promising class of drugs for targeted cancer therapy. Here we developed a novel ADC targeting RON receptor tyrosine kinase for potential pancreatic cancer treatment. To this end, we have synthesized a bisalkylating linker (BL), attached to a lysosomal protease-cleavable dipeptide with payload Monomethyl auristatin E (MMAE). The BL-MMAE was then conjugated to Zt/g4 (anti-RON mAb) through cysteine bridging technology to produce Zt/g4-BL-MMAE with a relatively homogeneous conjugation profile and an antibody to drug ratio of 1:4. Zt/g4-BL-MMAE showed significant improvement in drug conjugation homogeneity and serum stability over conventional ADCs prepared through maleimide based linkers. In pancreatic cancer cell lines overexpressing RON, Zt/g4-BL-MMAE specifically targeted RON-expressing tumor cells and was effective in rapid induction of cell surface RON endocytosis. Functional analysis revealed that Zt/g4-BL-MMAE caused cell cycle arrest at G2/M phase, reduction of cell viability and subsequently resulted in massive cell death. The calculated IC50 is in the range of 1 to 2 µg/ml. Therapeutic studies using mouse xenograft models are currently underway to determine the efficacy of Zt/g4-BL-MMAE for pancreatic and other epithelial cancers. We conclude that Zt/g4-BL-MMAE is a novel anti-RON ADC with excellent conjugation profile, serum stability, and selective cytotoxicity for pancreatic cancer cells. This work provides a pharmaceutical opportunity for evaluating potentials of RON-targeted ADCs in pancreatic cancer treatment in the future.

School: Graduate School of Biomedical Sciences Campus: Amarillo

#### GS3+ VARTAK, DAVID

Long noncoding RNA mediated regulation of MeCP2: A new paradigm.

David Vartak and Kevin Pruitt

Long noncoding RNAs (lncRNAs) have recently garnered significant attention. LncRNAs form about 68% of the noncoding portion of the genome. They have been implicated in numerous diseases including cancers where dysregulation of lncRNAs impairs their function. LncRNAs function as recruiters and guides of proteins to provide an additional layer of regulatory control through interactions with chromatin regulators. Methyl CpG binding protein 2 (MeCP2) is a frequently amplified oncogene in various cancers. It functions as an epigenetic gene regulator by binding to methylated cytosines of DNA and recruiting histone deacetylases and co-repressor complexes. In order for MeCP2 to exert regulatory control it has to bind to DNA, but what factors dictate where MeCP2 binds and how it recognizes a specific methylation marks is unknown. We hypothesize that lncRNA/s interact with MeCP2 by recruiting/guiding it to specific CpG clusters to mediate chromatin-remodeling events thereby conferring changes in gene expression.Therefore in the milieu of breast cancer the goal is to identify lncRNA which bind to MeCP2 and characterize their mechanistic and functional roles. To this end based on a literature screen we chose the following lncRNAs NEAT1, MALAT1, RNCR3, SRA1, GAS5, MEG3, HOTAIR and tested their expression in a panel of breast cancer cell lines. We found that all the above lncRNA were expressed in a panel of breast cancer cells except for MEG3. Next we evaluated the binding of MALAT1 and NEAT1 to MeCP2 in MCF7 cells and observed that MALAT1 and NEAT1 bind to MeCP2. These data provide evidence for the first time that lncRNAs are capable of binding MeCP2 in MCF7 cells. Further investigation of this interaction along with appropriate controls will provide us with a better understanding of function and mechanism of identified lncRNAs in the context of breast cancer.

# GS3+ VERLEKAR, DATTESH

Ceramide Synthase-6 binding to CD95/Fas confers resistance to chemotherapy in T-cell Acute Lymphoblastic Leukemia cells

Dattesh Verlekar, Hwangeui Cho, Sung-Jen Wei, Min H. Kang

Ceramide synthases (CERS) produce ceramides which are key intermediators in the biosynthesis of complex sphingolipids and play an important role in cell growth, differentiation, apoptosis and senescence. CERS6 is an isoform of ceramide synthases known to generate ceramides with C16 acyl chain (C16-Cer). Our data showed that CERS6 and C16-Cer levels were significantly higher in acute lymphoblastic leukemia (ALL) cells in comparison to peripheral blood mononuclear cells and T-lymphocytes derived from healthy human volunteers. We investigated the role of CERS6 in chemo-resistance in T-ALL cell lines. In CCRF-CEM cells stably transduced with CERS6 shRNA to knockdown the gene, the survival fractions were 5% and 2% in response to ABT-737 and DXM while non-targeted shCERS6 transduced cells showed 87% and 33%, respectively. CERS6 overexpression conferred resistance to ABT-737 and DXM. CCRF-CEM cells overexpressing CERS6, treated with ABT-737 or DXM showed 39% or 33% survival relative to 2% or 0.4% in vector control. Higher levels of cleaved PARP, cleaved Caspase 3 and cleaved Caspase 8 were induced in ABT-737 or DXM treated cells with CERS6 knockdown, which was reversed by CERS6 overexpression. The cytotoxic activity of ABT-737 in CERS6 knockdown cells was significantly reduced by the addition of a caspase-8 inhibitor Z-IETD, suggesting that CERS6 alters the cytotoxicity via extrinsic pathway of apoptosis. By co-immunoprecipitation of CERS6, we identified CD95/Fas, a mediator of extrinsic apoptotic pathway, as a novel CERS6 binding partner. In Fas pull-down samples, FADD (Fas-associated protein with death domain) was detected at higher levels in cells with CERS6 knockdown compared with control cells when treated with ABT-737, and this was reversed by the overexpression of CERS6, demonstrating that CERS6 interferes with FADD assembly with Fas. CERS6 may serve as a biomarker in determining the effectiveness of anti-cancer agents acting via the extrinsic pathway in T-ALL.

School: Graduate School of Biomedical Sciences Campus: Lubbock

# GS3+ WRIGHT, KANDIS

#### Determining the importance of macrophages in mediating Sertoli cell allo- and xeno-graft survival

Kandis Wright, Rebecca Gabrilska, Hannah Daniel, Gurvinder Kaur, and Jannette Dufour

The number of individuals waiting for a transplant far outweighs the number of available donors. Moreover, graft survival relies on toxic lifelong immunosuppression to prevent tissue rejection. However, ways to improve transplantation survival are poorly understood. Immune privileged Sertoli cells (SCs) survive long term post allo- and xeno-transplantation (between the same and separate species, respectively) without immunosuppression suggesting that SCs can be used to study mechanisms mediating transplantation survival. Previously, SCs were transplanted, the grafts were collected between days 1-20 post transplantation, and analyzed for differences in the immune response. The grafts contained macrophages, suggesting that macrophages are important in SC transplantation survival. In this study, M1 (pro-inflammatory) or M2 (regulatory) macrophages within surviving SC versus rejected control grafts were analyzed in vivo. In the SC allografts, more M2 macrophages were present throughout days 8-20. Interestingly, at day 8, there were more iNOS+ cells (M1 macrophage marker) in the rejected control allografts, however at days 11, 14, and 20 there were more iNOS+ cells in the SC allografts (significant at day 14). In the xenografts, flow cytometry revealed more macrophages in the rejected control grafts at days 4, 6, and 13 (significant at day 4), while there were more M1 macrophages at days 4 and 6, and significantly more Tregs at day 4 in the SC xenografts. These data suggest that the role of macrophages in the grafts is complex and requires further study. Future studies will characterize allograft macrophages using flow cytometry and evaluate the importance of macrophages by repeating the transplants in macrophage knockout animals. Ultimately, by elucidating how SCs survive transplantation without immune suppressive therapy, methods to improve human transplantation survival can be developed.

# GS3+ ZHAO-FLEMING, HANNAH

S. aureus and B. fragilis synergize in necrotizing soft tissue infections.

Hannah Zhao-Fleming, Armand Northcut, and Kendra Rumbaugh Ph.D.

Skin and soft tissue infections (SSTI) can manifest in a variety of ways, ranging from self-resolving abscesses to rapidly spreading necrotizing soft tissue infections (NSTIs). While an abscess may require minor medical intervention, if treatment is needed at all, a NSTI is a medical emergency, requiring immediate and aggressive surgical intervention. NSTIs can either be monomicrobial or, more commonly, polymicrobial. Monomicrobial NSTIs generally involve well-studied pathogens such as Streptococcus pyogenes or Clostridium perfringens. Polymicrobial NSTIs, however, are not as well understood. Staphylococcus aureus (Sa), a facultative anaerobe, is one of the most commonly isolated pathogens in polymicrobial NSTIs, but it is also commonly isolated in abscess infections. The other microbial and host factors that contribute to the development of NSTIs are also under studied. We hypothesize that several different factors can influence SSTI severity, one of which is the involvement of anaerobic bacteria, which are difficult to culture and thus often missed in clinical pathogen detection. In this study, we propose to better understand the role of anaerobic bacteria in the pathogenesis of polymicrobial necrotizing infections. In order to elucidate the contribution of anaerobic bacteria in the development of NSTIs, we introduced a commonly isolated wound anaerobe, Bacteroides fragilis (Bf), with Sa into in vitro and in vivo wound models. We found that Bf requires Sa to survive, both in the in vitro and in vivo environments. Sa also seems to stimulate Bf growth more than broth alone, and this increased Bf growth causes a worsened dermonecrosis in mice. Our preliminary results suggest that Sa may be stimulating Bf through a heat resistant small molecule. Based on our data, we conclude that Bf can be a significant contributing factor in NSTI disease progression, and that Sa and Bf display synergism, causing a disease state that favor NSTI over abscess.

School: Graduate School of Biomedical Sciences Campus: Lubbock

# **GSBS MASTERS STUDENTS**

#### **GSBS M BLAKELY, SUMMRE**

Evaluating Breast Cancer Incidence and Survivorship in Lubbock County

Summre Blakely, MPH, Drew Rasmussen, MPHc, Ashley Edling, MPHc, Nathan Villapando, MPHc, Sarah Neal Secrest, MPHc, Jaffer Samad, MPHc, Hridoy Haq, MPHc, Damilola Owoade, MPHc, Lisa Gittner, Ph.D, Hafiz Khan, Ph.D

Background: Breast cancer is the most frequently diagnosed cancer globally in women, with an estimated 50% of cases diagnosed and 42% of deaths occurring in developed countries. In the United States, there were about 40,610 deaths due to breast cancer as well as 252,710 invasive cases diagnosed in 2017. This study analyzed breast cancer data from Lubbock County in rural West Texas to determine if there was an association between various sociodemographic variables and breast cancer health outcomes.

Materials & Methods: Texas Cancer Registry data (1995-2014) were used for data analysis. Descriptive and inferential statistical analyses were performed to investigate whether there were relationships between sociodemographic variables and survivorships in Lubbock County breast cancer patients. Independent samples t-tests (, Kaplan Meier, and Cox Regression analyses were utilized to understand how race/ethnicity and other sociodemographic variables were associated. Additionally, cluster analysis was performed to detect hotspots of breast cancer.

Results: Five main zip code hotspots were detected in Lubbock County for breast cancer incidence. The mean survival time in days varied greatly by race/ethnicity group [White Hispanics (WH): (2514 1841), White non-Hispanics (WnH): (2626 1913), Black non-Hispanics (BnH): (2181 1828), and Other: (2072 1693)]. There were significant disparities found in survival times between BnH vs WH vs WnH; and survival time for age-at-diagnosis, zip code, insurance status, and stage of breast cancer.

Conclusion: Findings from this study show racial and ethnic disparities in survival times, and that a significant number of patients were diagnosed at later stages of breast cancer, perhaps indicating potential for improvement of screening programs. Furthermore, findings would be helpful for policymakers to improve financial assistance for preventive breast cancer-specific programs in the rural West Texas region.

#### **GSBS M BROCK, JOSHUA**

Combining Concept Mapping With Team-Based Approaches to Facilitate Learning in First Year Medical Students.

Joshua Brock

Team Based Learning (TBL) and concept mapping (CM) are gaining popularity with medical educators as active learning tools for developing higher-order thinking skills. This project's focus is to evaluate a method, specifically side-to-side concept mapping, of a TBL-type exercise that joins TBL sessions with a new adaptation of CM exercises. This special adaptation of CM is a method aimed at increasing effective critical thinking dialogue in a TBL group session. We expect to see both a perceived improvement in learning and in academic performance for the students who participated. Over the course of 9 weeks, during the 1st year medical studentâ€<sup>TM</sup>s multiple organ system (MOS) block, students were randomized into 4-7-member groups and each was given a specific role to play within their group. They used a special structured adaptation of the TBL group activity to analyze 2-3 clinical problems. This involves the progressive construction of side-to-side concept maps as the stem and answer choices are discussed. The sessions met on a biweekly basis in a classroom setting and degree of engagement. At the end of the project, a survey will be administered to determine whether the students found it beneficial in helping them in MOS. Preliminary experience to date shows that both the degree of engagement and the depth of integration for the group have increased. The current expectation is an upward trend in concept map scores over the course of MOS and a positive impact on the studentsâ€<sup>TM</sup> learning skills. Our conclusions will be drawn from the clarity of trends in the data and also both clarity and consistency in the survey outcomes.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### **GSBS M BUNCH, JAMES**

Benefits of Early Clinical Exposure Using Simulated Patient Encounters for First-Year Medical Students

#### James Bunch, Greg Brower, DVM, PhD

Early clinical exposure has the potential to improve retention of important physiological concepts in undergraduate medical education. Experiential learning has been linked to improved skill development, with one benefit being facilitating the transition between pre-clinical and clinical education. First-year medical students at Texas Tech University Health Sciences Center School of Medicine partake in Emergency Department Simulations during the Major Organ Systems (Systems Physiology) block, and again in the second year as part of the Systems Disorders block. With the goal of improving retention of clinical pathophysiology and quality of clinical reasoning, we embarked on a three-fold quality improvement project. We produced and distributed an electronic module introducing students to the layout and clinical features of our model Emergency Department Simulation room. Additionally, we developed new simulation activity based on renal physiology and the recognition of a common clinical condition, pre-renal azotemia. Finally, we developed an Advanced Clinical Skills elective to educate and equip School of Medicine Teaching Assistants to more effectively teach and explain the clinical reasoning required by the simulations. It is hypothesized that this intervention will result in improved clinical reasoning skills in medical students, as assessed by a pre- and post-test focused on clinical management of emergent disease. While there is accumulating qualitative data surrounding the benefit of early clinical education, we expect to demonstrate via quantitative evidence that early clinical exposure is beneficial to retention of clinical information and the development of clinical reasoning skills in first-year medical students.

# **GSBS M COATS, MCKENNA**

Post-Cholecystectomy Syndrome Due to Retained Gall Bladder Remnant

#### McKenna Coats

Introduction: Post-Cholecystectomy Syndrome is the presence or emergence of abdominal symptoms after the removal of the gall bladder, more specifically, symptoms that occur after the patient has healed from the initial operation. We present the case of a 57-year-old female with past medical history of diabetes mellitus, hypertension, cholelithiasis (gall stones) status post open chole-cystectomy in 2005, and an alcohol-related liver injury.

Case: A 57-year-old female with past medical history of diabetes mellitus, hypertension, and cholelithiasis status post open cholecystectomy in 2005 presents with right upper quadrant abdominal pain and scleral icterus. She denied fever, nausea, vomiting or diarrhea. She was afebrile, and her vitals were stable. Physical examination was positive for Murphyâ $\in$ <sup>TM</sup>s Sign. Laboratory studies showed elevated alanine aminotransferase, aspartate aminotransferase, and total bilirubin due to alcohol-related liver injury. An X-ray and US of the patientâ $\in$ <sup>TM</sup>s abdomen showed opacities in the right upper quadrant that appeared to be gallstones. However, there was no visualization of the gallbladder, consistent with the patientâ $\in$ <sup>TM</sup>s previous cholecystectomy. A further CT scan showed the same findings.

Conclusion: The patient developed pain in the right upper quadrant due to extensive stone formation in the retained Gall bladder remnant 12 years after surgery (post-cholecystectomy syndrome). The appearance and presentation are similar to stone formation in the presence of a complete gallbladder. An incomplete resection of the gallbladder is more common with laparoscopic approach than with an open cholecystectomy, the operation performed on the patient. Possible causes for incomplete resection are poor visualization of gallbladder, extensive inflammation, or adhesions. The patient's Post-Cholecystectomy Syndrome was resolved with surgical resection.

School: Graduate School of Biomedical Sciences Campus: Lubbock

# GSBS M CURTIS, SAMANTHA

Alternative Medicine and Arthritis

Samantha Curtis1, Yan Zhang, PhD2, Jeff A. Dennis, PhD1

Over one-third of U.S. adults with arthritis report having used complementary and alternative medicine (CAM), with about one fifth of that population using CAM specifically for arthritis. The prevalence of this sometimes debilitating disease has risen over recent years and is projected to affect larger portions of the population as time goes on. However, less is known about CAM use among individuals with current or chronic joint pain who do not have a diagnosis of arthritis. The study examines the characteristics and predictors of CAM use among U.S. adults reporting chronic joint pain, with specific attention to how an arthritis diagnosis versus no diagnosis impacts their CAM use. With more diagnosis of arthritis and an unstable healthcare climate a more interdisciplinary view of treatment needs to be employed and certain CAM modalities are viable co-treatments in arthritis. Individuals with chronic pain who have chronic joint pain but no diagnosis may seek out more alternative treatment because they have less access to conventional medical treatments via a physician. Data from the 2012 National Health Interview Survey, a nationally representative sample of 34,525 U.S. adults was weighted and analyzed using STATA 14.0. Preliminary findings indicate that about 30% of all U.S. adults have had joint pain or stiffness in the past 30 days, and among those individuals, slightly more than half have a diagnosis of arthritis. More importantly, about 12% of the sample indicates that they have chronic joint pain, lasting at least 3 months, with no formal diagnosis of arthritis. Ongoing analysis will explore how these individuals differ demographically, and in CAM use, from those with a medical arthritis diagnosis.

#### GSBS M DUGGAN, PAUL

Developing Anatomy Dissection Modules for Spanish-Speakers

Paul E. Duggan, Dr. Vaughan Lee

Over the last several years a new emphasis has been placed on establishing international relationships in order to improve global health. When institutions collaborate valuable data and resources can be shared and improved. This allows healthcare providers to receive better training, and ultimately to improve the quality of care that patients receive. When utilized effectively, global health initiatives can vastly improve healthcare in less fortunate countries. In an effort to improve global health TTUHSC has partnered with medical educators at La Universidad Cristiana AutÃ<sup>3</sup>noma de Nicaragua-LeÃ<sup>3</sup>n. Resources for medical education are sparse in Nicaragua. The institution's anatomy laboratory relies on cadavers that are scarce, and that are often are many years old. This makes it difficult for students to identify and learn anatomical structures. In order to combat this issue TTUHSC has shared its anatomy dissection videos with students in Nicaragua. These videos show step by step instructions for dissections and point out relevant anatomical structures. These videos can supplement the lack of dissection materials as well as begin to introduce students to English. Additionally, videos translated into Spanish would allow Spanish-speaking students in Nicaragua to create a strong foundation in anatomy. Using a protocol established for previous videos, Camtasia Studio software will be used to add both English and Spanish subtitles as well as Spanish narration for all TTUHSC thorax dissection videos. To evaluate the effectiveness of these videos, students from both TTUHSC and Nicaragua will complete a comprehension quiz after viewing the videos. Additionally, a survey will be used to measure subjective comfort level for bilingual, English-speaking, and Spanish-speaking students. Spanish dissection videos may also benefit TTUHSC students, providing practice for Spanish anatomical terms for better communication with patients.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### **GSBS M FLETCHER, ALEXANDRIA**

#### Developing "EPA thinking†with Expert Skills Program QuAGs

Alexandria Fletcher, Dr. John Pelley

The AAMC has created a list of entrustable professional activities (EPAs) that medical students should be competent in before entering residency. A major focus throughout the 13 different EPAs is integrative awareness of clinical scenarios and higher order thinking skills. Through the Expert Skills Program (ESP) we intend to help first year medical students gain this integrative awareness through critical analysis of clinical vignette questions; focusing on the rationales for both correct and incorrect answers. In weekly sessions, the group covered material pertinent to that weekâ€<sup>TM</sup>s lectures and discussed various test taking strategies that will be useful for Step 1, the NBME shelf exams, and the daily decisions made by a practicing physician. The focus of this project is twofold. First, we hope to create question sets relevant to each weekâ€<sup>TM</sup>s material that effectively engage students in integrative thinking. Since the objective is not determining the correct answer, but rather its rationale, these questions can be reused by future question analysis groups (QUAGs). This can also be applied for second year medical students at TTUHSC SOM. During each session, notes were taken using predetermined measures to attain the difficulty and degree of engagement for each question. Our second aim is to show that students who work through questions in a group setting feel higher confidence in their decision-making abilities. The decision-making abilities learned in QuAGs will not only be beneficial in test preparation but in the daily decisions required for diagnosis and treatment.

# GSBS M GARCIA JOSE

Developing online interactive embryology modules and determining their effectiveness in improving first-year medical student comprehension

Jose Omar Garcia<sup>^1</sup>, BS and Gurvinder Kaur<sup>^2</sup>, PhD

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First-year medical students at Texas Tech University Health Science Center School of Medicine take Clinically Oriented Anatomy during their first semester of school. During these 10 weeks, students are expected to learn about the anatomical structures of the human body, both in lecture and in the laboratory. Additionally, students are expected to learn the embryological origin of many of these organs and tissues. Due to the time commitments required for cadaver dissection and time needed to learn this vast amount of information, many students struggle to find adequate time to learn the associated embryology. Keeping this in mind, last year an updated high yield embryology fact sheet, covering key topics, was provided to the students online. Interestingly, the performance of these students (class of 2017) on the National Board of Medical Examiners (NBME) Anatomy and Embryology exam was improved and was over 0.8 SDs above the National Average. Based on these observations, we hypothesize that providing concise online interactive embryology modules will aid in improving the student's performance on the NBME and the United States Medical Licensing Examination (USMLE). For this project, the learning module includes high yield material covering the development of the cardiovascular system. The module utilizes Microsoft PowerPoint and the interactive e-learning tools of Adobe Captivate 8. The module will be self-paced with the option to start and stop in the event of interruptions. In order to determine the effectiveness of this module students will take a pre-assessment quiz before watching the module and a post-assessment quiz after to gauge its' effectiveness. Our plan is to make this module available to students in upcoming years to improve medical students' knowledge of heart development and comprehension on the cardiovascular system.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### **GSBS M GREGOIRE, PAOLA**

*FXYD6 as a regulator of*  $\hat{I}\pm 3$  *pumps in the brain* 

Paola Gregoire, Joshua Brogan, Misty Ruppert, Dylan Meyer, Pablo Artigas

Every cell maintains essential Na+ and K+ gradients through the function of the of Na/K pump. This P-type ATPase is formed by an  $\hat{l}$ =subunit ( $\hat{l}$ =1- $\hat{l}$ =4),  $\hat{l}$ <sup>2</sup>-subunit ( $\hat{l}$ <sup>2</sup>1- $\hat{l}$ <sup>2</sup>3) and frequently a third subunit of the FXYD protein family. The FXYD family consists of seven tissue-specific auxiliary subunits that regulate the Na/K pump and possibly other membrane proteins in a tissue specific manner. In vitro, the seven FXYD proteins are able to interact with pumps formed by the α1 subunit, but their regulation of pumps formed by other subunits is less clear. Expression of the FXYD proteins phospholemman (FXYD1), phosphohippolin (FXYD6) and FXYD7 has been reported in the brain. Here we focused on determining the interactions of FXYD1 and FXYD6 the  $\hat{I}\pm$  subunits in the hippocampus and cortex. We hypothesized in neurons,  $\hat{1}\pm 1$  prefers to interact with FXYD1, while  $\hat{1}\pm 3$  prefers to interact with FXYD6. We isolated cortex and hippocampus from euthanized wild-type and FXYD1-knockout mice, homogenized the tissue and performed co-immunoprecipitation and western blotting. Co-IPs showed that FXYD6 strongly interacts with α3 pumps, but also appears to interact with α1 pumps in both wild-type and FXYD1-knockout mice. Immunostaining of brain slices shows colocalization of α3 and FXYD6. Thus, although there may be a preferred interaction partner, in vivo interactions are not exclusive. The previously undescribed association of FXYD6 with neuronal  $\hat{1}\pm 3$  pumps led us to study the kinetic effects of human FXYD6 on human Na/K pumps formed by  $\hat{I}\pm 3$  subunits, utilizing heterologous expression in Xenopus oocytes and two-electrode voltage clamp electrophysiology. FXYD6 reduced the apparent affinity for K+ activation of Na/K pump currents by 2-fold. Studies regarding FXYD6 effects on intracellular Na+ affinity are underway. Although it remains unclear if FXYD6 is the preferred regulator of  $\hat{I}$ +3 pumps, our data demonstrate that FXYD6 is a natural interacting partner and a regulator of Na/K pumps formed by  $\hat{I}$ +3 subunits.

# GSBS M HAQ, HRIDOY

Littlefield has a Big Problem in Lamb County: A Study of Breast Cancer Incidence and Mortality

Hridoy Haq, MPHc, Drew Rasmussen, MPHc, Summre Blakely, MPH, Ashley Edling, MPHc, Nathan Villapando, MPHc, Jaffer Samad, MPHc, Damilola Owoade, MPHc, Lisa Gittner, Ph.D, Hafiz Khan, Ph.D

Background: Breast cancer is the eighth leading cause of death of women globally. According to the World Health Organization, breast cancer is the listed cause of death for 569.8 per 100,000 women. In the United States, cancer is the second highest cause of death for women, with breast cancer being the most commonly diagnosed. The purpose of this study was to determine if there were any relationships between sociodemographic variables and breast cancer occurrences in Lamb County.

Materials and Methods: Lamb County breast cancer patient data from 1995-2014 was obtained from the Texas Cancer Registry. Demographic variables were taken from the US Census Bureau. Inferential and descriptive statistical methodologies via SPSS Software were used to find potential relationships between patient survival and various sociodemographic variables. We used independent samples T-tests ( $\hat{l}\pm=0.05$ ) to determine significant relationships.

Results: The survival times based on age showed significance between some age groups. The patientâ $\in$ TMs survival times for the age group >78 was significant compared to women ages <51 (p=0.010) and 61-68 (p=0.009). White non-Hispanics (n=150, Xì,=64.73+13.18) had a mean diagnosed age about 5 years higher than White Hispanics (n=45, Xì,=59.82+14.86). Statistical analyses indicate a significant difference (p=0.035) between the age of diagnosis for White non-Hispanics and White Hispanics. With respect to survival time, White non-Hispanics (2944+1969) and White Hispanics (2208+1685) were also significant (p=0.047). Source of insurance did not appear as significant in a T-Test against survival time.

Conclusions: White Hispanics appeared to have lower levels of survivorship, though it was not fully clear why this pattern is such. Age at diagnosis seems to be a main contributor to survival times of female breast cancer patients in Lamb County. Future studies are needed to better understand the factors affecting this pattern of cancer incidence.

School: Graduate School of Biomedical Sciences Campus: Lubbock

## GSBS M JOHN, DIJO

Prescription Opioids Misuse In a National Sample of US Adolescents

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Prescription opioid misuse is an important public health concern since opioids are increasingly associated with drug dependence and fatal overdose. Although the frequency of prescription of controlled substances among adolescents in the United States have increased significantly over the past two decades, investigations into prescription opioid misuse have mainly focused on adults. The objective of this study was to characterize prescription opioid misuse in a nationally representative sample of 8th-and 10th-grade students.

Data are from 74,804 adolescents from the 2012-2016 Monitoring The Future project.

The overall prevalence of prescription opioid misuse was 3.1% with no difference in misuse between males and females. Compared to adolescents who did not misuse prescription opioids in the past year, a greater proportion of those who misused prescription opioids also used non-prescribed opioids like heroin, lived with none or only one parent and had parents with no college education. In multivariable adjusted models, use of marijuana (OR=5.14; 95%CI: 4.41-5.99) and alcoholic beverages (OR=3.02;) in the past year, ever use of cigarette (OR=2.34;), truancy (OR=1.09;), greater availability of after-school hours without supervision (OR=1.06;), and a history of suspensions (OR=1.32;) were all associated with higher odds of prescription opioid misuse. Being black (OR=0.81;) or Hispanic (OR=0.63;) compared to white race, importance of religion in one $\hat{a}\in$ <sup>TM</sup>s life (OR=0.62;) and having an ambition to complete college (OR=0.91;) were all associated negatively with prescription opioid misuse.

This study observed common characteristics that predispose adolescents to prescription opioid misuse with previous use of other substance being positively associated with prescription opioid misuse. Future research should seek to better understand the mechanisms through which race, religion and academic ambitions promotes adolescents' abstinence from the misuse of prescription opioids.

# **GSBS M LOY, SYDNEY**

Promoting Effective Self-Directed Learning with Individual Formative Laboratory Assessments

Sydney Loy, Vaughan Lee, PhD

Formative assessments have been used to aid self-directed learning for anatomical information in the Clinically Oriented Anatomy (COA) course at the Texas Tech Health Sciences Center School of Medicine (TTUHSC/SOM). Such assessments for learning objectives addressed in the laboratory present a unique challenge related to testing knowledge based on recognition of structures on a 3-dimensional dissected cadaver. In an attempt to address this in a method appropriate for self-directed learning, online formative practicals for each unit have been utilized since 2016. During the 2017-18 COA course, formative assessments for individual laboratory sessions in Units 1 and 2 were utilized to encourage individual assessment and promote academic performance by improving summative exam scores. The assessments were created with ExamSoft using cadaver photographs with applicable laboratory and clinical questions. To guide individual student learning, each assessment was made available indefinitely and rationales were provided for each answer choice. Preliminary evaluation of these assessments have shown varied levels of correlation in medical student academic performance and rendered exemplary student perception results. Formative laboratory assessments for Unit 3 will be completed and provided during the 2018-19 COA course in order to better evaluate effectiveness. Inclusive outcomes will be analyzed based on student summative assessment scores in correspondence to assessment usage and score reports. Furthermore, student perceptions will be determined through end of block evaluations and critiqued appropriately. Ultimately, the objective is to complete the individual laboratory quizzes for the COA course to provide additional self-directed resources to students to stimulate student readiness, improve summative exam scores, and overall educational quality.

School: Graduate School of Biomedical Sciences Campus: Lubbock

# **GSBS M LUCIO, CHRISTINE**

Resettlement Stressors and the Process of Acculturation for Refugee Women Resettled by the International Rescue Committee in Abilene, Texas

Christine Lucio, MSW, LCSW

Research has shown that recently resettled refugees face a number of stressors when adjusting to their new country. These stressors are classified as  $\hat{a} \in \hat{c}$  eresettlement stressors $\hat{a} \in \hat{c}$  and can include discrimination, financial insecurity and a lack of social support. These resettlement stressors add significant burdens on refugees who are already attempting to deal with basic survival needs and the trauma of their past.

Utilizing Community-Based Participatory Research Methods and the narrative approach, semi-structured interviews were performed during home visits from February 2018 until March 2018. The population consisted of adult, female refugees that have resettled in Abilene, Texas in the last 0-36 months with the assistance of the International Rescue Committee.

Semi-structured interviews were conducted with local refugee interpreters experienced with relationship-building and trained on how to conduct interviews utilizing techniques that will not re-traumatize participants. Techniques presented during data collection for this vulnerable population included giving control to the person being interviewed, providing full explanation of consent, ensuring the participant that they can end the interview at any time, allowing extra time for responses and rapport building, being sensitive to strong reactions, changes in breathing, and reassuring the participant that they are safe.

Responses were recorded, analyzed and compared to determine what resettlement stressors exist for this population and how these resettlement stressors, time in country, country of origin and the International Rescue Committee cultural orientation programming influence resettlement. Future research recommendations and implications for practice will be discussed.

# **GSBS M MERIDA MORALES, NORIKO**

Small Group Concept Mapping as a Tool for Integrating Physiology Topics with Clinical Cases

Noriko Merida Morales, John W. Pelley, MBA, PhD

Concept maps are graphical tools that can be used as visual representations of oneâ€<sup>TM</sup>s understanding of correlations between specific topics. Previous research has shown concept maps to be effective in improving studentâ€<sup>TM</sup>s comprehension of complex topics and overall performance in medical school. We wanted to determine if the small group setting could be an effective way to teach this method to interested first year volunteer medical students at the Texas Tech Health Sciences Center School of Medicine. The concept mapping sessions were implemented for each of the topics covered in the Major Organ Systems (MOS) block including the cardiovascular, respiratory, renal, gastrointestinal, and endocrine units. Concept maps were used in the sessions in two ways; 1) to map out complex topics, and 2) to employ as a tool to analyze clinical cases. Our goal for this project is to assess the effective-ness of using concept maps to improve studentâ€<sup>TM</sup>s ability to integrate physiological concepts, improve critical thinking skills, and improve overall student performance in the MOS block at TTUHSC. Furthermore, we expect to establish a basis for future studies on small group concept mapping to determine factors that can enhance depth of integration and degree of engagement by medical students.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### **GSBS M NAVARRO, STEPHANY**

Next Science Coated Urinary Tract Catheters Prevent Biofilm Development by Urinary Tract Pathogens

Stephany Navarro, Jane Colmer-Hamood, Thomas Nelius, Matthew Myntti, Abdul Hamood

Urinary tract infections (UTIs) are one of the most common types of hospital-acquired infections, with 75% of those UTIs being associated with the use of urinary tract catheters. Bacterial pathogens attach to both the inner and outer surface of the catheter and form a protective structure termed a biofilm, which protects the bacteria from the effect of antibiotics and the host immune response. Available antimicrobial-coated catheters vary in their efficiency. Recently, we demonstrated that Next Science (NS), a novel antimicrobial agent, is very effective in preventing wound infection by gram-negative and gram-positive wound pathogens. We hypothesized that NS-coated urinary tract catheters (UTCs) would inhibit biofilm development by urinary tract pathogens. Through a protocol approved by the TTUHSC IRB, we obtained 57 isolates of bacterial pathogens from patients who presented with UTIs at the TTUHSC Department of Urology Clinic. All isolates grew in artificial urine medium (AUM), which closely mimics human urine. NS inhibited the planktonic growth of the isolates at different concentrations for each isolate. Commercially-available silicone UTCs were cut into 1.5-cm pieces and coated on the inner and outer surfaces with NS. Urinary tract pathogens cultured in AUM were examined for biofilm development on either coated or uncoated catheter pieces using the microtiter plate assay. We determined the number of microorganisms (colony forming units) present in the biofilm on each catheter piece. NS-coated catheter pieces inhibited biofilm development by several urinary tract pathogens including Escherichia coli, Staphylococcus aureus, Klebsiella pneumoniae, and Enterococcus faecium. This inhibition will be confirmed by visualizing some of the biofilms by confocal laser scanning microscopy. These results suggest that NS is a potential novel antimicrobial agent to either prevent or significantly reduce biofilm development by urinary tract pathogens on UTC.

# GSBS M O'DELL, CHRISTOPHER

A public health analysis of mental health screening and assessment procedures at Lubbock County Detention Center

Desiree Ojo, Christopher O'Dell

OBJECTIVE: A six-week long observational study was conducted at the Lubbock County Detention Center (LCDC). The purpose of this study was to observe the procedures and processes currently in place that involve inmates with mental health conditions.

METHODS: Researchers observed LCDC, StarCare and Correct Care Solutions (CCS) employees during inmate pre-booking, booking and medical discharge to observe mental health screening procedures and map mental health information processing and sharing across departments. TTUHSC student researchers did not take any notes while in the facilities; however, they spent time in the parking lot following each session recording their own observations. This study did not observed or describe the inmates themselves, nor did it evaluate performance of employees. As such, individual information about inmates and employees was not recorded. The relationships between systems of inmate mental health screening was examined through observational analysis.

RESULTS: Preliminary observations suggest a significant lack of mental health and behavioral program support for the female inmate population compared to the male inmate population. Further, the Electronic Medical Record systems set up for the third-party agencies that work with LCDC do not work cohesively, often contributing to gaps in care for the inmates with mental health issues. Finally, gaps in diagnosis and data collection were observed in the electronic system used to review and asses the mental health of incoming inmates allowing for information to be relayed in an incomplete or incorrect state.

CONCLUSIONS: Centralizing the electronic medical record system, improving the electronic system used to review and assess incoming inmates and providing behavioral support, including improved support programs for female inmates, will improve mental health issue identification and treatment. These improvements are likely to decrease the recidivism rate in Lubbock County and improve commu

School: Graduate School of Biomedical Sciences Campus: Lubbock

# GSBS M OJO, DESIREE

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Desiree Ojo, Jeff Dennis, Christopher O'Dell, Lisa Gittner

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#### GSBS M OWOADE, DAMILOLA

Investigating Breast Cancer Incidence and Mortality in a Rural West Texas Parmer County

Damilola Owoade, MPHc, Drew Rasmussen, MPHc, Summre Blakely, MPH, Ashley Edling, MPHc, Nathan Villapando, MPHc, Sarah Neal Secrest, MPHc, Jaffer Samad, MPHc, Hridoy Haq, MPHc, Lisa Gittner, Ph.D, Hafiz Khan, Ph.D

Background: The incidence rate of breast cancer has increased over the years especially in developed countries; however, with the advent of technology and early detection, mortality rate has not been significantly reduced. Breast cancer is the second most diagnosed cancer in the U.S. The age-adjusted incidence rate of breast cancer in Parmer County is higher than those in the rest of Texas (24.3 to 23.1 per 100,000 people). The aim of this research was to find out whether sociodemographic variables were associated with occurrences of breast cancer in Parmer County, Texas.

Materials and Methods: The data was extracted from the Texas Cancer Registry (1995-2014). Descriptive and inferential statistical methods determined the relationships between sociodemographic variables and the incidence of breast cancer. SPSS software was used for data analysis and statistical significance level ( $\hat{I} \pm 0.05$ ) was considered to detect statistical relationships.

Results: The majority of patients were between the ages of 56-65 years (n=29). Women in this age group also had the highest survival (2968Å $\pm$ 1634) days. Women below the age 45 had the lowest survival (2445Å $\pm$ 1967) days. Usually an increase in ages should amount to a decrease in survival days but in Parmer County it was inconsistent. White Non-Hispanic, n=23 (96%), ages 66-75 has the highest incidence of breast cancer. White Hispanic had the lowest breast cancer incidence. Patients with Medicare had the highest incidence. Cluster analysis indicates, the zip code: 79035 had the highest survival while the zip code: 79347 had the lowest survival days.

Conclusions: The age-adjusted incidence rate of breast cancer was higher than the state-wide rate. A thorough investigation is needed on health education and screening to improve existing health policy that may also benefit patients by perpetuating low-cost diagnosis in hospitals and clinics.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### GSBS M QUESADA, KANDI

The Influence of Education on the association of Apolipoprotein  $\hat{I}\mu 4$  Allele with Mortality in the Elderly: The New Mexico Aging Process Study

Kandi Quesada, Linda Appiah, Richard Baumgartner Duke Appiah

We investigate the risk of death in relation to the apolipoprotein  $\hat{1}\mu4$  allele and evaluated how it interacts with education in 504 elderly adults (mean age 73 years, 65.3% women) who were enrolled in 1993 into the New Mexico Aging Process study. During 9 years of follow-up, apolipoprotein  $\hat{1}\mu2$  appeared to be associated with a lower risk for all-cause mortality (Hazard ratio (HR) =0.73, 95% Confidence interval (CI) I: 0.30-1.71) compared to apolipoprotein  $\hat{1}\mu3$  carriers in models adjusted for age, socio-demographic, medical conditions, adiposity, and lifestyle factors. The apolipoprotein  $\hat{1}\mu4$  allele conferred almost a threefold elevated risk of mortality (HR=2.76, 1.42-5.37). An interaction between education and apolipoprotein e4 (p=0.027) was observed with the HRâ€<sup>TM</sup>s of mortality among e4 carriers compared to non-carriers being 1.59 (0.64-3.96) for those with  $\hat{a}\%$  college education; 6.66 (1.90-23.4) for those with some college or trade; and 14.1 (3.03-65.6) for participants with  $\hat{a}\%$  high school education. No significant interaction was identified between apolipoprotein E genotype and cognitive function for mortality risk. These findings suggests that genetic (apolipoprotein  $\hat{1}\mu4$ ) and environmental (education) factors act interactively to influences survival in the elderly with higher education attenuating the adverse effect of apolipoprotein  $\hat{1}\mu4$  on mortality.

# GSBS M RASMUSSEN, DREW

An Investigation of Breast Cancer Incidence and Survivorship in a Rural, West Texas Hale County

Drew Rasmussen, MPHc, Summre Blakely, MPH, Ashley Edling, MPHc, Nathan Villapando, MPHc, Sarah Neal Secrest, MPHc, Jaffer Samad, MPHc, Hridoy Haq, MPHc, Damilola Owoade, MPHc, Lisa Gittner, Ph.D, Hafiz Khan, Ph.D

Background: Breast cancer is the most diagnosed type of cancer and the second most common cause of cancer death among women in the United States. Although breast cancer incidence rates are slowly decreasing nationally, women of all races and ages in Texas are more likely to develop breast cancer compared to all other cancers. Hale County, a rural city in West Texas has higher age-adjusted mortality rates (26.2/100,000), on average, compared to all of Texas (23.1/100,000). The purpose of this study was to understand the relationship between sociodemographic variables and breast cancer outcomes. Materials & Methods: Breast cancer data (1995-2014) for West Texas was obtained from the Texas Cancer Registry. An independent samples t-test was used to determine significant relationship ( $\hat{l} = 0.05$ ) between sociodemographic variables and breast cancer survivorship. We used Kaplan Meier curves to illustrate survival probability functions for race/ethnicity and other factors. To detect significant differences between the race/ethnic groups, the Cox Proportional Hazard Ratio method was performed. Results: Female breast cancer patients in Hale County were most likely to be White Non-Hispanic (n=266, 65.5%). Discrepancies exist between 75 and 84 years old, where data for White Hispanics was unreliable due to its high variability (1870±3363 days) and Other races produced the second highest survival time ( $2965\hat{A}\pm2160$  days). Individuals that did not have or were not aware of the status of their insurance had significantly higher survival times (Private vs. Other, p=0.0001, Public vs. Other, p=0.0001) for all race/ethnicities (WNH:  $3237\hat{A}\pm2225$ , WH:  $3115\hat{A}\pm 2257$ , Other: 2796 $\hat{A}\pm 2150$ ). Insurance also proved to have a protective effect with a hazard ratio of 0.202 (p=0.0001). Conclusion: It was unclear why those with insurance had lower survivorship compared to those without. Future studies should examine how survivorship has changed since the implementation of the Affordable Health Care Act.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### **GSBS M RHODEN, KRISTIN**

Creation of an Interactive Online Module for Review of the Female Reproductive System

Kristin Rhoden and Dan Webster

Problem: During the first year medical curriculum, students have found the Biology of Cells and Tissues (BCT) block to be challenging. This is possibly due to the class having a more self-directed structure and a curriculum that covers multiple disciplines in a 6 week period. Female reproduction is considered by students to be the most difficult subject of the block and students struggle to master the basic female reproduction concepts. This is reflected by student performance on the third exam in the BCT block.

Potential Solution: Providing students with an accessible resource that correlates specifically with the first year curriculum and adds guidance and structure to the concepts in a manner that generates active learning and retention of information, so that student performance and confidence is increased.

Methods: Using Kernâ€<sup>™</sup>s model for curricular development, data was collected from second year medical students to survey what female reproduction subject they struggled with and how they would like to see the information organized. The online interactive learning module was created with Adobe Captivate 8 to cover the major female reproduction subjects, and includes rollover images, audio, quiz questions, linked recourses, and a post survey in order to assess and validate the usefulness of the module. In the future, we will field test the module to get post-use feedback from first and second year medical students and will continue to monitor the effectiveness of the module through student feedback and/or exam performance. We believe we have constructed a useful interactive learning tool for first and second year medical students that can be used to review basic female reproductive subjects in a self-paced manner, and await student validation on the finished product from the post survey.

#### GSBS M SAMAD, JAFFER

An uncommon case of a healthy rural Texas community: Terry County's low stages of development of breast cancer

Jaffer Samad, MPHc, Drew Rasmussen, MPHc, Summre Blakely, MPH, Ashley Edling, MPHc, Nathan Villapando, MPHc, MPHc, Hridoy Haq, MPHc, Damilola Owoade, MPHc, Lisa Gittner, Ph.D, Hafiz Khan, Ph.D

Background: Cancer is a growing epidemic; especially in rural West Texas which is a hotspot of breast cancer. Terry County's incidence rate (88.3/100,000) differs from its neighbors, Lubbock County (113.3/100,000). The purpose of this study was to investigate if there were any relationships between sociodemographic factors and breast cancer incidence in the rural West Texas Terry County.

Materials and Methods: Data on breast cancer incidences were taken from the Texas Cancer Registry (1995-2014) for Terry County. Statistical methods were used to determine the possibility of relationships between race/ethnicities, age groups, insurance status, zip code, grade, and stage of breast cancer. An independent samples t-test ( $\hat{I} \pm 0.05$ ) was utilized to determine significant differences in sociodemographic variables and survival times of breast cancer incidences in Terry County.

Results: Mean and standard deviation of survival times for subjects of three ethnicity groups were recorded to be 2551.84 and 1782.051 respectively. Survival time was highest for female ages of 46-55 (3142  $\hat{A}\pm$  1530) and lowest for females above 75 (1737  $\hat{A}\pm$  1447). Women in Terry County were most likely to develop breast cancer at the ages 66-74 (n=45, 29%). Women diagnosed with in situ breast cancer had significantly lower survival times compared to other stage of diagnoses (In situ vs. regional, p<0.0001); in situ vs. distant metastasis p&lt;0.0001). For in situ and localized combined, White Non-Hispanic constituted 35.9%, 16.7% for White Hispanic and 20% for Black Non-Hispanic.

Conclusions: There was no clear explanation why women in Terry County were less likely to develop breast cancer compared to other counties. The fact that women in this county were more likely to have lower forms of breast cancer gives rise to question of preventative measures and screenings. Further investigation should explore behavioral and environmental factors that lead to this discrepancy.

School: Graduate School of Biomedical Sciences Campus: Lubbock

## **GSBS M SCRUGGS, CAROLINE**

The Use of Online Learning Modules for Increased Understanding of Embryological Concepts

Caroline Scruggs, Vaughan Lee, PhD

Online learning modules have historically been rated highly effective in facilitating increased understanding of various concepts in Clinically Oriented Anatomy (COA) at Texas Tech University Health Sciences Center School of Medicine (TTUHSC/SOM). Embryology comprises approximately 18% of the Anatomy & Embryology National Board of Medical Examiners subject exam (NBME) and all COA exams. Even with student led reviews, lectures, and embryology fact sheets, embryology section scores on past NBMEs had been deficient. In an attempt to improve student NBME scores, embryology fact sheets were revised for the 2017 course to align with the current textbook and include concepts most relevant to the NBME. Student evaluations of these modifications were positive with a 4.77 out of 5 rating. NBME summary scores also showed improvement from the 2016 to 2017 course with higher scores in 2017 compared to 2016. The mean item difficulty for TTUHSC/SOM Embryology score was lower than all other content areas for TTUHSC SOM apart from Thorax. Evaluations from the 2017 course requested the introductory Unit 1 embryology concepts be presented with increased organization. Therefore, modules of embryological weeks 1-4 will be created to facilitate long term learning of the foundational embryological concepts needed as foundational knowledge for second year medical school courses. These modules will be distributed for the 2018 course and embryology NBME scores of the 2018 course compared to the 2017 class to determine the impact of the modules on student learning. In addition, representative embryology questions from the 2017 COA Unit 1 exam will be included on the 2018 Unit 1 exam to assess effectiveness of the modules. Student perceptions of the modules will be measured on course evaluations and included in determining the effectiveness of this educational intervention. Improved resources for learning embryological concepts are predicted to enhance the quality of COA.

# GSBS M SHERRILL, KINZIE

Does glyphosate (and its metabolite) have neurotoxic activity? An in vitro study using an isogeneic induced pluripotent stem cell model

Kinzie Sherrill, Adrianna Martinez, Abraham Alahmad

Background: Glyphosate (RoundupÂ $\mathbb{R}$ ) is a common herbicide sprayed on weeds, grass, and crops. An important trait of glyphosate is its relative safety on mammals, as it targets the shikimate pathway (a biosynthesis pathway of aromatic aminoacids). Until now, poisoning cases in the literature are associated with voluntary ingestion of the concentrated product and only provide information on the pharmacokinetics of glyphosate. Yet, no studies have investigated the possible neurotoxicity associated with acute exposure to glyphosate, in particular to its structural similarity to glycine. The aim of this study is to investigate the effect of acute glyphosate exposure on the blood-brain barrier using an induced pluripotent stem cell model.

Methods: IMR90-c4 induced pluripotent stem cells (iPSCs) were differentiated into astrocytes, brain endothelial cells, and neurons using established protocols. Cells were treated with glyphosate (GPH), AMPA (GPH major metabolite) and glycine (GLY) for 24 hours with concentrations ranging from 10ï-M to 1mM. Barrier integrity was assessed using transendothelial electrical resistance (TEER), fluorescein permeability and immunofluorescence, whereas changes in cell metabolism was monitored using MTT assay. Changes in neurite formation was assessed by immunofluorescence.

Results: AMPA, GPH, and GLY failed to show detrimental effects on the barrier function (as measured by TEER and fluorescein permeability). We did not notice changes in tight junction complex integrity. In addition, we noted no changes in cell metabolism. However, we noted a slight decrease in neurite count following treatment with GPH and AMPA.

Discussion: Our data suggest a relatively low neurotoxicity of glyphosate even at very high concentrations on the blood-brain barrier. We did not notice differences between GPH, AMPA, and GLY. However, we noted some differences in neurite formation between controls and treatment. We are currently investigating the permeability of the blood

School: Graduate School of Biomedical Sciences Campus: Amarillo

## GSBS M TAPASWI, ANAGHA

Effect of Carbidopa on AR expression and activity

Anagha Tapaswi, Dr Vadivel Ganapathy and Dr Yangzom D Bhutia.

Prostate cancer is a slow developing disease, but some grow relatively faster. Risk factors for prostate cancer include: old age and family history of disease and race. Moreover, a diet high in red meat, processed meat and milk products is also a major risk factor in the development of the disease. Androgen is a natural or synthetic steroid hormone that regulates the development and maintenance of male characteristics. Androgen receptor (AR) is known to be inhibited by AhR. Role of AhR in inhibiting AR expression has been well known. AhR also acts an E3 ubiquitin ligase to promote proteolysis of AR. (Ohtake F et.al, 2009). Role of Carbidopa as an agonist for the nuclear receptor AhR was established in pancreatic cancer cells (Jiro Ogura et.al, September 2017). AR expression is also affected by the levels of Dopa Decarboxylase (DDC). DDC is required for the translocation of AR in the nucleus via Dihyrotestosterone. This translocation is required for the transcription of Androgen receptor elements (ARE).

AIMS: This study focusses on the effect of carbidopa on the levels of AR expression in LnCap cells. Carbidopa causes degradation of androgen receptor via the activation of AhR. The aim is to study the protein level of androgen receptor (AR) following carbidopa (25 micromolar) treatments. The project also aims to study the levels of AhR targets at mRNA level. Western blot, Real time PCR and RT-PCR was done to study the endogenous levels of AR and its interacting partner, AhR. The study also hypothesises the inhibition of AR translocation to the nucleus by inhibiting DDC. Immunofluorescence was performed to study the translocation pattern of AR after 3 hours of treatment with 30 micromolar carbidopa.

RESULTS: A decrease in levels of Androgen receptor was observed after 24 hours of treatment with 25 m carbidopa. Increase in expression of AhR was observed following carbidopa treatments. Translocation of AR is reduced in the cells treated with carbidopa.

#### **GSBS M TORRES, TIFFANY**

Group A Streptococcal Bacteremia in a Patient With Colitis and Invasive Rectal Cancer

Tiffany Torres, MPH, Drew Rasmussen, MPHc, Hafiz Khan, PhD, Abhilash Perisetti, MD

Introduction: Group A Streptococcus (GAS) is a gram-positive cocci which primarily causes skin and soft tissue infections, pharyngitis and pneumonia. Life threatening infections including necrotizing fasciitis and toxic shock syndrome have also been reported. Bacteremia is seen in the extremes of age, immunocompromised host, and IV drug abuse. Gastrointestinal tract (GI) involvement is rare with few cases of Group A Streptococcus colitis reported especially in children. We present a rare case of 54-year-old female with GAS bacteremia and proctocolitis as being the only source.

Case: A 54-year-old female with no significant past medical history presented with complaints of abdominal pain and bloody diarrhea since three weeks. Associated symptoms included fever, chills, nausea and vomiting. On physical exam, the patient appeared to have abdominal tenderness in left lower quadrant, afebrile and no hypotensive. Laboratory testing, including White Blood Cell Count (WBC), and Chest X ray were unremarkable. CT scan showed thickening of the colonic wall in the left colon consistent with sigmoid colitis with no associated colonic mass and diverticulosis. The blood cultures obtained from two different sites grew GAS suggesting from a GI infection rather than common causes of bacterial dysentery. Antibiotics were administered. Colonoscopy revealed a large circumferential ulcerative mass at the rectum that was identified as stage III adenocarcinoma and surrounding colitis. She was planned for neoadjuvant chemoradiation for stage III rectal cancer.

Conclusion: Group A streptococcal (GAS) bacteremia from underlying primary GI infection is very rare. Group D streptococcal bacteremia association with underlying colon cancer has been noted in the literature; however, this is the first case of Group A Streptococcus with underlying rectal cancer to our knowledge. The ulceration from rectal cancer or colitis itself might have caused bacteremia.

School: Graduate School of Biomedical Sciences Campus: Lubbock

#### **GSBS M VILLALPANDO, NATHAN**

#### Breast Cancer Incidences and Survivals for Rural Bailey County

Nathan Villapando, MPHc, Drew Rasmussen, MPHc, Summre Blakely, MPH, Ashley Edling, MPHc, Sarah Neal Secrest, MPHc, Jaffer Samad, MPHc, Hridoy Haq, MPHc, Damilola Owoade, MPHc, Lisa Gittner, Ph.D, Hafiz Khan, Ph.D

Background: Breast cancer is the most frequently diagnosed cancer in women around the world, with an estimated 50% of cases diagnosed and 42% of deaths occurring in developed countries. In the United States, it was estimated that 252,710 women will be diagnosed and there will be 40,610 deaths in 2017. This study analyzed breast cancer data from Bailey County to determine if there was an association between various sociodemographic variables and breast cancer occurrences in a Rural Texas Baily County.

Materials and Methods: Breast cancer incidences data (1995-2014) for the Bailey County (n=112) were collected from the Texas Cancer Registry data. Descriptive statistics and inferential statistical methodologies were used for data analysis. An independent-samples t-test was performed to investigate relationships between sociodemographic factors (age at diagnosis, race/ethnicity, insurance status, stage, and grade) and survivorships of breast cancer patients in Bailey County.

Results: Women ages 56-65 were more likely to be diagnosed with breast cancer (n=29, 26%) and had the shortest survivorship of 2304 Å $\pm$  1773 days. Women below ages 45 (n=15, 13%) had the longest survival time of 4512 Å $\pm$  1771 days. There were significant mean differences in survivorships between patients with private insurance and no insurance (p=0.005) and age groups 46-55 and 56-65 (p=0.039) and 46-55 and 66-75 (p=0.010) There is a significant difference between White Hispanic (n=85, 78%) and White non-Hispanic (n=24, 22%) (p=0.0001).

Conclusions: Disparities in survival times across the different age groups were observed within the Bailey County. Since many patients were diagnosed with breast cancer at older ages, there is potential for improvement of screening programs. While few patients had insurance, most did not provide insurance coverage information. More data must be collected to make a proper assessment of breast cancer incidence data.

#### GSBS M XIE, MIN

Treatment of Renal Cell Carcinoma with a Listeria-based immunotherapy targeting CD105.

Min Xie, Dr Laurence Wood

Renal cell carcinoma (RCC) is the most prevalent type of malignant kidney cancer in the U.S with a 5-year survival rate below 10% if discovered at Stage IV. Mild clinical symptoms only occur in 10-15% of all cases contributing to reduced survival by making early discovery a challenge. While RCC is resistant to traditional treatments, such as chemotherapy and radiotherapy, with only 4-5% success rates, it is fortunately responsive to immunotherapy. Early immunotherapies such as cytokines, while somewhat effective, have some severe side effects. Microbe-based vaccines may be better strategies to still stimulate the immune system but solve the problem of treatment-related adverse events. Listeria monocytogenes (LM) is a bacterial pathogen utilized in cancer vaccines that prefers to infect antigen-presenting cells (APCs), especially dendritic cells (DCs), and can induce robust specific cytotoxic T lymphocytes (CTLs). Our strategy is to use attenuated LM as the vector and express a tumor associated-antigen (TAA), CD105. LM-infected DCs will process and present CD105 peptides on MHC class I and II molecules and the mature DCs will activate CD105-specific CTLs. These CTLs will then target both tumor cells and tumor-associated vasculature. In this project, we are examining the therapeutic efficacy of Lm-LLO-CD105 vaccines on mice RCC models and exprest this will induce robust CD105-specific CTLs that target RCC in animal models.

School: Graduate School of Biomedical Sciences Campus: Abilene

# **MEDICAL STUDENTS YEARS 1-2**

#### MS1-2 ABRAHAM, HELAYNA

Impact of Community Health Workers on Triple Aim

Helayna Abraham, Debra Flores, PhD

In 2012, under Waiver 1115, Texas waived the provisions of federal health and welfare programs and reallocated Medicaid funding to implement DSRIP projects addressing local gaps in services and satisfy the triple aim goals: Improving the patient experience of care, improving the health of population, and reducing the per capita cost of health care. Of the 1,451 projects, 107 projects utilized Community Health Workers (CHWs) in a variety of ways to assist people to gain access to needed services and builds individual, community, and system capacity by increasing health knowledge and self-sufficiency through a range of activities such as outreach, patient navigation and follow-up, community health education and information, informal counseling, social support, advocacy, and participation in clinical research. The aim of this study was to asses the impact of DSRIP projects that utilize community health workers on the goals identified under triple aim. In the first reporting year (DY3), CHWs served 208,533 unique patients (77% greater than goal) with 61.8% being Medicaid, Low-Income, or Uninsured (MLIU). In the second reporting year (DY4), CHWs served 357,013 unique patients (36% greater than goal) with 59.11% being MLIU. And in the final reporting year (DY5), CHWs served 450,190 patients 17% greater than goal, with 56.1% being MLIU. Projects were required to report metrics that quantified improvement in patient satisfaction and health of the population. The project metrics demonstrated had an overall 18.62% increase in patient satisfaction and improved health outcomes in 21,592 patients. The improved outcomes generated over \$50.5 million in healthcare savings during the two measurement years and are expected continue to produce positive economic benefits.

#### MS1-2 AHMED, ALI

Purified Chimera of the Intracellular Domain of an Anionic Cys-loop Receptor.

Ali F. Ahmed1, Akash Pandhare2, Jackson V. Littlejohn1, Michaela Jansen2

The glycine  $\hat{I}\pm 1$  pentameric ligand-gated ion channel (pLGIC) is an anion-conducting receptor part of the Cys-loop superfamily and critical in mediating postsynaptic inhibition in the central nervous system. Dysfunctional pLGICs have been implicated in numerous serious neuropsychiatric diseases including Alzheimerâ $\in^{TM}$ s disease, Parkinsonâ $\in^{TM}$ s disease, myasthenia gravis, and smoking and alcohol addiction. An aberration in the GLRA1 gene encoding glycine  $\hat{I}\pm 1$  receptor (Gly- $\hat{I}\pm 1R$ ) can lead to disruption of glycinergic transmission by inherited mutations and result in neurological diseases such as hereditary hyperekplexia.

3 distinct domains, the extracellular domain (ECD), transmembrane domain (TMD), and intracellular domain (ICD), constitute each subunit of eukaryotic pLGICs from the Cys-loop superfamily.) Both the ECD and TMD have been explored in depth with regard to structural information. However, ICD structural information has yet to be well understood.

The goal of our project was to optimize protein expression and purification of the ICD of glycine  $\hat{I}\pm 1$  receptor. For this purpose we generated a chimera containing maltose-binding protein (MBP) fused to the N-terminus of the ICD of Gly- $\hat{I}\pm 1R$  and separated by a short alanine linker. We expressed this chimera in E. coli and were able to purify to homogeneity by employing 3-step purification (amylose column purification, followed by nickel column purification, and size exclusion chromatography). Further characterization to determine size using size exclusion chromatography coupled by Multi-Angle Light Scattering (SEC-MALS) revealed that the ICD of Gly- $\hat{I}\pm 1R$  is a monomer in solution. Further experiments are underway to gain additional structural insight.

School: School of Medicine Campus: Lubbock

## MS1-2 AHNOOD, ELMIRA

*Improved background pain management in burn injured patients using an analgesia-only, non-drip, non-sedation protocol.* 

E. Ahnood, MS, B.R. Bradley, MS, J. E. Kesey, RN, FNP, M. Elshiekh, MD, S. Dissanaike, MD, J. Griswold, MD

INTRODUCTION: Traditional background pain management for burn injured patients include IV drips of opiate/opioids like morphine/fentanyl in combination with benzodiazepines like midazolam/lorazepam. This approach, while adequate for pain and anxiety control, trades for significant side effects like over sedation and delirium, GI tract dysfunction, decreased mobility and can be costly. In October 2014 we switched to an analgesia only, enteral approach using methadone and Gabapentin, begun 24 to 36 hours after admission in patients admitted to our regional Burn Center.

METHODS: Retrospective review of EHR was performed for 65 patients treated with methadone/Gabapentin as well as 65 patients treated with traditional opiate/opioids for pain and benzodiazepines. Data was extracted for demographic information, wound severity, as well as assessment of level of pain management (Likert pain scale), sedation and delirium (RASS and CAM scores) GI tract function and nutrition tolerance, urinary retention, and cost.

RESULTS Demographic data and wound severity showed no difference between the two groups of patients. Patients treated with methadone/Gabapentin had lower pain scores, less frequent over sedation and no delirium compared to the patients treated with the traditional approach. In addition, the methadone/Gabapentin group had less frequency of high gastric residuals, nausea, vomiting, plus more regular bowel movements and better overall nutrition tolerance. Finally, there was a significant reduction in cost with the methadone/Gabapentin approach.

CONCLUSIONS: An analgesic-only, enteral, background pain management protocol with methadone and gabapentin provides improved pain control while e

# MS1-2 ALI, FAHAD

Impact of Timing of Interval Cholecystectomy, following Percutaneous Cholecystostomy Tube for Acute Cholecystitis, on Operative and Patient Outcomes

Ali Fahad, Eneko Larumbe, Edwin Onkendi

Background: Percutaneous cholecystostomy tube (PCT) has been used as a bridge treatment for grade II-III moderate to severe acute cholecystitis (AC) to "cool" the gallbladder down over several weeks and allow the inflammation to resolve prior to performing interval cholecystectomy (IC) and removal of the PCT. The aim of this study was to assess the impact of timing IC after PCT on operative success and outcomes.

Methods: A retrospective review of electronic medical records of patients who were treated for acute cholecystitis with a PCT and subsequently underwent IC at our institution between January 2005 to December 2016 was performed. The patients were divided into three groups (n=7 each) based on the duration of the PCT prior to IC, and these groups were comparatively analyzed. A comparative sub-analysis of clinical outcomes between patients who underwent surgery within the first week vs. third week or later after PCT was also performed.

Results: . Overall, there was no statistically significant difference in outcomes between performing IC within the first 5 weeks, 5-8 weeks and >8 weeks after PCT placement. The length of stay, overall morbidity, Clavien-Dindo grade of complications and mortality were similar between the 3 time intervals. However, a sub-analysis showed that patients who underwent IC within the first week of PCT placement had statistically significant higher mortality rate (p=0.048) compared to those who underwent IC >3 weeks of PCT placement.

Conclusion: Delaying IC to >5 weeks after PCT placement for AC is not associated with any improvement in patient morbidity, length of stay or rate of conversion from laparoscopic to open cholecystectomy. Cholecystectomy within the first of PCT placement is associated with higher mortality rate than after 3 weeks likely due to associated sepsis.

School: School of Medicine Campus: Lubbock

#### MS1-2 ALONZO, RYAN

#### Efficacy of Sm-p80 in Natural Mimic Conditions in Baboon Analysis of IgM Antibody Titer and Egg Burden

Ryan Alonzo, Priscilla Ortiz, Jaxson Thomas, Whitni Redman, Arif Siddiqui, Samra Lazarus, Adebayo Molehin, Souad Sennoune, Weidong Zhang, and A.A. Siddiqui

Schistosomiasis is a tropical disease affecting a large number of populations. Five species of the Schistosoma genus parasite are associated with human disease. The species Schistosoma mansoni, was used for this study that mimics a natural chronic infection for intestinal schistosomiasis found in African countries. For this study, the vaccine contains Sm-p80 protein and a TLR9 agonist adjuvant, CpG-ODN. Sm-p80 is the large subunit of the parasite calpain and aids in surface membrane renewal a recycling. In this study, baboons were infected with S. mansoni cercariae, treated with praziquantel, immunized, and challenged with cercariae. Transformed pCold E. coli stock was used to express Sm-p80 protein to be used for ELISA antibody quantification. The protein was then purified and concentrated for ELISA antibody titers. Fecal egg counts were used throughout the study to demonstrate if the vaccine lowered egg burden. Liver, small intestine, and large intestine tissue egg counts were done to determine tissue egg load. Egg burden causes the majority of the pathology associated with the parasitic infection, so if the egg burden decreases there are less severe symptoms. The Sm-p80 protein was accurately expressed, purified, and concentrated. IgM was focused on because not only is it the first antibody seen in an infection, but it would be helpful to determine if the vaccine would increase IgM titer levels. Although present, IgM titer levels did not show significant difference between control and experimental animals. Liver, small intestine, and large intestine tissue and fecal egg burdens were lowered in experimental animals post-vaccination.

#### MS1-2 ASAD, USMAN

Impact Of Timing Of Interval Cholecystectomy, Following Percutaneous Cholecystostomy Tube For Acute Cholecystitis, On Operative And Patient Outcomes

Usman Asad, BS, Amir Aryaie, MD, Eneko Larumbe, PhD, Mark Williams, MD, Edwin Onkendi, MD

INTRODUCTION: Percutaneous cholecystostomy tube (PCT) is used as a bridge treatment for grade II-III moderate to severe acute cholecystitis (AC) to allow the inflammation to resolve prior to performing interval cholecystectomy (IC) and removal of the PCT. The aim of this study was to assess the impact of timing IC after PCT on operative success and outcomes.

METHODS/PROCEDURES: A retrospective review of EMRs of patients who were treated for AC with a PCT and subsequently underwent IC at UMC between January 2005 to December 2016 was performed. The patients were divided into 3 groups (n=7 each) based on the duration of the PCT prior to IC and were comparatively analyzed. A comparative sub-analysis of clinical outcomes between patients who underwent surgery within the 1st week vs. 3rd week or later after PCT was also performed.

RESULTS: Overall, there was no statistically significant difference in outcomes between performing IC within the first 5 weeks, 5-8 weeks and >8 weeks after PCT placement. The length of stay, overall morbidity, Clavien-Dindo grade of complications and mortality were similar between the 3 time intervals. However, a sub-analysis showed that patients who underwent IC within the first week of PCT placement had statistically significant higher mortality rate (p=0.048) compared to those who underwent IC >3 weeks of PCT placement. The two patients who died in our sample had IC within a week after PCT placement. Even though there was a statistically significantly higher morbidity rate in those who had IC >3 weeks after PCT, the Clavien-Dindo grade of these complications was lower than <III in all cases.

CONCLUSION: Delaying IC to >5 weeks after PCT placement for AC is not associated with any improvement in patient morbidity, length of stay or rate of conversion from laparoscopic to open cholecystectomy. Cholecystectomy within the first week of PCT placement is associated with higher mortality rate than after 3 weeks likely due to associated sepsis.

School: School of Medicine Campus: Lubbock

#### MS1-2 BACON, LUKE

CAM Use among Adults with Arthritis or Other Rheumatic Conditions-a literature review

Luke Bacon, MBA

This poster aims to summarize the results of a comprehensive literature review concerning the use of complementary and alternative medicine (CAM) approaches for the treatment of arthritis and other rheumatic conditions. The literature review was conducted using EndNote as a reference organizational tool searching studies published on Pubmed from 2000 to 2017. Keywords included: alternative medicine, complementary medicine, CAM, rheumatoid arthritis, osteoarthritis, gout, fibromyalgia. Study year, type, findings, and limitations. Of the 29 studies extracted from PubMed, 25 studies were included. Information from the included literature were compiled in summary tables. Findings showed that movement based therapies such as Yoga or Tai Chi and Acupuncture appear to be safe and effective options for improving pain outcomes in the treatment of Osteoarthritis and Fibromyalgia but insufficient evidence was found regarding their use for Rheumatoid Arthritis. Some evidence supported the use of some herbal or pharmaceutical supplements for the alleviation of symptoms. The main limitations of the studies include small sample size and subjective measurements, which may introduce different biases limiting the validity and reliability of the findings. In addition, the heterogeneity of the CAM modalities makes it difficult to drawn conclusion on the effect on a certain CAM approach. Future research with better study design and bigger sample size are recommended. Clinical practitioners may consider to identify ways in which these beneficial CAM therapies can be best used to improve pain and quality of life outcomes for Arthritis and Other Rheumatoid Conditions.

# MS1-2 BANERJEE, AVANTIKA

Sex Differences in Cardiovascular Disease Outcomes in Response to Fenofibrate Therapy in Type 2 Diabetic Patients in the AC-CORD Lipid Study

Avantika Banerjee, Tejas Patel, Gyorgy Csako, Andrew Dodge, Colin Wu, Charu Gandotra, George Sopko, Helena Dviglin, Sean Coady, Ye Yan, Frank Pacino, Yves Rosenberg, Ahmed Hasan, National Heart, Lung, and Blood Institute (NHLBI)

Background: Coronary artery disease is the leading cause of death in Type 2 diabetics with lipid abnormalities. Fibrates have emerged as second-line agents to reduce circulating triglycerides and elevate HDLC. The ACCORD Lipid Trial investigated whether combined simvastatin + fenofibrate (fibrate therapy) could reduce major adverse cardiovascular events (MACE), defined as non-fatal stroke, nonfatal myocardial infarction, and cardiovascular death, to a greater extent than simvastatin monotherapy. Although the results were inconclusive, ACCORD reported heterogeneity in sex, with men experiencing fewer MACE than women in the fibrate group. The purpose of this secondary analysis is to explore the sex differences reported in ACCORD and identify potential confounding variables that could contribute to the heterogeneity in the original findings.

Methods: 5,518 patients were analyzed using Statistical Analysis System software. The Regularized Cox PH regression with Lasso was used for variable selection. A two sided p-value < 0.05 was considered statistically significant.

Results: Without cardiovascular disease(CVD) history, there was no difference in the occurrence of MACE within sex between statin monotherapy and fibrate therapy (p = 0.74 men and p = 0.64 women, respectively). With CVD history, men with fibrate therapy experienced fewer MACE events compared to statin monotherapy (HR 0.623, p = 0.04), whereas women with fibrate therapy experienced more MACE events (HR 1.34, p = 0.04). When grouped by fibrate therapy and baseline CVD history, only women with baseline CVD and fibrate therapy experienced higher occurrence of MACE than their male counterparts, with women in all other groups having better outcomes.

Conclusion: For patients with CVD history in the ACCORD Lipid Trial, men derived cardiovascular benefits from fibrate therapy, whereas women had worse clinical outcomes. Without CVD history, there were no sex differences observed. Confirmatory studies are warranted.

School: School of Medicine Campus: Lubbock

#### MS1-2 BOUFFARD, EMILY

Development of a serum therapy to protect severely burned patients from Pseudomonas aeruginosa

Emily Bouffard1, Nithya Mudaliar2, Jane-Colmer Hamood3 4, John Griswold2, Sharmila Dissanaike2, Abdul Hamood3

Severe burn destroys skin barriers and represses both local and systemic immune responses. As a result, severe burns are often associated with infectious complications. Colonizing bacteria multiply, establish an infection, and translocate from the infected burn wound into the bloodstream causing bacteremia and sepsis. Among the different pathogens that cause sepsis in burn patients is the opportunistic pathogen Pseudomonas aeruginosa, which produces numerous virulence factors including the type-three secretion system (TTSS). Previous studies proved the effectiveness of antibodies to the TTSS protein PcrV in treating chronic P. aeruginosa lung infections. We hypothesize that PcrV antibody is a potential serum therapy to prevent P. aeruginosa sepsis in severely burned patients. We tested this hypothesis using the murine model of thermal injury. Recombinant PcrV (rPcrV) was produced in Escherichia coli and purified. Polyclonal PcrV antibody was raised in rabbits and the IgG fraction (rPcrV-IgG) was purified. Control IgG (cIgG) was obtained from a non-immunized rabbit. Thermally injured mice infected with PAO1 were divided into 2 groups; one group received intraperitoneal (IP) injection of rPcrV-IgG while the other received IP injection of cIgG. At 48 h post infection, the mortality rate among mice treated with cIgG was 100% but 0% among mice treated with rPcrV-IgG. Additionally, comparable numbers of PAO1 were recovered from infected skin of mice treated with either rPcrV-IgG or cIgG. However, PAO1 bacteria were recovered from the livers and spleens of mice treated with cIgG but not rPcrV-IgG. Extended experiments for 10 d post treatment showed that all infected mice treated with rPcrV-IgG survived. We recovered no PAO1 bacteria from the livers and spleens of rPcrV-IgG-treated mice at 2, 4, 8, and 10 d post treatment. These results suggest that rPcrV-IgG is a potential serum therapy to prevent P. aeruginosa sepsis in severely burned patients.

#### MS1-2 BROGAN, JOSHUA

FXYD6 and Naâ<sup>o</sup>, Kâ<sup>o</sup>-ATPase  $\hat{I}\pm 3$  Subunit Colocalization in Mouse Hippocampus and Cortex

Joshua Brogan, Paola Gregoire, Misty Ruppert, Pablo Artigas

The Naâ<sup>*e*</sup>,Kâ<sup>*e*</sup>-ATPase builds and maintains Naâ<sup>*e*</sup> and Kâ<sup>*e*</sup> electrochemical gradients essential for the life of every human cell. There are many Naâ<sup>*e*</sup>,Kâ<sup>*e*</sup>-ATPase isoforms with tissue-specific distribution and their mutation has been implied in forms of migraine, alternating hemiplegia of childhood and hyperaldosteronism. The Naâ<sup>*e*</sup>,Kâ<sup>*e*</sup>-ATPase comprises an α subunit (one of four isoforms) and a Î<sup>2</sup> subunit (one of three isoforms). Seven members of the FXYD protein family are known to associate with αÎ<sup>2</sup> dimers and regulate the Naâ<sup>*e*</sup>,Kâ<sup>*e*</sup>-ATPase, also in a tissue-specific manner. The effects of FXYD6, highly expressed in the hippocampus, are poorly understood. To learn more about the isoform presence in different brain regions and FXYD6 localization and function, we extracted brains from euthanized mice and performed immunostaining on fixed hippocampal brain slices as well as Western blotting of plasma membrane preparations of hippocampal and cortical homogenates. Several antibodies were used to probe the slices and Westerns. Western blotting demonstrates the presence of α1, α2, α3, FXYD1, FXYD6 and FXYD7 in both cortex and hippocampus samples. Immunostaining shows colocalization of α3 subunits and FXYD6 proteins. Future studies will address the role of isoform multiplicity in the brain, with a particular emphasis on FXYD6.

School: School of Medicine Campus: Lubbock

#### MS1-2 BUCKHOLZ, ABIGAIL

Community Resources in West Texas and Southeastern New Mexico for Treatment of Substance Use Disorders and Co-morbidities

#### Abigail Buckholz

Substance Use Disorder is a highly prevalent disorder in which individuals experience a chronic, compulsive loss of control over substance intake. This disorder can be triggered by another psychiatric disorder, or can itself trigger psychiatric disorders and, so, has a high rate of comorbidity with psychiatric diseases.

Lubbock and the surrounding areas (West Texas and Southeastern New Mexico) offer many opportunities for individuals to seek treatment. However, as there are many kinds of treatment, as well as different locations for treatment, attempting to refer a patient to the proper treatment and most convenient location can be daunting. This difficulty is compounded when the patient has comorbid conditions that could exacerbate the original problem, or could restrict the patient from entering certain institutions. This paper is intended to assist physicians in understanding the different levels and types of treatment available, and to help them choose the best place to send each patient.

The information used in this paper was gathered by interviewing individuals working in the substance use field and by calling and/ or exploring the websites of establishments that can assist with addictions. It is hoped that physicians who have greater awareness of treatment opportunities will be able to provide a higher level of care for their substance use disorder patients.

# MS1-2 BUIE, JOHN

Smaller prostate size at the time of radical prostatectomy for primary prostatic adenocarcinoma is associated with worse pathological features and increased tumor volume

John Buie, Shadi Khalil, MD, Christopher Massey, MD, Werner de Riese, MD, PhD, Pranav Sharma, MD

Prostate cancer (PCa) and benign prostatic hyperplasia (BPH) are two of the most common urinary diseases in men over 50 years old. The known literature, however, offers conflicting reports and theories on the potential relationship between prostate size and prostate cancer severity. Marked reduction in androgenicity and lower overall intra-prostatic growth factor concentrations in smaller prostates may serve as a more ideal environment for the development of more aggressive tumors, but this has not been elucidated to date. Radical prostatectomy (RP) is a reliable surgical treatment option for men diagnosed with non-metastatic primary prostatic adenocarcinoma with a 10-15 year life expectancy.

In this retrospective, single-institutional, hypothesis-driven chart review database study, we identified all consecutive men diagnosed with non-metastatic primary prostatic adenocarcinoma who underwent definitive surgical treatment with RP with or without pelvic lymph node dissection (PLND) at TTUHSC Urology from 2010  $\hat{a}$ <sup>(\*)</sup> 2016. We stratified patients based on prostate size, which was determined by the weight (in grams) of the RP specimen after surgery. Cumulative tumor volume in the RP specimen was also measured and recorded.

On multivariate analysis, larger prostate volume was associated with less PSM, less SVI, less ECE, and less LVI when accounting for patient age, race, body mass index (BMI), comorbidities, pre-biopsy PSA, clinical tumor stage based on digital rectal examination (DRE), and clinical Gleason score. Patients with a prostate volume >60 gms were less likely to have high-risk PCa (Gleason score >8), node-positive disease, and BCR.

In this study, we showed that in our cohort of patients undergoing definitive surgical resection with RP for treatment of non-metastatic primary prostatic adenocarcinoma, smaller prostate volume was associated with more aggressive pathologic features, a higher incidence of pathologic node-positive disease, and increased rates of BCR.

School: School of Medicine Campus: Lubbock

# MS1-2 BYRD, ALYSSA

Accessing Community Connection to Essential Service Survey (ACCESS survey)

Cheryl Erwin, JD, PhD, Alyssa Byrd

Background: Focal points for improving health policy revolve around minimizing deficiencies in access, quality, and cost of health care. Understanding the health care landscape of an area can aid in determining disparities in health care for underserved individuals. Additionally, individuals with genetic disorders are at risk for genetic discrimination, including access to care.

Objective: The goal of this study was to determine the rate of uninsured patients, assess perceptions of barriers to health care access, evaluate the importance of health care insurance, and inquire concerning patient perceptions of the risk to genetic privacy.

Methods: The study surveyed 23 adult patients in Lubbock, TX. The study used a 15-minute, anonymous, self-administered, pen and pencil survey (ACCESS Survey). It was distributed at TTUHSC clinics and assessed perceptions pertaining to access to health care and expectations of privacy of genetic information.

Results: The uninsured and unemployment rates were reported to be higher than national average. Patients also had a lower average income than compared to the national average. The population worried about the cost of health insurance and out of pocket expenses more than access to care. Low numbers of patients had a personal care provider, but the wait time to see a family physician was less than the national average. The majority favored federal assistance for low-income persons and continued coverage with cost protection for individuals with pre-existing conditions. Patients worried more about genetic discrimination related to insurance over relationships and employment.

Conclusion: Health care in Lubbock, TX is a major concern for patients. The cost of health insurance was especially worrisome to the population, though deficiencies in both access and quality exist in the area as well. These results show that work still needs to be done to decrease disparities in health care for the underserved population of rural west Texas.

# MS1-2 CALDWELL, JOSEPH

Chronic Peritoneal Indwelling Catheters for the Management of Malignant and Nonmalignant Ascites: A Narrative Literature Review

Joseph Caldwell B.S.; Hawa Edriss, M.D.; Kenneth Nugent, M.D.

Background: Ascites is a debilitating condition affecting many patients with end-stage liver disease or advanced abdominal malignancies. Serial paracentesis can reduce the symptoms of refractory ascites, but this procedure requires frequent trips to a clinic and places a great burden on patients and their caregivers. Indwelling peritoneal catheters are an alternative which can allow these patients to manage their symptoms at home. This review aims to assess the safety and efficacy of these devices.

Methods: A literature search was conducted to identify articles reporting indwelling catheter placement in patients with ascites. Inclusion criteria were for studies with at least 20 adult subjects that had been published within the past 15 years. Patient demographics, indications, complication rates, and survival times were analyzed.

Results: Fourteen studies comprising 957 patients (687 with malignancy [71.7%], 270 without [28.3%]) were reviewed. Symptom improvement was reported in all cohorts. The most common complication in patients with malignant ascites was catheter dysfunction (39/687, 5.7%). Overall infection rate for patients with malignancy was 5.4% (37/687); patients with pancreatic malignancy comprised at least 70.2% (26/37) of these infections. The infection rate for patients with nonmalignant ascites was 12.2% (33/270), while catheter malfunction was 1.1% (3/270). Infection risks significantly increased for devices in place longer than 12 weeks. Average survival time after catheter placement was 7.2 weeks for patients with malignancy and 164 weeks for patients without malignancy.

Conclusions: Indwelling peritoneal catheters are effective for the palliation of refractory ascites in patients with certain malignancies. Due to prolonged device usage, peritonitis is a concern for patients with ascites attributable to nonmalignant etiologies, but proper implantation technique and maintenance may greatly reduce infection risks.

School: School of Medicine Campus: Lubbock

#### MS1-2 CARLSEN-LANDY, DAVID

A Study of Criminal History among Young Adults with Co-Occurring Mental Health and Substance Abuse Disorders in Psychiatry Outpatient

David Carlsen-Landy, M.S.

Introduction: Significant research in the fields of psychiatry, psychology, and criminal justice show significant co-occurrence of substance abuse, mental illness, and criminality. Approximately one million of the 12.5 million annual arrests involve persons with severe mental illness and 64-76% of inmates from state to federal levels reporting a co-occurring substance abuse disorder. Additionally, age has been shown to serve as a predictor of criminal activity. Young adults, particularly those ages 18-24, are more likely to be arrested, exhibit arrestable behavior, or be rearrested for any offense. Age also serves as a predictor for mental illness and substance abuse, with psychiatric and substance abuse disorders often first diagnosed in this age group. This study investigates the incidence of criminality among young adults with co-occurring psychiatric and substance use disorder in the TTUHSC Psychiatry Outpatient Clinic in Lubbock, TX.

Methods: A retrospective chart review of electronic medical records of patients aged 18-25 years with dual diagnosis of psychiatric and substance use disorders was conducted. Records were reviewed and data on criminal history, including arrests, convictions, and/ or incarcerations for misdemeanors or felony crimes were collected.

Results: While research is still ongoing, the trend we are seeing this early shows study participants with co-occurring psychiatric and substance abuse disorders demonstrate at least some criminal behavior, with substance abuse occurring earlier in life than both diagnosis of a psychiatric illness and first arrest. Age of first psychiatric diagnosis more often occurs prior to first arrest.

Impact/ Conclusion: This study will contribute to the understanding of when, prior to or after their diagnosis of psychiatric illness and/or substance abuse, the risk of criminality is more likely, with the goal of informing psychiatric services to help reduce the incidence of arrest or incarceration of at risk patients.

## MS1-2 CAUSEY, JORDAN

Clinical Presentation and Resource Utilization for Index Visits and Revisits for Young Children with Acute Respiratory Illnesses Seen in the Emergency Department

Jacob Hayes, Jordan Causey, Lara Johnson

Background: Children discharged from the emergency department (ED) with acute viral respiratory illness may return to the ED for any reason. In this study, we compare patient characteristics, clinical severity, and disposition for index versus return visits in a nationally representative sample of ED visits.

Methods: We utilized the National Hospital Ambulatory Medical Care Survey (NHAMCS), a nationally representative sample of ED visits from 2005 to 2015. We included visits for patients less than three years with an acute respiratory illness based on ICD-9 codes with valid revisit data. We determined the frequency of index and return visits and compared the visits based on resource utilization, vital signs, insurance status, and disposition using chi-squared tests. All analyses were conducted with SAS 9.3 and SUDAAN 11.0 to account for the complex sample design and all percentages are weighted.

Results: There were 4520 visits for acute respiratory illnesses meeting inclusion criteria. Return visits comprised 2.9% of the sample and had a higher frequency of government funding (Medicaid/CHIP) than did index visits (78% vs 64%, p=0.005). Half of patients were tachycardic, with a quarter tachypneic or febrile, and 1% had abnormal oxygen saturation with no differences between index and return visits. Return visits had procedures done more often than index visits (40% vs 22%, p=0.001) and were less likely to be discharged home (91% vs 97%, p=0.03) with no difference in medication use (83%) or imaging (20%).

Conclusions: Revisits did not differ from index visits in presenting vitals but were more likely to have government funding, receive more procedures, and were less likely to be discharged home. This study is limited by a lack of clinical information and an inability to compare aspects of index and return visits for individual subjects. These findings suggest that there may be opportunities to reduce return ED visits and admissions in this population.

School: School of Medicine Campus: Lubbock

## MS1-2 COLE, CALEIGH

Correlation of D-Dimer with BNP in decompensated heart failure: A relationship that needs more definition

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Purpose: Inflammation and coagulation pathways are upregulated in heart failure (HF). This study attempts to address the role of d-dimer in decompensated heart failure in the setting of activated neurohormonal pathways and pro-inflammatory molecules.

Methods: A retrospective crossectional/observational study was conducted in 162 patients with decompensated heart failure. Spearmanâ $\in^{TM}$ s rank order correlations were performed between D dimer and BNP and echocardiographic parameters in these patients. All patients used in this study were ruled out for a pulmonary embolus by CT/VQ scans. Scattered plots were generated to demonstrate the correlations. Level of significance was set at 0.05. Analyses were performed using SAS software. Study protocol was approved by TTUHSC IRB, Lubbock, TX.

Results: D-dimer and BNP showed a positive correlation (r=0.283, P<.001). BNP showed significant correlations with echocardiographic parameters: LVEF(r= - 0.324, P<.001), LVIDd (r=0.226, P=.009), mitral inflow E/A(r=0.233, P=.027), average septal and lateral tissue Doppler velocity eâ€<sup>TM</sup> (r= - 0.18, P=.005), TAPSE (r= - 0.21, P=.017), RVSP (r=0.326, P=0.007). Correlation between d-dimer and LVEF, LVIDd, MV E/A, eâ€<sup>TM</sup>, TAPSE, RVSP were not significant despite a significant correlation between D-dimer and BNP in this study population. Individual scatter plots are shown in figure 1

Conclusions: The observation that  $D\hat{a}\in$  dimer correlated significantly with BNP in decompensated HF but was not significantly correlated with structural echocardiographic parameters suggests that elevation of d-dimer is a secondary effect of neurohormonal upregulation.

# MS1-2 DELEON, SABRINA

TTUHSC Culinary Medicine Elective: Modifications in Course Curriculum and Effects on Student Competencies

Elisa Vengalil, Sabrina Deleon, Dr. Kathy Chauncey, Dr. Betsy Jones

The purpose of this project was to modify the original TTUHSC SOM Culinary Medicine elective to focus on developing students' skills in patient counseling, culinary skills, and medical nutrition knowledge.

Culinary Medicine is a growing evidence-based field in healthcare that seeks to improve providers $\hat{a} \in \mathbb{T}^{M}$  abilities to educate and motivate patients to improve their chronic illnesses through appropriate dietary interventions. More than just utilizing nutrition knowledge, it involves teaching cooking skills and recipe modifications to patients to suit their diverse socioeconomic, cultural, and dietary needs.

The 2017 elective consisted of four lectures and four labs as well as a dietician-led tour of a grocery store and a volunteer event. Four lecture meetings were held throughout the Fall 2017 semester as follows: 1) learning the basics of a dietitian's job in a hospital setting; 2) womenâ€<sup>TM</sup>s nutrition and principles of nutrition; 3) patient dietary counseling; 4) budgeting and bulk meal prepping. For each lab, students were divided into teams of two to four and assigned to one of ten cultural diets.

After evaluating medical students before and after taking the Culinary Medicine elective, we found an average increase in confidence in patient education skills, from 2.37 prior to Lab 1 to 3.75 after Lab 4; an increase in confidence in culinary skills from 2.55 prior to Lab 1 to 4.07 after Lab 4; and an increase in confidence in nutritional biochemistry knowledge from 2.57 after the first lecture to 3.33 at the conclusion of the elective. Students learned much about cooking and nutrition for diverse dietary needs. Based on our findings, we identified several improvements that could be made for future runs of the elective and concluded that the Culinary Medicine elective makes an impact on the confidence that future physicians trained at TTUHSC have in motivating patients to manage their chronic diseases.

School: School of Medicine Campus: Lubbock

## MS1-2 EFFENDI, MALEEH

Positional Plagiocephaly: A Comparative Study Between Large Volume Centers and One Low Volume Center.

Arya Nair, Maleeh Effendi, Mayank Aranke, Joshua Demke

Background: During an infantâ€<sup>™</sup>s first year of life, the babyâ€<sup>™</sup>s inability to roll from back to belly frequently leads to positional plagiocephaly. Most physicians agree that orthotic helmets are most effective for treatment. In large cities, helmet-specific orthotic companies often use 3-D laser scanning technology to allow for custom fit helmets, obviating the need for traditional head molds that are labor intensive. In smaller cities, patients are referred to local orthosis providers without 3-D scanners, where helmets are casted traditionally. There is almost no literature demonstrating that large volume orthotic company helmets employing 3-D laser scanning are superior. Our goal is to see if the outcomes from one small volume cranial orthosis center are comparable to results from larger centers. Methods: 37 patients from our local orthotic manufacturer were included in this study. Diagonal difference (DD) and cranial vault asymmetry index (CVAI) at the beginning and end of treatment were recorded. Published data from urban orthosis facilities using 3D measurement devices were divided into two groups: Group 1 measured the change in DD after treatment, and Group 2 measured the change in CVAI after treatment. To compare measurements between the cohorts, individual t-tests were performed. Results: Of the 37 patients, mean change in DD was 0.727cm (SD=0.29cm), with a mean CVAI improvement was 5.065%. In our analysis comparing Group 1, one study had an insignificant change (p>0.05) in DD, while one article had significantly less change (p&t;0.05) in DD. In comparing Group 2, one study had an insignificant change (p>0.05) in CVAI, while two studies showed significantly less change (p<0.05) in CVAI. Only one study had significantly greater improvement, both in DD and CVAI. Conclusion: The results of our literature review and analysis reveal that the majority of studies indicated that a smaller facility could achieve similar or better results than those from lar

# MS1-2 ESQUIVEL, ESTEBAN

Time to operation does not influence health outcomes for perforated peptic ulcer disease

Esteban Esquivel, John Lung, and Sharmila Dissanaike, MD, FACS

Background: Perforated peptic ulcer (PPU) is usually considered a surgical emergency, with a mortality and morbidity up to 30% and 50%, respectively. PPUs are associated with more than 70% of deaths in patients with peptic ulcer disease (PUD) and PPUs develop in 2-10% of patients with PUD. Prior studies in Europe and India have shown a link between rapid surgical intervention and positive outcomes in PPU.

Objective: We examined the relationship between the time interval from perforation to operation and postoperative outcomes.

Methods: Seventy two patients were admitted to Texas Tech University Health Sciences Center in Lubbock, TX for a perforated peptic ulcer January 1, 2010 - May 1, 2017. Data collected included the perforation to operation time interval, age, gender, ethnicity, income level (SES), insurance status, morbidity, mortality, and length of hospital stay. Logistic regressions were conducted using SPSS to determine predictive variables.

Results: Thirty-seven (51.4%) patients had a perforation to operation time interval less than 24 hours, 14 (19.4%) 24-48 hours, and 21 (29.2%) more than 48 hours.

Thirty-three (45.8%) patients had a postoperative morbidity, 20 (27.8%) patients were readmitted, 9 (12.5%) had postoperative mortality with an average time to death of 37.6 days, and 7 (9.7%) had a postoperative surgical infection. Logistic regression analysis found no significant predictive variables for perforation to operation time interval, postoperative morbidity, or postoperative mortality.

Conclusion: Our results indicated that a longer perforation to operation time interval is not as consequential to patient outcome as suggested in previous studies outside the United States. Further research should be performed to examine whether this is due to advances in surgical and postoperative management in the United States that minimize the risk factor of a prolonged perforation to operation time interval.

School: School of Medicine Campus: Lubbock

## MS1-2 FAHEID, MOHAMED

Effect of APP and Tau toxicity on humanized serotonergic and nonserotonergic neurons and the protective effects of Citalopram.

Mohamed Faheid, P. Hemachandra Reddy, XingLin Ying, Maria Manczak, Arubala Reddy

Depression is often considered a comorbidity of Alzheimer's. But their connection may be more involved than we once thought considering neurotransmitter links in their respective pathologies. Serotonin is a neurotransmitter that plays an important role in regulating midbrain pathology in both AD and depression. However, molecular links between serotonin regulation and AD progression are not well understood. Our goal was to investigate that connection. To achieve our objective, we stably transfected rat serotonergic (5HT) cell lines RN46A and B14, and non-serotonergic IMR32 and SHSY5Y cells with mutant APP (Swiss) and WT APP and mutant Tau (P308L) and WT Tau cDNAs. Stably transfected and un-transfected cells were studied for mitochondrial biogenergetics, apoptosis, cell viability and mRNA and protein levels of mitochondrial, AD, serotonin, and synaptic genes. Using immunocytochemistry, we studied localization of synaptic and mitochondrial proteins and mechanism of serotonin in AD pathology. Using sandwich ELISA, we measured amyloid beta (Ab) 40 and 42, Serotonin, beta and alpha secretase levels in transfected and un-transfected cells. Using transmission electron microscopy, we also studied ultra-structural changes. Preliminary results of our study revealed that significantly increased cell apoptosis, reduced cell viability in stably transfected cells with mutant APP and mutant Tau cDNAs relative to un-transfected cells. Serotonin neurons have never been studied under the effect of APP/Tau pathology so these are the first studies on in vitro midbrain neurons. Based on these observations, we conclude that RN46A, B14 and non-serotonergic cell lines IMR32 and SHSY5Y are unique cell models to study mechanisms involving the serotoninergic system in AD pathology. These stable cell lines will be useful for drug screening in AD.

#### MS1-2 FARMER, REED

#### Serum therapy to prevent Pseudomonas aeruginosa sepsis: assessment of rPcrV-IgG in passively immunized mice

Reed Farmer, Nithya Mudaliar, Jane Colmer-Hamood, Sharmila Dissanaike, John Griswold, and Abdul Hamood

Pseudomonas aeruginosa is a gram-negative opportunistic pathogen that causes severe infections in immunocompromised patients including severely burned patients. Colonization of burnt tissue by P. aeruginosa often leads to systemic sepsis and death. Damage caused by P. aeruginosa is due to the production of numerous cell-associated and extracellular factors including the type three secretion system (T3SS) which translocates effector molecules into the cytoplasm of the host cell, resulting in cell death. In addition to the effector proteins, translocators form pores on the host cell membrane to facilitate effector translocation into the host cytosol. Among these translocators is PcrV. We hypothesize that sufficient levels of PcrV-antibodies protect severely burned patients from P. aeruginosa sepsis. In this study, we tried to determine the level of PcrV antibodies within the blood of thermally injured mice following immunization with recombinant PcrV (rPcvR). We overproduced rPcrV in Escherichia coli and purified it using nickel column chromatography. Using rPcrV, we raised polyclonal PcrV antibody in rabbits. We purified the IgG fraction from rPcrVimmunized (rPcrV antibody [rPcrV-IgG]) and nonimmunized (control antibody [C-IgG]) rabbits using chromatography cartridges. Mice were intraperitoneally (IP) injected with either rPcrV-IgG or C-IgG at a dose of 14 mg/kg. Blood was obtained from treated mice at 8, 24, 36, 48, 72, and 96 h post-injection and the serum fraction was separated. The level of rPcrV-IgG in each serum fraction was determined by enzyme linked immunosorbent assay (ELISA). Between 8 and 72 h post injection, the titer of rPcrV-IgG was relatively constant (about 600-700 pmoles). At 96 h post injection, the titer dropped to 250 pmoles. These results suggest that thermally injured mice receiving a single IP injection of rPcrV-IgG maintain a considerable titer that may protect them from P. aeruginosa sepsis for 4-5 days

School: School of Medicine Campus: Lubbock

#### MS1-2 FILLMORE, TYSON

#### Isolated Hip Fracture Mortality in Geriatric Trauma Patients

Tyson Fillmore, MSII;<sup>a</sup> Kaushik Mukherjee, MD, MSCI, FACS;<sup>b</sup> Jayne McCauley, MD;<sup>a</sup> Stephen Gates, MD;<sup>a</sup> Amber Tucker, RN;<sup>a</sup> Oscar D. Guillamondegui, MD, MPH, FACS;<sup>c</sup> Steven E. Brooks, MD, FACS<sup>a</sup> <sup>a</sup>Texas Tech University Health Sciences Center, Lubbock, TX, Department of Surgery <sup>b</sup>Loma Linda University Medical Center, Loma Linda, CA, Department of Surgery <sup>c</sup>Vanderbilt University Medical Center, Nashville, TN, Department of Trauma and Acute Care Surgery

INTRODUCTION: Geriatric isolated hip fracture patients have in-hospital mortality of 3%, and one-year mortality between 20-33%. Although studies detail frailty scoring and outcome prediction, few describe how to use this information. We recognized that some patients our Level 1 Trauma Center received early operative repair, only to transition to comfort care. We hypothesized that isolated hip fracture patients predominantly discharge to skilled nursing facilities (SNF) and have significant one-year mortality, justifying early consultation of Palliative/Supportive Care (PC) service for goals-of-care discussion.

METHODS: Retrospective cohort of 768 patients, aged 60 and older, was examined after treatment for isolated hip fracture between January 1, 2014 and December 31, 2016. Patients aged less than 60 years, pathologic fractures, and poly-system trauma patients were excluded. Data was analyzed using logistic regression for discharge disposition and mortality.

RESULTS: Mean age was  $79.5\hat{A}\pm9.2$  years. Mean length of stay was  $6.1\hat{A}\pm3.2$  days. 3.4% of patients died in the hospital, 15.5% at 3 months, 17.9% at 6 months, and 25.6% at 1 year after injury. Only 34% of patients went home; 14% to rehab, and 48% to SNF. Each decade of age increase, patients are 35% less likely [95%CI 22-46%,p<0.001] to be discharged to home/rehab. Each decade of age increased odds of 6-month mortality by 88% [95%CI 42-143%, p<0.001].

CONCLUSION: Only 34% of geriatric isolated hip fracture patients disposition home, and these fractures confer a 25% one-year mortality. This underscores the need for early consultation of PC for goals-of-care discussion with patients or surrogates.

# MS1-2 FRANCISCO, ROSHIRL

Increasing Awareness of Mental Health Resources Among Medical Students

Roshirl Francisco, Anna S. Deleon, Alan Gonzalez, Elisa Vengalil, Kendall Marshall, David A. Carlsen-Landy, Allison Perrin, PhD

Depression is common amongst medical students with the statistics showing it accounts for about 15-30% being afflicted. One out of sixteen students have been shown to have suicidal ideation, but over 60% of them were reluctant to seek help because of possible consequences and perceived stigma from classmates and faculty. A survey was conducted amongst first-year medical students at TTUHSC to see how knowledgeable and comfortable they were with accessing the mental health resources provided by the school and around the city of Lubbock. The results of this survey indicated that they were not comfortable enough to seek and use these resources if needed. In order to increase awareness for seeking and using mental health resources, we created the SOM Care Guide for Students in Distress in collaboration with the TTUHSC SOM Office of Student Affairs. The guide was distributed to all of the first-, second-, and third-year medical students at all four TTUHSC SOM campuses. The guide included indicators for different levels of distress as well as the appropriate resources for each campus for students. A pre- and post-assessment were conducted and an increase in student comfort and knowledge of the resources and protocols provided inside the pamphlet were shown.

School: School of Medicine Campus: Lubbock

# MS1-2 GABRILSKA, REBECCA

#### Expression of induced nitric oxide synthase (iNOS) in Sertoli cell allografts

Rebecca Gabrilska, Hannah Daniel, Kandis Wright, Gurvinder Kaur, Jannette Dufour

Transplant recipients rely on immunosuppressive agents to promote graft survival. Nonetheless, immune rejection continues to be a major hurdle to prolonged graft survival. Immune privileged Sertoli cells (SCs) are a promising alternative to improving allograft survival (transplantation between genetically different individuals of the same species) as SCs survive allotransplantation long term (≥100 days) without immune modulating agents. Previously, primary mouse SCs (pSCs) or control mouse Sertoli cell line (MSC-1) cells were transplanted as allografts and evaluated for survival and the immune response. Post allotransplantation pSC grafts demonstrated increased survival (≥20 days) compared to MSC-1 grafts, which were fully rejected between days 11-20. Interstingly, both surviving and rejecting grafts contained macrophages, suggesting they may play an important role in mediating allograft survival. Compared to M2 (regulatory) macrophages, M1 (cytotoxic) macrophages express inducible nitric oxide synthase (iNOS) which produces nitric oxide in response to varying physiological conditions. In this study, the expression of iNOS was evaluated using immunohistochemistry on allografts isolated from days 2, 5, 8, 11, 14, and 20 post allotransplantation. In the MSC-1 cell grafts, there was elevated iNOS expression at day 8; however, in the pSC grafts, expression was increased at days 11, 14, and 20 (significantly elevated at day 14). These data demonstrate iNOS expression in the rejecting MSC-1 cell grafts at early timepoints post transplantation and surprisingly in the pSC grafts at later time points. Further study is required to identify the cell type(s) expressing iNOS and investigate the role of iNOS in pSC allotransplantation survival. Ultimately, methods to improve human transplantation survival can be developed by understanding how SCs survive allotransplantation without immunosuppressive therapy.

#### MS1-2 GARTMAN, GRACE

A Pathological Examination of Fibrosarcomatous type Dermatofibrosarcoma protuberans

Grace Gartman, Kendra Walker, Dr. Lisa Smith (faculty mentor)

Dermatofibrosarcoma protuberans (DFSP) is a relatively uncommon soft-tissue tumor that arises in the dermis and is slow-growing and locally aggressive. Transformation into the much rarer fibrosarcomatous type, which has greater cytological atypia and higher mitotic rates, increases the risks of recurrence and metastasis. This

review aims to examine a patient case study of dermatofibrosarcoma protuberans with fibrosarcomatous differentiation (FS-DFSP) with associated pathological findings and compare characteristics, treatments and outcomes published in other studies. A pathologistâ€<sup>TM</sup>s examination of histological stains as well as specific markers in immunohistochemical studies can highly suggest a diagnosis of FS-DFSP. For the aforementioned patient case, histopathological examination revealed a hypercellular spindle cell neoplasm in a fascicular arrangement invading the subcutaneous fat with areas of necrosis, moderate atypia, and abundant mitotic activity. On immunohistochemical testing, the tumor cells were positive for vimentin, actin, CD34 and negative for pancytokeratin, desmin, and S100. Because proper radical surgical excision techniques can treat the patient, an efficient determination of FS-DFSP versus other more clinically common conditions can improve outcomes and reduce the risk of transformation and metastasis.

School: School of Medicine Campus: Lubbock

#### MS1-2 GAVIN, MEREDITH

#### Effect of Nicotine on Ulcerative Colitis

Meredith Gavin, BS, Vadivel Ganapathy, PhD

Ulcerative colitis (UC) is an inflammatory bowel disease distinct from Crohnâ€<sup>TM</sup>s disease. UC increases the risk of colon cancer. One of the unique features of UC is its relationship to smoking. UC in smokers becomes more severe when they quit smoking, and the disease severity of UC decreases when they start smoking; this association has led to the description of UC as the disease of the non-smokers. In contrast, smoking exacerbates Crohnâ€<sup>TM</sup>s disease. We hypothesize that nicotine is responsible for the protection against UC. We have identified several transporters and receptors in the colon that function as anti-inflammatory molecules: SLC5A8, ABCG2, GPR109A, GPR43, and GPR81. We hypothesize that exposure of the colon to nicotine induces the expression of some or all of these anti-inflammatory proteins, thus at least partly providing the molecular basis of nicotine-induced protection against UC. We will test this hypothesis by two different approaches involving in vitro and in vivo experiments. In vitro, we will expose the human colon epithelial cell line NCM460, originally derived from normal human colon mucosal epithelium, to nicotine (different doses, different treatment periods) and then monitor the expression of the afore-mentioned five genes at the mRNA level (qPCR) and protein level (western blot and immunofluorescence) and function wherever feasible. In vivo, mice will be exposed to nicotine by subcutaneous injection (3 mg/kg) daily for 7 days and then killed; colon tissue will be collected and processed for tissue sectioning (immunofluorescence) and epithelial cell isolation (mRNA for qPCR and protein lysates for western blot). As it is already known that nicotine protects against UC by activating neuronal acetylcholine receptor, we will use the specific antagonist hexamethonium to evaluate the involvement of this receptor in the regulation of the expression of the five genes by nicotine.

# MS1-2 GONZALEZ, ALAN

The effects of antioxidants on the inflammatory response caused by Type II diabetes

Alan Gonzalez, Gurvinder Kaur, Jannette Dufour

Type II Diabetes is one of the leading causes of death for the US because of unhealthy diets and decreased amount of exercise. Although this ailment is serious in itself it is also a stepping stone to other comorbidities such as hypertension, cardiac disease, neuropathies and many other changes that affects an individualâ€<sup>TM</sup>s quality of life. The study begins by generating mice models that are either normoglycemic or hyperglycemic, in order to closely relate the mouse to a type II diabetic the mouse was fed a high fat diet and the normoglycemic mouse was fed a low fat diet. The insulin levels of the mice were tested frequently using intraperitoneal insulin tolerance test. Once the mice have obtained a level of insulin resistance that is reversible, they are treated with either: Tocotrienol, Green Tea Polyphenols (GTP), Statins, Geranylgeraniol or a combination of two of these reagents. These treatments are tested to see which of them are able to decrease the amount of macrophages present in the pancreas when compared to a high fat diet mouse. Macrophages are leukocytes that can either be inflammatory or regulatory but are thought to be inflammatory in these high fat models. The amount of macrophage marker. Analysis of the results demonstrated that the Tocotrienol, Green Tea Polyphenols and Tocotrienol/Statin groups had a decreased amount of macrophages compared to a high fat diet mouse.

School: School of Medicine Campus: Lubbock

#### MS1-2 GREEN, WILLIAM

RLIP76 and GPx1 Expression in Adenocarcinoma and Squamous cell carcinoma in Lung Tissue

William C Green, Srikala Meda MD, Sharda Singh PhD, Sanjay Awasthi MD

Rlip (aka RLIP76, encoded by RALBP1) and GPx1 (Glutathione peroxidase 1) are expressed in most human tissues. Rlip acts as a membrane-bound protein that transports xenobiotics and glutathione conjugates out of the cell. GPx1 functions in the detoxification of hydrogen peroxide and is an important antioxidant enzyme in humans, protecting normal cells from oxidative stress. Rlip is overexpressed in many cancers, while GPx1 is lost or under expressed. Increased Rlip expression contributes to increased drug resistance and loss of GPx1 contributes to cancer progression. Therefore, in this retrospective study, we investigated the prognostic value of Rlip and GPx1 expression in squamous cell and adenocarcinoma of the lung and compared their expression levels with surrounding normal tissue.

Tissue samples were taken from the South Plains Oncology Consortium for 19 cases of non-small cell lung cancer with 10 squamous cell and 9 adenocarcinoma. Formalin fixed and paraffin embedded tissues were sectioned into 4 micron thick slices. Tissues were prepared and stained with either anti-Rlip or anti-GPx1 primary antibodies and HRP secondary antibodies using the BenchMark ULTRA IHC/ISH Staining Module by the TTUHSC Pathology Dept. Slides were interpreted and compared to negative controls by Dr. Suzanne Graham using light microscopy.

Initial results indicated that Rlip stained more intensely in both squamous cell and adenocarcinoma tissue versus the surrounding normal tissue. GPx1 stained tissue was the opposite, in that both squamous cell and adenocarcinoma stained less than surrounding normal tissue. All these results indicate that less GPx1 expression may not influence the chemo/radiotherapy response. On the other hand, protective effect of Rlip may be a basis for drug resistance during treatment and tumor growth. Further studies are in progress to confirm these findings and we will correlate expression of these proteins with chemo/radiotherapy response or survival.
### MS1-2 GUDENKAUF, BRENT

Effects of Powdered Rifampin and Vancomycin on Biofilm Production of Staphylococcus Aureus on Orthopedic Implants

Gudenkauf BM, Douthit C, Mudaliar N, Hamood A.

As the population ages, joint replacements and traumatic orthopedic repairs (open-reduction internal-fixation) are becoming more common. The insertion of these prostheses is associated with a 1-2% chance of chronic biofilm-associated infection, most commonly caused by Staphylococcus species. These infections naturally resist many antibiotics and are notoriously difficult to treat, requiring surgical debridement, and/or prosthetic removal to cure. We evaluated the activity of rifampin and vancomycin in inhibition and elimination of methicillin-sensitive Staphylococcus aureus (ATCC 29213) biofilms in vitro on stainless steel prosthetic implant material. Nearly 10 million colony forming units grow in complex biofilm MIC's of vancomycin and rifampicin were 1 ug/mL and 80 ng/mL, respectively. At these concentrations, both antibiotics were able to reliably inhibit biofilm formation. With a challenge of 5000 CFU per plate, vancomycin achieved 99.9% elimination of biofilm-associated Staphylococcus aureus, while rifampicin achieved complete elimination. Either vancomycin or rifampin may be used intraoperatively during prosthetic placement to prevent S. aureus biofilm formation, but rifampin is superior to vancomycin as an adjunct to surgical debridement once biofilm and chronic infection has been established. These results will inform clinical decisions on antimicrobial prophylaxis for prosthetic implantation as well as the treatment of biofilm-associated periprosthetic infections.

School: School of Medicine Campus: Lubbock

#### MS1-2 HANSON, KEITH

#### Non-accidental trauma as a potential risk factor for deformational plagiocephaly development in the pediatric population

Keith Hanson BA, Peyton Presto BS, Mark Stephens MBA, Nikita Tangella BS, and Laszlo Nagy MD

Deformational plagiocephaly is the partial flattening of an infant's skull due to external forces, and an understanding of the management of this condition is important for pediatricians, plastic surgeons, and neurosurgeons alike. Since the onset of the "Back to Sleep†SIDS prevention campaign in the early 90s, the rate of deformational plagiocephaly has been increasing in the United States. Once thought to be a relatively benign cosmetic condition, research into the condition over the past two decades has presented evidence that children with deformational plagiocephaly may experience neurodevelopmental delays relative to their peers, particularly with respect to motor development. While more high-powered research is needed to confirm any link between neurological deficits and deformational plagiocephaly, proper identification and screening of this condition, if only for cosmetic purposes, is important given that the best results from cranial remodeling therapy and infant care modifications are seen with early intervention. Risk factors identified through review of relevant studies includes male sex, supine sleeping position, feeding position/pattern, birth status, neck dysfunction, and spinal deformities. However, no investigators have explored non-accidental trauma as a possible risk factor for the development of deformational plagiocephaly. To address this gap in the literature, we will conduct a retrospective chart review of all cases of non-accidental trauma at the University Medical Center in Lubbock over the past 10 years. The rate of deformational plagiocephaly in this population will be compared to that of the general population, and other demographic variables will be compared as well via correlation and regression analysis. Our findings should help guide further work in the classification and management of DP.

# MS1-2 HELTON, TYLER

Detergent studies for enhanced stability of a sugar transport protein MelB

Tyler Helton<sup>1</sup>, Parameswaran Hariharan<sup>1</sup>, Kyung Ho Cho<sup>2</sup>, Hazrat Hussain<sup>2</sup>, Pil Seok Chae<sup>2</sup>, and Lan Guan<sup>1</sup> <sup>1</sup>\_Department of Cell Physiology and Molecular Biophysics, Center for Membrane Protein Research, School of Medicine, Texas Tech University Health Sciences Center, Lubbock, TX 79430, USA

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Studies on membrane proteins are important for understanding the physiology of the cell. Most biophysical analyses and structural studies require not only the membrane proteins being isolated from the membrane, but also the purified membrane protein with its native structure and function. There are many types of membrane proteins, and the detergents optimal for various membrane proteins are not always the same. Membrane proteins often face problems with solubility. This is because there is a finite number of detergents available for research applications. Thus, development of new detergents is necessary. MelB St and MelB Ec, the melibiose permease of Salmonella typhimurium and Escherichia coli, respectively, are two well-studied prototypes for cationcoupled transporters. Both proteins are frequently used for testing detergent effects by serving as a benchmark. In this study, 17 designed and synthesized detergents have been assessed on their ability to extract the two MelB proteins from membranes and their efficacy in maintaining the protein stability and function. Compared to the reference detergent dodecylmaltoside (DDM), we have identified 12 novel detergents with superior features in MelB St extraction and stability. Few selected detergents were assessed for their capability to retain MelB function by a sugar-binding assay. Membrane vesicles expressing MelB St or MelB Ec were solubilized, and the detergent extracts were mixed with a fluorescent sugar analogue (dansyl galactoside,  $D^2$  G), a substrate of MelB. The intensity of Förster resonance energy transfer (FRET) from Trp to dansyl group can be reversed by a non-fluorescent sugar melibiose. The data show that while MelB St in each of the testing detergents including DDM binds the sugar substrates, MelB St binds galactosides only in these new detergents with stronger stabilizing abilities. The results suggest that these novel detergents are promising for future biological studies.

School: School of Medicine Campus: Lubbock

#### MS1-2 HERRMANN, JOSEPH

Effects of Contrast Sensitivity Loss and Reaction Times to Pedestrians in a Driving Simulator.

#### Joseph Herrmann, Jackie Albert, Garrett Swan, Alex Bowers

My project involved using a state of the art driving simulator at Massachusetts Eye and Ear Infirmary at Harvard Medical School in Boston Massachusetts to assess the impact of impaired contrast sensitivity on the reaction times of drivers. Cataracts are the most common age related visual impairment in the U.S. and they typically diminish a person's contrast sensitivity as well as their visual acuity. Past research has demonstrated a link between persons with diminished contrast sensitivity and past motor vehicle crash involvement as well as impairment of driver reaction times. Our project aim was to assess the degree of this reduction in reaction time, particularly whether the reactions of drivers in our study were "timely" or fast enough to avoid a collision. Since no states evaluate contrast sensitivity for obtaining a driver's license, we hoped to indirectly address the question of whether current vision standards for licensure effectively account for drivers with cataracts. We hypothesized that loss of contrast sensitivity would negatively impact the timeliness of reactions in our participants. In order to test this, we enrolled 15 drivers with at least two years driving experience, with binocular vision of at least 20/25 who had no adverse ocular history. These drivers then performed three drives wearing Bangerter filters which reduce the wearer's visual acuity and contrast sensitivity. They performed a fourth drive wearing a lense which reduced only visual acuity and a fifth drive with no impairment was used as a control. We found that pedestrian detection was nearly 100%, but that reaction time was significantly affected by loss of contrast sensitivity. In fact, at the highest level of contrast sensitivity impairment, the drivers in our study failed to react in time to avoid hitting a pedestrian 40% of the time. This is particularly important as these individuals would still qualify for a driver's license in all 50 states.

## MS1-2 HSU, CHIA

Dispersal of biofilms with commercially available glycosidic hydrolases with potential applications in wound healing

Joel Barrett, MS2, Chia Hsu, MS2, Derek Fleming, PHD Candidate, Kendra Rumbaugh, PHD

Chronic wounds are often complicated by the presence of bacterial biofilms, which can confer up to one-thousand percent increase in antibiotic tolerance and maintain a persistent state of inflammation that makes wound-healing extremely difficult. Effective treatments must deal with this protective barrier, and the biofilm may be manually debrided or chemically disturbed to disperse the pathogens, exposing the bacteria to the host immune system and potential medical interventions. Previously, our lab has demonstrated degradation of polymicrobial biofilms with in vitro and ex vivo models using multiple glycoside hydrolases, enzymes that target common glycosidic linkages within bacterial biofilms. The present study investigated the effects of multiple enzymes on S. aureus and P. aeruginosa co-cultured biofilm materials within the in vitro and ex vivo models previously established by the Rumbaugh lab. An approximate 80% reduction in biomass produced by P. aeruginosa and S. aureus in vitro following exposure to either Xylanase or Cytohelicase (p & lt; 0.05; n = 3) was found. Furthermore, preliminary data obtained via q-PCR found approximately 45% and 6% dispersal within samples exposed to Cytohelicase and Xylanase respectively. Another goal of the study was to examine the effect of a particular combination of two common glycoside hydrolases (cellulase and alpha-amylase) on bacterial dispersal for a variety of bacterial species. Quantitative PCR data from these trials demonstrated high dispersal percentages for in vitro mono-bacterial samples. Together, these results suggest a potential dispersal and bactericidal mechanism for some of the glycosidic hydrolases analyzed in the present study. Future work will examine the efficacy of these enzymes in vivo, as well as explore a wider variety of enzyme combinations, in order to estimate the clinical relevance of commercially available glycosidic hydrolases in treating biofilm-containing wounds.

School: School of Medicine Campus: Lubbock

#### MS1-2 JIDD, ADAM

Student Knowledge Integration of Life Lessons in Spirituality

Cheryl Erwin, JD, PhD, Adam Judd, MS2

Background: Religion and spirituality are important to many patients; and connecting with patients on a spiritual level can benefit patient care. These types of connections can help build patient trust, increase satisfaction with care, and enhance patient intention to adhere to physician recommendations (Street, 2008). However, lack of training, concerns about appropriateness, and questions about patient interest can all keep physicians from inquiring about patients' spirituality (Baetz, 2004; Rasinski, 2011). This disconnect is undermining the patient-physician relationship, and many patients are demanding that their physicians be able to address religiosity and spirituality with them (Kuczewski, 2007).

Purpose: This study aims to evaluate the perspective of students and physicians at Texas Tech University Health Sciences Center regarding curriculum in the spiritual dimension to health care in general and to determine their preference, in particular, with regards to inclusion of spirituality in their training.

Procedures: A survey was distributed among current students and faculty at TTUHSC. Responses of the faculty and students were compared. Of the responses that were statistically distinct, we did a thematic analysis and allocated the responses into four groups: diversity, communication, end of life needs, and understanding of resources available. Free-text responses about the pros and cons of addressing spirituality in healthcare written by the students and faculty were also qualitatively analyzed.

Conclusions: Many students are uncomfortable addressing spirituality in a healthcare setting, and further education on the topic is warranted.

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# MS1-2 KELLEY, JOHN

Analysis of potential disparities in access to care in West Texas versus East Texas

John Kelley, Debra Curti, Catherine Hudson

Rural West Texas presents several challenges in terms of effectively delivering health care in an emergency setting versus other areas of the state. Recent studies have shown that the low population density, in rural areas, creates potential disparities in care. Cities with a higher population density such as Houston and Dallas, located in East Texas, do not face these challenges because they are better equipped, have more trauma facilities, and have higher level personnel to deliver care. The barriers and challenges faced by rural emergency responders are significant and include poor phone service, insufficient broadband service, and lack of staff and significantly longer transport times from rural areas to appropriate emergency care. In this study we will analyze factors that contribute to these disparities, we will show differences in healthcare personnel and access to emergency services in the different regions and their impacts on patient care.

School: School of Medicine Campus: Lubbock

#### MS1-2 KIRK, DECLAN

Pediatric Orbital Fractures: A Ten Year Retrospective Chart Review

Declan Kirk, BS; Jane Gilmore, BS; Coby Ray, MD, MS, MBA; Eneko Lerumbe, PhD; David McCartney, MD

Background: Orbital fractures in pediatric patients are exceedingly rare, but when they occur they can cause vision threatening damage to the eye. Most facial fracture work-up protocols include imaging for potential orbital fracture. The orbit consists of 4 bony structure defined as the medial, inferior, lateral, and superior walls. There are 7 bones that make up these four walls. Isolated versus non-isolated wall fractures can be important in understanding the potential for ocular injury.

Methods: An IRB approved, retrospective chart review of all patients identified as having an orbital wall fracture in the UMC emergency department between 2008-2017 was undertaken. Data was collected including demographics, mechanism of injury, additional injuries, patient reported symptoms, radiographic findings, and required treatments. This data was analyzed based on which wall was fractured and whether or not the fracture was isolated to the respective walls.

Results: 40 patients of 569 charts reviewed were included in the pediatric cohort. The average age of the patient population was 11.9 years with 72.5% being in males. The breakdown of walls demonstrated 42.5% medial (12.5% isolated), 80% inferior (37.5% isolated), 25% lateral (0% isolated), and 12.5% superior (2.5% isolated). 17.5% of patients experienced loss of consciousness. Direct impact was most common mechanism of injury, followed by sports. Within those injured by sports baseball was the most common.

Conclusion: Although rare, orbital wall fractures in children can occur and can cause various symptoms. The most common reported symptom was pain in the globe or orbit followed by blurred vision and thus ED clinicians must be vigilant for orbital wall fractures in the setting of these symptoms, and especially when the mechanism of injury fits the patterns described above.

# MS1-2 KIRKPATRICK, CARSON

Prophylactic antibiotic usage is not associated with any difference in postoperative UTI-related complications after ileal conduit urinary diversion

Carson Kirkpatrick, MS2, Allen Medway, MD, Pranav Sharma, MD

Introduction: Majority of complications after ileal conduit urinary diversion with cystectomy are related to urinary tract infections (UTIs). Controversy exists regarding use of prophylactic antibiotics after surgery. We determined if prophylactic antibiotic use during ureteral stent placement after ileal conduit urinary diversion decreased incidence of UTI-related complications.

Methods: We retrospectively identified 75 consecutive patients who underwent ileal conduit urinary diversion with cystectomy at our institution from 2010 - 2016. Patients were stratified based on presence or absence of a UTI-related complication in the 90-day postoperative period. Means were compared with independent T-test and proportions with chi-square analysis. Multivariate logistic regression was performed to determine independent predictors of UTI-related complications.

Results: Forty-five patients (60%) were prescribed prophylactic antibiotics after surgery. Mean duration of antibiotic use was 15 days, and mean duration of ureteral stenting was 25 days. Most common antibiotics used included fluoroquinolones (n=23, 30.7%) followed by sulfamethoxazole-trimethoprim (n=14, 18.7%). Rate of 90-day UTI-related complications was 36% (n=27), and 90-day UTI-related readmission rate was 14.7% (n=11). On bivariate and multivariate analysis, prophylactic antibiotic use was not associated with reduced 90-day UTI-related complications (p>0.05). Patients prescribed prophylactic antibiotics had increased incidence of Clostridium difficile infections in the 90-day postoperative period compared to controls (20% vs 3.3%; p=0.038).

Conclusions: Prophylactic antibiotic use after ileal conduit urinary diversion with cystectomy was not associated with reduced UTIrelated complications, and rate of Clostridium difficile infections was higher in this patient cohort. The effect of early removal of ureteral stents on UTI risk still has to be elucidated.

School: School of Medicine Campus: Lubbock

#### MS1-2 KONG, LYDIA

Mortality And Pneumonia Rates In Rib Fractures: A National Trauma Data Bank Review 2010-2014

Yana Puckett, MD, MPH, MSc; Lydia Kong; Hannah Pham; Sharmila Dissanaike, MD, FACS; Steven E. Brooks, MD, FACS

OBJECTIVES: Surgical stabilization of rib fractures, aggressive pulmonary toilet, and epidural and paravertebral blocks have become mainstay treatment and increasingly popular in the management of trauma patients with rib fractures. Previous studies have associated increased age and number of rib fractures with increased mortality and complication prompting a paradigm shift in treatment. We hypothesize that mortality and pneumonia rates have decreased over the years due to improvements in rib fracture management.

METHODS: Retrospective NTDB data was extracted between 2010-2014 for patients with rib fractures (dcodes 807-807.4). Patient demographics, number of fractured ribs, and pneumonia and mortality rates were abstracted. Patients were dichotomized by age  $a_{W} \le 65$  or < 65. Pearson  $e^{TM}$ s correlation was used to compare trends in mortality and pneumonia. Chi-Square test was used to compare mortality and pneumonia rates with levels of rib fractures. Significance at P < 0.05.

RESULTS: A total of 789,769 rib fracture patients were analyzed. Total overall mortality and pneumonia rates were 0.29% and 9.01%, respectively. In patients  $\hat{a}$ %¥ 65, overall mortality rate decreased by 0.14% (R2= -0.623, P=0.262) and pneumonia rate decreased by 1.55% (R2= -0.986, P=0.002). In patients < 65, there was no significant change in overall mortality (R2= -0.189, P=0.761) or overall pneumonia (R2= -0.283, P=0.644) rates. There was no statistical difference in either mortality or pneumonia rates in conjunction to rising number of rib fractures in either age group.

CONCLUSIONS: Improved management and treatment of rib fractures over time (2010-2014) has contributed to the observed decrease of overall rates in both mortality and pneumonia in patients  $\hat{a}$ %  $\pm$  65 with rib fractures. Rising number of rib fractures may no longer be associated with concomitant increase in pneumonia and mortality rates.

# MS1-2 LE, AUDREY

Developing a Database for Forensic Analysis: Impact of Water Temperature and Exposure Time on Scald Burns in Human Skin.

Audrey Le BA, Natalie Tully BS, Sharmila Dissanaike MD

Introduction: Determining the time of exposure to a given water temperature is a valuable tool in assessing the etiology of a scald. This becomes extremely important in forensic analysis in the setting of suspected child and elder abuse. It is known that increasing the water temperature not only decreased the time to scald, but also increases the severity of the scald; however, little research has been done to accurately predict these measures on fresh human skin. Furthermore, the available data does not account for variations in age and ethnicity. Considering what these determinations may expose about the nature of the patient $\hat{a} \in \mathbb{T}^M$ s condition, we sought to increase the accuracy of available data.

Methods: Patients undergoing elective surgery of healthy tissue from the abdomen and lower limb donated the removed tissue for this study. Immediately after surgery, the skin was dissected into 2 cm x 2 cm samples and exposed to water baths starting at 50 degrees and visualizing the time it took to develop a second degree and third degree scald. The skin was then discarded and the trial was repeated with a fresh sample from the same tissue at 60, 70, 80 and 90 degrees.

Results: In this study, skin was obtained from 11 patients of Caucasian and Hispanic descent. Time to second and third degree scald decreased rapidly as water temperature increased. Differences in time to burn were noted at lower temperatures, and variability among patients decreased as the temperature increased.

Conclusions: There is variability in time to scald in human skin at lower temperatures, which narrows with increasing water temperature. We are expanding this study to a larger sample size in order to build a robust reference tool. The results of this study will provide the groundwork for more reliable estimation of the time and temperature necessary to cause a scald burn. This will improve our ability to provide determinations of non-accidental injury and direct preventive measures.

School: School of Medicine Campus: Lubbock

## MS1-2 LEAR, MICHELLE

The Association between Body Mass Index and Airway Pressures in Patients with Sepsis and Acute Respiratory Failure

Michelle Lear, Hawa Edriss, Asley Sanchez, Edna Juarez, Shengping Yang, Kenneth Nugent

Purpose: Patients with increased BMI have excessive adipose tissue in the thoracic wall and abdomen. This reduces chest wall compliance and creates worse gas exchange secondary to abnormal ventilation/perfusion relationships in the lung bases. This study considers the effect of obesity on the pressures required for mechanical ventilation in patients with sepsis and acute respiratory failure.

Methods: The EMR of patients hospitalized between 2010 and 2016 with sepsis who required mechanical ventilation were reviewed to collect demographic characteristics, clinical information including BMI, mechanical ventilation pressures, management requirements, and outcomes including mortality and length of stay in the ICU and in the hospital. Peak pressures and plateau pressures were recorded 24 hours after admission and the initiation of mechanical ventilation. This timeframe allowed clinicians to adjust the ventilator and stabilize the patient.

Summary: This study included 173 adult patients. The mean age was 58.5 Å $\pm$  16.7 years; 53.2% were men. The mean BMI was 29.6 Å $\pm$  11.9. The mean white blood count was 14.3Å $\pm$  8.0 k/ŵL, 43.9% of the patients had pulmonary infections, and 34.7% had extrapulmonary infections. The overall mortality was 44.5%. The mean length of stay was 12.4 Å $\pm$  11.8 days in the ICU and 16.6 Å $\pm$  13.6 days in the hospital. The mean peak pressure on day one of mechanical ventilation increased from 19.5 Å $\pm$  5.1 cm H2O in underweight patients (BMI< 18.8) to 26.0 Å $\pm$  8.0 cm H2O in patients in the obese category (BMI> 30). The mean plateau pressure on day 1 of mechanical ventilation increased from 16.3 Å $\pm$  4.3 cm H2O in underweight patients to 21.3 Å $\pm$  5.5 cm H2O in obese patients.

Conclusions: These results indicate that patients with increased BMI require higher average ventilator pressures to maintain adequate gas exchange. This likely reflects reduced chest wall compliance and suggests that trans-pulmonary pressures are less certain in these patients.

## MS1-2 LITTLEJOHN, JACKSON

Design of an Approach to Produce a Highly Pure Soluble Chimera of the GABAAÏI Intracellular Domain

Jackson V. Littlejohn, Akash Pandhare, Ali F. Ahmed, Michaela Jansen

The GABAAÏ1 receptor is an anion-conducting pentameric ligand-gated ion channel (pLGIC) within the Cys-loop superfamily of receptors that binds Î<sup>3</sup>-aminobutyric acid (GABA), an inhibitory neurotransmitter. Receptors in the Cys-loop superfamily have three domains: the extracellular domain (ECD), the transmembrane domain (TMD), and the intracellular domain (ICD). While the structure of the ECD and the TMD are highly conserved between the different types of receptors within the superfamily, the ICD has been shown to have high variability between the subtypes. For the former reason, many drugs in clinical use that target these receptors, such as general anesthetics, anti-seizure drugs, anxiolytics and sedatives, also bind to other members in the Cys-loop superfamily, causing a wide range of unwanted side-effects. Consequently, it is important that the different ICDs in the superfamily be characterized in order to aid in the development of newer drugs with specific binding, to eliminate adverse side effects. While X-ray crystallography has been able to elucidate the structures of the ECD and TMD individually, the complete ICD of any Cysloop receptor has yet to be characterized.

Here we aim to characterize, in-depth, the structure of the GABAAÏ1 ICD. First, we created a soluble chimera of the GABAAÏ1 receptor ICD, in which the ICD is conjugated at the N-terminus to a maltose binding protein, and at the C-terminus to a 6-His tag. Then, we focused on optimizing the expression of this chimera in E. coli cells, followed by a 3-step purification strategy in an effort to produce the highly pure ICD in sufficient quantity and quality. Future studies are aimed at elucidating the structural information by utilizing various techniques such as size-exclusion chromatography coupled with multi-angle light scattering (SEC-MALS), circular dichroism (CD), and X-ray crystallography.

School: School of Medicine Campus: Lubbock

### MS1-2 LITTLEJOHN, MARGARET

Long-Term Growth, Neurodevelopmental, and Systemic Outcomes in Laser and Bevacizumab-Treated Infants with Retinopathy of Prematurity

Margaret Littlejohn, MS2, Lingkun Kong, MD, PhD, Ann Demny, BSN, Robert G. Voigt, MD, Sonia A. Monteiro, MD

Purpose: Recent usage of intravitreal bevacizumab (IVB) to treat retinopathy of prematurity (ROP) has led to questions regarding systemic absorption of bevacizumab and its potential long-term side effects. We performed a prospective, observational clinical study to test the hypothesis that IVB-treated infants have similar long-term growth and systemic outcomes compared to laser-treated infants.

Methods: Total of 67 infants were who were treated with IVB injection (N=47) or laser (N=20) from 2010 to 2014 were enrolled. The neurodevelopmental outcome measurements include body weight (BW), height and head circumference (HC) at age 1 and 3; neurodevelopmental quotient (DQ) at age 1 and 3. Systemic multi-organ functional outcomes include hepatic, renal, and hematologic lab values. Two-tailed Studentâ $\in$ TMs t- tests were used to compare the group means of the IVB-treated and laser-treated groups.

Results: There was global developmental delay in both groups. Patients in both groups showed progress over time, but the changes were not significant, p=0.1 to 0.7. There were no significant differences in neurodevelopmental sub-domains, body weight, height and HC between the two groups at age 1 and 3, p=0.3. Infants treated with IVB had lower AST levels (p=.002) at 2 months post treatment as well as lower albumin levels (p=.034) at 4 weeks post treatment. IVB treated infants showed lower creatinine levels (p=.013) at 2 months post treatment. Other renal lab values showed non-significant differences in groups. IVB treated infants demonstrated significantly lower blood glucose (p=.041) at 2 years of age. No significant differences between IVB and laser treated infants were demonstrated in hemoglobin, hematocrit, or platelet counts.

Conclusions: Our results indicate that there re differences in liver, kidney and blood glucose lab tests between IVB and laser treated infants. The clinical significance of these changes needs to be investigated.

## MS1-2 LUNG, JOHN

Evaluating Stressors, Activities, and Safety Net with Medical Student Quality of Life

John Lung, Ethan Evans, Adam Tsen, Betsy Goebel Jones EdD, Jeff Dennis PhD

Background: Quality of life among medical students is a composite of academic satisfaction, coping mechanisms, and positive emotions. To our best knowledge no studies have examined quality of life as measured by medical student happiness levels based on stressors, activities, and family support levels. We hypothesized that a higher quality of life would correlate with lower levels of stress and higher levels of family support, fitness, eating habits, and academic performance.

Methods: A survey was sent to all TTUHSC School of Medicine students that included the Subjective Happiness Scale, a validated measure of oneâ€<sup>TM</sup>s subjective account of happiness; hours spent each day on activities; stressors about money/budget, school/ studying, relationships, health/appearance; and family financial support for unexpected expenses.

Results: Our survey received 256 responses. Medical students scored high overall (mean = 5.24, SD=1.25) on the subjective happiness scale with no significant differences between gender, medical school year, or ethnicity. A logistic regression showed that those who say their parents or family are  $\hat{a} \in \alpha$  very likely $\hat{a} \in$  to help with unforeseen expenses are significantly more likely to report a happiness score of 6-7 (OR 2.46, 95% CI: 1.41, 4.38). Students reporting higher stress about school (OR 0.60, 95% CI: 0.45, 0.60) and health (OR 0.65, 95% CI: 0.48, 0.89) are less likely to report a happiness score of 6-7.

Conclusion: Our findings demonstrate a financial safety net as an independent predictor of happiness level for medical students. Medical students are less likely to be happy if they are stressed about school or health, but reported a high level of happiness. Our results indicate that improving programs to bridge unexpected medical expenses could help improve medical student quality of life.

School: School of Medicine Campus: Lubbock

## MS1-2 LUNNEY, AUSTIN

Moderate or severe LUTS is associated with increased recurrence of non-muscle-invasive urothelial carcinoma of the bladder.

Austin Lunney, Pranav Sharma MD, Allan Haynes MD.

Introduction: Non-muscle-invasive bladder cancer can recur despite transurethral resection (TURBT) and adjuvant intravesical therapy. Tobacco products excreted in urine are hypothesized to cause tumor-promoting effects on urothelial cells through direct contact via mechanisms such as immunomodulation. We determined if moderate or severe lower urinary tract symptoms (LUTS) (defined as International Prostate Symptom Score [IPSS]>8) was associated with increased tumor recurrence.

Methods: We retrospectively identified 70 consecutive men initially diagnosed with non-muscle-invasive urothelial carcinoma of the bladder at our institution from 2010  $\hat{a} \in 2016$ . Patients were stratified based on presence or absence of tumor recurrence on follow-up. Means were compared with independent T-test and proportions with chi-square analysis. Multivariate logistic regression was performed to determine independent predictors of recurrence.

Results: Majority of patients had Ta disease (58.6%) followed by T1 (28.6%) and Tis (12.9%). Forty-one (58.6%) patients had moderate or severe LUTS upon presentation within 30 days of initial TURBT with mean IPSS of 13.2 vs 5.2 in control group (p<0.01). Biopsy-proven tumor recurrence occurred in 24 (34.3%) patients at mean follow-up of 31.7 months. Mean time to recurrence was 14.6 months. Twenty-two of 41 (53.7%) patients with moderate or severe LUTS developed tumor recurrence vs 2 of 29 (6.9%) controls (p&lt;0.01). Moderate or severe LUTS was an independent predictor of tumor recurrence (odds ratio [OR]: 20.7, 95% confidence interval [CI]: 3.3  $\hat{a} \in 131$ ; p=0.001).

Conclusions: Contact time with urine may be an important prognostic factor in non-muscle-invasive bladder cancer. Patients with significant urinary symptoms should be treated aggressively to minimize recurrence risk.

## MS1-2 LYUKSYUTOVA, ANNA

Inhibition of glucosylceramide synthase using near-infrared light based microRNA regulation as a model for hepatic steatosis treatment.

Anna Lyuksyutova, Della Simmons, Jesse Hinshaw, Taylor Doherty, Gavin Lawlis, Mark Gomelsky

Cardiometabolic syndrome is a precursor state associated with both type II diabetes and cardiovascular disease. It has been demonstrated recently that sphingolipid accumulation in obese mice contributes to insulin resistance, dislipidemia and hypertension, all hallmarks of cardiometabolic syndrome. Attenuation of sphingolipid production via inhibition of glucosylceramide synthase (GCS) is a powerful new approach for reduction of hepatic steatosis and blood triglyceride levels, as well as improved insulin sensitivity in obese rodents. Here, we show that microRNA-190 and microRNA-200 are able to inhibit GCS levels in mammalian cell culture as well as in vivo in Drosophila melanogaster. Specifically, presence of these microRNAs significantly impairs accumulation of lipids in Drosophila fat bodies and subsequently delays pupation onset. However, as both microRNA-190 and 200 are predicted to regulate other gene targets, it is imperative to control their expression both temporally and spatially. In collaboration with Dr. Gomelsky we have created tools for precise temporal and spatial control of expression using near-infrared light (NIR), which has several orders of magnitude better penetration into liver, heart and other perfused organs. Here, we present our preliminary work on microRNA and NIR light delivery in mice. If successful, these type of experiments will provide a platform for temporal and spatial inhibition of not only sphingolipid production via GCS, but also a vast variety of other therapeutically important targets.

School: School of Medicine Campus: Lubbock

#### MS1-2 MARTIN, LIVINGSTON

Seattle Children's Clinical Effectiveness: Designing a Pathway for Kawasaki Disease (KD)

Livingston Martin; Michael G. Leu, MD, MS, MHS; Ivan Meyer, PMP, LSSGB

Â Clinical informatics is a multidisciplinary field that seeks to improve healthcare by increasing quality and efficiency, while reducing cost and medical errors. Some examples include creating clinical pathways and guidelines, and building and maintaining medical information, communication and analytics technologies. One component of clinical informatics is clinical effectiveness, which seeks to improve treatment by using clinical audit, evaluation and rapid cycle improvement to build clinical decision support algorithms. This research project involved working with the clinical effectiveness team at Seattle Childrenâ $\in$ TMs Hospital to design a clinical decision pathway for Kawasaki Disease (KD). KD is an acute vasculitis that presents with prolonged fever and subsequent cardiac complications.

Â Â Â The goal of the clinical effectiveness team is to drive clinical improvement through use of evidence, consensus and analytics. This is achieved by mapping out gaps in clinical diagnosis and treatment of KD, while reviewing available literature to create the most effective diagnosis and treatment algorithm. This is done in several stages. The first stage is the development of the current state. This is a comprehensive analysis of the current way KD is diagnosed and treated. The next stage of development is an extensive literature review, which finds what studies and guidelines exist to inform the development of the new treatment algorithm. The findings are then incorporated into a new decision support algorithm. Next is the build where the new algorithm is tested and analyzed by the same team that created the current state. Once it is approved, it is implemented within the Seattle Childrenâ $\in$ TMs EHR for clinicians to use, and is made available both online and directly to other hospitals. The aim of this research was to understand what are the recommended labs to order in KD and to update the clinical decision support.

# MS1-2 MCCARTY, BRANDON

Degenerative Spine Changes in Youth Patients who participated in sports.

Brandon McCarty; Dr. Laszlo Nagy

Spinal degeneration has been suggested to be prevalent in both children who have elevated BMI and children who participate in football, baseball, and gymnastics. Although a recent study has focused on the spinal degeneration seen in adolescent motocross racers as compared to age-matched non racersnon-racers, it seems apparent that an investigation of the association between spinal degeneration and general youth sport participation is overdue. Since the sports of football, baseball, and gymnastics all are conceptually dif-ferent in their approach to both competition and "game†play, it is interesting that all three have had evi-dence of spinal degeneration even though the mechanism of body movement throughout participation and risk factors of the three sports differ. However, an investigation in the overall presence of spinal degeneration type among the three sport categories is needed so that educated con-clusions can be drawn regarding the nature and prevalence of spinal degeneration within both the individual sport and through the comparisons of the sports to each other. To have reliable conclusions, the evidence of elevated BMI association with increased spinal degeneration severity must be accounted for and used to rule out other potential causes of spinal degeneration seen in youth sport participation since children of many shapes, sizes, and BMIs engage in youth athletics.

School: School of Medicine Campus: Lubbock

#### MS1-2 MCKINNEY, JORDAN

Sporotrichosis: A Case of Microbial Mimicry

Jordan McKinney, Dr. Fatma Levent

Sporotrichosis is an infection commonly caused by the dimorphic fungus Sporothrix schenckii. Individuals usually contract sporotrichosis via soil contaminated with fungal spores, which is often associated with sphagnum moss, rose bushes, and hay. In the United States, this fungus has been associated with outbreaks in New Mexico, Missouri, Oklahoma, and Texas. Lymphocutaneous infection is the most common form of the infection, especially in children, where the site of infection slowly progresses from a singular lesion to an unhealing ulcer. It is not uncommon for sporotrichosis to present with eosinophilia. According to current guidelines, itraconazole 200 mg orally daily for lymphocutaneous sporotrichosis is recommended for a total of  $3\hat{a}$ <sup>6</sup> months (including 2â€"4 weeks after all lesions have resolved). A 6-year-old previously healthy male presented to the clinic with a 2-month history of enlarged cervical lymph nodes. On exam, the original lesion had left a linear scar while another one had increased erythema; painless lesions had appeared ascending the neck from the initial lesion. The mother noted that the patient had been more easily fatigued, but no pain or fever at the time of visit. Patient was initially treated with antibiotics due to suspected Bartonella henselae infection associated with the history of cat exposure. However, laboratory results repeatedly were negative for Bartonella henselae and Toxoplasma serology. Complete blood count with differential revealed eosinophilia. After failed rounds of antibiotics, patient was prescribed empirical itraconazole treatment due to the history of patient falling into a haystack from around twenty feet one month before initial cervical lymphadenopathy. After three weeks of itraconazole treatment, patient was active and well with complete resolution of lymphadenopathy. Although uncommon, sporotrichosis remains as a disease that can cause localized infection and eventually dissemination if not properly treated on time.

#### MS1-2 MENDE, SARAH

Eribulin Induced Encephalopathy in a Patient with Advanced Breast Cancer

Sarah Mende, MPH, MDc, Drew Rasmussen, MPHc, Summre Blakely, MPH, Hafiz Khan, PhD, Abhilash Perisetti, MD

Introduction: Eribulin is used for patients with advanced breast cancer (ABC) as an anti neoplasticism agent by inhibiting microtubule activity, thereby inhibiting actions against breast cancer. The purpose of this case study was to report a situation in which a ABC patient that was treated with Eribulin developed drug-induced CNS toxicity that improved with steroid administration.

Case Description: A 49-year old female with a history of ABC presented with altered mental status. Per her family, she was found unresponsive at home since the last one day. Due to her ACB diagnosis she was extensively treated with partial lumpectomy, chemotherapy, and radiology. Two weeks before presentation she was started on the 1st cycle of Eribulin. Her physical exam showed that she was oriented only to place and had slightly elevated blood pressure. Laboratory testing showed minimally elevated WBC, but otherwise normal labs. Non-contrast CT scans head was negative for a bleed, mass or space-occupying lesion. MRI showed bilaterally symmetrical basal ganglia hyperintensity without metastatic deposits. Carbon monoxide or cyanide exposure was ruled out with blood work. Due to suspicion for Eribulin related CNS toxicity, the patient was given a trial of dexamethasone, a steroid, and showed significant reversal of confusion and became lucid within a few hours.

Conclusion: Neutropenia, dizziness, headache and peripheral neuropathy have all been noted as side effects of Eribulin for treating ACB, but this was the first case of Eribulin induce encephalopathy with steroids as a potential treatment option. Preclinical evidence suggests that the agent does not cross the blood-brain barrier (BBB) to a significant extent, but as radiotherapy has been linked to compromise the BBB, this may be a potential mode of entry. Eribulinâ $\in$ <sup>TM</sup>s specific effects are unclear. Future studies could help identify its potential effects on the CNS.

School: School of Medicine Campus: Lubbock

## MS1-2 MILLER, MARY (KATIE)

Incidental radiological finding leading to neonatal Herpes Simplex Virus diagnosis

Mary Miller1; Fatma Levent, MD1; Roy Jacob, MD2

Neonatal Herpes Simplex Virus (HSV) can result in permanent sequelae despite its low prevalence. Central nervous system (CNS) involvement occurs in approximately one-third of the cases, with typical manifestations including seizures, lethargy, poor feeding, and skin lesions. In the absence of skin lesions, the initial presentation of HSV CNS disease may be indistinguishable from other causes of neonatal sepsis or meningitis.

We report a case of a two week old female born at 32 weeks of gestation presenting with intrauterine growth retardation (IUGR) and respiratory distress. The mother denied any history of cold sores, genital ulcers, or vesicles. The patient was started on empiric antibiotics which were discontinued since the cultures remained negative. She had a normal physical examination, however continued to have poor feeding. On day of life 10, a head echoencephalogram (US) was significant for mild dilation of ventricles with increased echogenicity. A repeat Head US was consistent with ventriculitis which lead to a Magnetic Resonance Imaging revealing diffuse leptomeningeal and periventricular enhancement. A lumbar puncture was performed; cerebrospinal fluid showed pleocytosis with lymphocytic predominance. Gram stain and culture remained negative, but an HSV-1 polymerase chain reaction (PCR) was positive.

The patient initially received empiric acyclovir, and antibiotics which were discontinued once cultures were negative. She continued treatment with intravenous (IV) acyclovir for 21 days. She was discharged to continue oral acyclovir until six months of age.

Although neonatal HSV infection with CNS involvement commonly presents with seizures, lethargy, irritability or poor feeding, early in the course, none of these symptoms may be present. Evaluation for HSV infection and empiric acyclovir treatment should be considered in all neonates with aseptic meningitis or other signs or symptoms of meningoencephalitis without an obvious bacterial cause.

# MS1-2 MITCHELL, DIANA

The Influence of Mechanical and Oral Bowel Prep in Outcome of Retrieval of Greater than Twelve Lymph Nodes in Elective Colon Cancer Colectomy

Yana Puckett, MD, MPH, MS, Diana Mitchell, MBA, RN, Sharmila Dissanaike, MD, FACS, Amir Aryiae, MD, FACS

The use of preoperative bowel preparation is a heavily debated topic in colorectal surgery literature. Studies suggest excising 12 or more lymph nodes (LN) during colectomy in patients with colon cancer is associated with improved survival. To date, no study has investigated the effect of preoperative bowel preparation on the ability to retrieve > 12 LN in elective colon cancer surgery. We elected to determine the influence of mechanical and/or oral bowel preparation in ability to retrieve 12 LN in elective colon cancer colectomies.

National Surgical Quality Improvement Program database (NSQIP) was analyzed for the year 2014 to 2015. Data abstracted included number of nodes retrieved, type of operation performed, whether chemotherapy was administered within 90 days of operation, and stage of cancer at time of colon resection. Data was compared between patients that received mechanical and oral antibiotic bowel prep (MOABP) to those that didn't. Binary logistic regression was used to identify confounding variables in retrieval of greater than 12 LN in patients that underwent a preoperative MOABP.

After accounting for missing cases, a total of 18,792 patients with a diagnosis of colon cancer were analyzed. Greater than 12 lymph nodes were retrieved in 88% (16,538) of patients. MOABP was used in 34.21% (5,721). Patients with MOABP had a higher rate of retrieval of greater than 12 lymph nodes (p=0.004). Open operative approach compared to laparoscopic was associated with 15% greater odds of retrieval of >12 lymph nodes (OR 1.148; 95%CI (1.035-1.272); P=0.009); >T2 status (OR 1.273; 95%CI (1.148-1.413); P<0.0001); and metastatic colon cancer (OR=1.194; 95% CI (1.013-1.408); P=0.035. Patients that underwent chemotherapy within 90 days of colectomy had a 16% less chance of retrieval of &gt;12 lymph nodes (OR=0.834; 95% CI (0.723-0.963); P=0.013).

The use of combination MOABP before surgery for colon cancer increases chance of retrieval of >12 LN in ele

School: School of Medicine Campus: Lubbock

#### MS1-2 NAIR, ARYA

#### ACell Urinary Bladder Matrix for Complex and Chronic Wounds

Arya Nair, Maleeh Effendi, Mayank Aranke, Eneslo Idicula, Dr. Catherine Ronaghan, Dr. John Griswold

One of the leading causes of nosocomial morbidity in hospital patients is a surgical site infection (SSI), which is defined as an infection that happens up to 30 days after an operation. SSI's remain relatively common, occurring in 3% to 20% of surgical procedures. Aside from greater morbidity and mortality, these infections are an encumbrance to treat and have heavy demands on healthcare resources due to the extended hospital stay. A consequence of a SSI is that the wound becomes progressively more difficult to close and transforms into a chronic open wound. Not only does the patients' mortality dramatically increase; the scenario presents an immense burden to the countryâ€<sup>™</sup>s healthcare system. ACell matrix has been used to treat chronic open abdomen wounds with remarkable success, often with multi-drug resistant bacterial infections. The following case aims to demonstrate the potential of ACell matrix in healing an abdominal surgical site infection that becomes a chronic, recalcitrant wound. The methods discussed offer an attractive alternative to NPWT, negative pressure wound therapy, the current standard of care for open abdomen wounds. NPWT takes upwards of 3 months to heal, is painful, and inconvenient. While many SSIâ€<sup>™</sup>s have been successfully treated with Acell Matrix at our facility, the patient discussed had such exacerbating comorbidities and habits detrimental to wound healing that wound closure seemed extremely unlikely. The patient had an active smoker status with a 100 pack year history, rheumatoid arthritis, systemic lupus erythematous, peripheral vascular disease, protein calorie malnutrition, and sarcopenia. The patient was further immunosuppressed with prednisone therapy. Additionally, the patient lived in a remarkably unsanitary home environment with fecal matter in the bed. Despite this, the patient healed with ACell therapy, and the discussion that follows comments on the prognostic advantages and improved outcomes seen when compared with NPWT.

### MS1-2 NGUYEN, QUANG

€Œis Hands-On Endoscopic Lab Training Beneficial To Surgical Residents? Residents Prospective Of Surgical Endoscopyâ€

Quang Nguyen, MBA; Chanaka N. Kahathuduwa, Ph.D.; Theophilus Pham, MBA; Sarah Elise Wilson; Adel A. Saleh, MD; Amir Aryaie, MD

Introduction: Endoscopy is an important skill for general surgeons to possess. However, there is lack of training in endoscopy within surgery residency programs. We implemented a one-day endoscopic surgery course with the aim of improving the confidence of surgical residents in performing endoscopic procedures. We also aimed to examine the effect of the exposure to this course on self-reported confidence in performing endoscopic procedures.

Methods and Procedures: The Fundamental of Endoscopic Surgery Course at Texas Tech University Health Science Center is a one-day course consisting of both didactic training and hands-on lab training. The didactic part of the course is taught by attending physicians and focuses on the basics of endoscopy, management of upper and lower gastrointestinal (GI) bleed, and techniques to perform a variety of GI endoscopic procedures on swine esophagus and stomach explant. The lab portion of the course allows residents to perform different endoscopic surgical procedures with the attending physicians providing guidance. Residents from PGY-1 to PGY-5 participated in the course. A 14-item questionnaire that measured the self-reported confidence in performing several endoscopic procedures on a 1-5 Likert scale was administered before and after the course.

Results: Twenty-two participants successfully completed the training and the questionnaires. A significant improvement was observed in the overall confidence in performing a variety of endoscopic procedures (1.231  $\hat{A} \pm 0.384$ , p <0.001). The improvements remained significant even after controlling for the years of postgraduate surgical training (P &lt; 0.001).

Conclusion: The one-day Fundamental of Endoscopic Surgery Course enabled residents to be more confident with endoscopic procedures. Overall, the residents felt that the course was helpful and would like to attend more than one session per year. This course should be held, at least, annually to allow the general surgery residents to become eve

School: School of Medicine Campus: Lubbock

## MS1-2 ORTIZ, PRISCILLA

#### Efficacy of Sm-p80 in Natural Mimic Conditions in Baboon: Determination of IgG1 Antibody Titer and Egg Burden

Priscilla Ortiz, Ryan Alanzo, Jaxon Thomas, Whitni Redman, Arif Siddiqui, Samra Lazarus, Adebayo Molehin, Souad Sennoune, Weidong Zhang, A.A. Siddiqui.

Schistosomiasis is a devastating parasitic neglected tropical disease that currently affects hundreds of millions of individuals. Due to the complex life cycle of schistosomes, inefficient control measures currently in place, and risk of drug resistance to praziquantel (PZQ), an alternative elimination strategy is imperative. While several vaccines for schistosomiasis are in various stages of animal and human trials, the Sm-p80 vaccine shows significant promise. Targeting the membrane renewal protein calpain, the Sm-p80 vaccine is the only schistosomiasis vaccine shown to have prophylactic as well as therapeutic effects. In acute murine and baboon studies, Sm-p80+CpG-ODN vaccine had the ability to increase total IgG titers, and decrease the amount of S. mansoni eggs passed in stool and retained in tissues.

Any proposed schistosomiasis vaccine will primarily target populations in endemic regions. As individuals in these regions have likely been infected with schistosomiasis and given PZQ treatment at a previous point, it is important to consider the effects of past exposures and treatment to schistosomiasis when testing a vaccine. In this study, 10 baboons were chronically infected with Schistosoma mansoni and received PZQ treatment to mimic natural infection conditions in endemic communities. Baboons were divided into two groups (n=5), with the experimental group receiving the Sm-p80+CpG-ODN vaccine and the control group receiving CpG-ODN vaccine both followed by two boosters. The experimental group expelled fewer eggs in their stool when compared to the control group. Experimental baboons also exhibited less egg retention in the liver (36.7%), small intestine (74.9%), and large intestine (51.7%) compared to control baboons. An increased IgG1 titer was also detected during post-vaccination cercarial challenge with S. mansoni in experimental baboons in comparison to control baboons, which suggests an increased protection against S. mansoni in experimental baboons.

## MS1-2 PARK DEWITT, JUDY

Eliminating errors during routine biopsies using a dual independent verification protocol

Usman Asad, BS; Judy Park DeWitt, BS; Kleesy L. Thomas, MD; Cloyce L. Stetson, MD

At the TTUHSC Dermatology Clinic, our QI project aimed to improve patient safety during routine biopsy procedures by preventing errors in patient identification, anatomic site specification and characterization and placement of specimens during accession. We developed and implemented a standardized specimen labeling protocol that limits the number and impact of such errors. The protocol consisted of: 1) a formalized  $\hat{a}\in$ œtime-out $\hat{a}\in$  procedure in which staff verify the patient name and date of birth, 2) a  $\hat{a}\in$ œcall-out $\hat{a}\in$  process where the physician first states aloud the respective anatomic site during specimen collection, and the nursing staff verifies this by repeating the anatomic site aloud, and 3) a biopsy sheet to be signed, at any location on paper, by the physicians and nurses, confirming that the verification had been performed. The protocol began in February 2017, and six errors were reported during the first month. Upon further investigation, it was determined that the time-out procedure was being done infrequently. As an intervention, a time-out verification signature line was added to the biopsy sheet that was to be signed by the nurse upon successful time-out completion. The staff was also re-educated on the importance of time-out procedures. The interventions were successful, as no errors were reported in the second and third months.

School: School of Medicine Campus: Lubbock

#### MS1-2 PATEL, RAJ

Gender Based Difference in Serotonin in Relation to Alzheimer's Disease

Raj Patel, Ethan Evans, Arubala P. Reddy, P. Hemachandra Reddy

Depression is a commonly referenced comorbid condition associated with Alzheimerâ<sup>CTM</sup>s disease (AD) and is an area with limited treatment options that leads to difficulties in patient care. Depression tends to be higher in women compared to men however this relationship is not well understood. Previous studies have indicated that serotonin synthesis is higher in men compared to women while anxiety is twice as prevalent in women compared to men. Clinical evidence has suggested that both depression and anxiety are precursors to AD. The causal factors for the high rate of these comorbid conditions is not well understood. The underlying mechanism for reduced serotonin and its relation to AD in women is not well defined and there is limited understanding of how dysfunction in serotonin is related to AD. We hypothesize that the expression of serotonin is altered earlier in the brains of women compared to men and that these serotonin related chemical changes are more pronounced in pre-menopausal women. To test this hypothesis, we studied the cellular and molecular changes in both the brains of healthy humans as well as primates. Using Affymetrix gene expression we were able to study the serotonin enriched brain tissue of humans and rhesus monkeys and using this data we were able to compare these microarrays to both men and women. The results of our study indicated that mRNA levels were differentially expressed in men relative to women in both human and primate assays. The altered chemical pathways that were observed are mitochondrial, BDNF and G protein coupled receptor genes. Overall our study suggests that there is reduced energy metabolism in women compared to men and that this is linked to lower serotonin levels. This reduction in energy metabolism could serve as a preliminary factor towards the cascade of events that eventually could lead to the development of AD.

## MS1-2 PHAM, THEOPHILUS

Quantintative Risk Assessment For Post-Hepatectomy Liver Failure: Analysis Of The 2015 Acs-Nsqip Procedure-Targeted Hepatectomy Database

Yana Puckett, MD, MBA, MPH, MS; Theophilus Pham, MBA; Edwin Onkendi, MD, FACS

Background: Post-hepatectomy liver failure (PHLF) is a feared complication following liver resection and a majorcause of significant perioperative morbidity and mortality. The aim of this study was to analyze the quantitative risk association of perioperative factors with PHLF.

Methods: Analysis of patients in the 2015 ACS NSQIP Procedure-Targeted Hepatectomy Database, who underwent hepatectomy, was done. In this database, PHLF is graded according to the International Study Group of Liver Surgery (ISGLS). Multiple regression model was performed to assess the association of perioperative factors with PHLF.

Results: A total of 3,854 patients who underwent hepatectomy were analyzed. PHLF occurred in 218 patients (5.7%). Of these, 106 (48.6%) had ISGLS grade A PHLF, 64 (29.4%) grade B, and 48 (22%) grade C. Open hepatectomy was associated with 13-fold risk of PHLF compared to minimally invasive hepatectomy (p=0.018), postoperative bile leak with a 5-fold risk of PHLF (p<0.0001) and liver cirrhosis and parenchymal congestion with 2-fold risk of PHLF (p=0.004 and 0.02). Increased INR and bilirubin on or after postoperative day 5 were associated with slightly increased risk of PHLF (p&lt;0.0001 and p&lt;0.001). Preoperative stenting, hepatitis B/C status, intraoperative ablation, major versus minor hepatectomy, duration of drain, and drain bilirubin level had no association with PHLF. Pringle maneuver use and hepatobiliary reconstruction were protective against PHLF.

Conclusion: PHLF occurs in 5.7% of hepatectomies. The risk of developing PHLF is 13-fold after open hepatectomy compared to minimally invasive hepatectomy, 5-fold in patients with post-hepatectomy bile leak, and 2-fold in patients with liver parenchymal congestion and cirrhosis. Use of Pringle maneuver and hepatobiliary reconstruction are protective against PHLF.

School: School of Medicine Campus: Lubbock

#### MS1-2 PHAM, ANDREW

Optogenetic Stimulation of Amygdala CRF Neurons Modulates Pain Behaviors in an Arthritis Model

Andrew Pham

The goal of my research project with Dr. Neugebauer was to provide a deeper understanding of how the amygdala is involved in mechanisms of pain using a technique called optogenetics. Optogenetics is the expression and activation of light-sensitive channels to control neuronal activity in live tissues. We stereotaxically injected a viral vector into the basolateral nucleus of the amygdala (BLA) to express either an activating (Channelrhodopsin, ChR2) or inhibiting (Halorhodopsin, eNpHR 3.0) channel. Using a CamKII promoter, expression was restricted to glutamatergic pyramidal cells in the BLA. After waiting 3-4 weeks for these channels to be expressed, we implanted a remote-controlled optical (LED) stimulating device in the central nucleus of the amygdala (CeA) to selectively stimulate the axon terminals from the BLA within the CeA. We measured the effects of channel activation on several different behavioral responses, including vocalizations, mechanical thresholds, and open field tests in control rats and in arthritic rats. The arthritis pain model was induced in rats by injecting kaolin and carrageenan into the knee joint and waiting 6-8 hours and measuring knee circumference to ensure there was inflammation. Our original hypothesis was that activating the BLA axon terminals in the CeA would increase or generate pain behaviors, whereas silencing the BLA axon terminals in the CeA would decrease pain behaviors. We are still in the process of collecting and analyzing data, although our preliminary results show there may be some decrease in arthritic pain-related behaviors with the optical silencing of the BLA axon terminals in the CeA. The effects of optical activation on the BLA are not clear yet.

## MS1-2 PILLUTLA, PRANTI

Sound Intensities Measured During Cadaveric Cortical Bone Drilling

Pranati Pillutla BS, James C. Wang MD, PhD, Steven Zupancic AuD, PhD, Joshua C. Demke MD

The goal of my research project with Dr. Neugebauer was to provide a deeper understanding of how the amygdala is involved in mechanisms of pain using a technique called optogenetics. Optogenetics is the expression and activation of light-sensitive channels to control neuronal activity in live tissues. We stereotaxically injected a viral vector into the basolateral nucleus of the amygdala (BLA) to express either an activating (Channelrhodopsin, ChR2) or inhibiting (Halorhodopsin, eNpHR 3.0) channel. Using a CamKII promoter, expression was restricted to glutamatergic pyramidal cells in the BLA. After waiting 3-4 weeks for these channels to be expressed, we implanted a remote-controlled optical (LED) stimulating device in the central nucleus of the amygdala (CeA) to selectively stimulate the axon terminals from the BLA within the CeA. We measured the effects of channel activation on several different behavioral responses, including vocalizations, mechanical thresholds, and open field tests in control rats and in arthritic rats. The arthritis pain model was induced in rats by injecting kaolin and carrageenan into the knee joint and waiting 6-8 hours and measuring knee circumference to ensure there was inflammation. Our original hypothesis was that activation in the CeA would decrease pain behaviors. We are still in the process of collecting and analyzing data, although our preliminary results show there may be some decrease in arthritic pain-related behaviors with the optical silencing of the BLA axon terminals in the CeA. The effects of optical activation on the BLA are not clear yet.

School: School of Medicine Campus: Lubbock

#### MS1-2 POLACKAL, SHARON

A New Vision for the Prevention of Sudden Cardiac and Drug Overdose Induced Death: AED and Naloxone Equipped Drones

Sharon Polackal, Dr. Francisco Fuentes, M.D.

Background: Cardiovascular disease is the number one cause of mortality worldwide. There is new data on the efficacy of AED equipped drones in reducing bystander wait time, and a variety of experiments on its speed and practicality have been conducted. Likewise, the current nationwide epidemic of opioid overdose calls for an exploration of novel initiatives. Data regarding the use of the IV and nasal spray formulas of naloxone supports its success in reversing opioid overdose and preventing sudden death.

Purpose: The aim of this literature review is to explore the feasibility of incorporating an AED and naloxone armed drone system to the current Chain of Survival and to evaluate the magnitude of its potential to reduce mortality due to sudden cardiac arrest and opioid overdose.

Methods: A Google Scholar, Cochrane, MEDLINE, New England Journal of Medicine, and Journal of the American Medical Association (JAMA) search for articles was conducted. The content of the articles along with separate data collected from the CDC and AHA were studied and analyzed.

Results: Four publications contained studies that tested the mean arrival time of drones and EMS services to sites of crisis. Reduction of mean response times with drones was statistically significant across all regions of Toronto, and in the three other studies in Sweden. A CDC report surveyed organizations that provided IV naloxone kits to 152,283 people from 1996 to 2004 and found 26,463 overdose reversals reported--revealing bystander willingness to intervene in the case of an overdose if naloxone is available to them.

Conclusion: The implementation of drones equipped with naloxone and an AED will lead to faster bystander response to crisis and provides the revolutionary next step forward in reducing sudden death in the U.S. Remodeling the current Chain of Survival to meet the existing shortcomings include this new wave of change.

## MS1-2 PRESTO, PEYTON

Foramen size as a potential risk factor for febrile seizure development in the pediatric population

#### Peyton Presto MS, Keith Hanson BA, Mark Stephens MBA

Febrile seizures have been shown to occur in 2-5% of children between the ages of 6 months to 5 years, making them the most common seizures of childhood. These seizures occur in young children who experience a fever (commonly >100.4 F or 38 C) but exhibit no evidence of intracranial infection or acute neurological illness. Febrile seizures may occur before or soon after the onset of fever. It has been shown that the likelihood of experiencing a febrile seizure increases with the child's temperature as opposed to the rate of temperature rise. Risk factors identified through review of relevant studies include male sex, developmental delay, family history, day care attendance, viral infections (particularly human herpesvirus 6 infection), certain vaccinations (DTP and MMR), and zinc and iron deficiencies. However, no investigation has been conducted to explore foramen size and associated venous drainage as a potential risk factor for experiencing febrile seizures. Of particular interest are the parietal foramen, which conducts the parietal emissary vein (PEV), and the condylar canal, which conducts the occipital emissary vein (OEV). Emissary veins lack valves, which allows them to play a crucial role in selective brain cooling via a bidirectional flow of cooler blood from the head's evaporating surface. If the cranial apertures conducting these veins are narrowed, the cerebral venous outflow is potentially reduced and therefore unable to prevent the brain from cooling as rapidly as expected, leading to a febrile seizure. To explore this possibility, we will conduct a retrospective chart review of all febrile seizure patient cases at the University Medical Center in Lubbock, Texas, over the past 10 years. The size of the parietal foramen and condylar canal in febrile seizure patients will be compared to those of unaffected children of the same age. Our findings will help guide further work in the detection and prevention of febrile seizures.

School: School of Medicine Campus: Lubbock

#### MS1-2 RAJAN, ADITYA

Possible Role of RALBP1 in regulating AP2M1 effects on endocytosis, immune response and blood sugar regulation

Aditya Rajan, Sanjay Awasthi, Sharda Singh

RALBP1, a mercapturic acid pathway, endocytosis related gene, has attracted interest due to its role in the pathogenesis of various cancers. Studies have shown RALBP1 deficient mice have increased p53 activation, decreased glucose and lipid levels, and a high degree of resistance to carcinogenesis even in the presence of potent carcinogens. Studies have shown RALBP1 binds to AP2M1, and AP2M1 is an inhibitor of the insulin secretion promoting protein GLP-1. we sought to outline the possible effects of this interaction on regulation of endocytosis, Carcinogenesis and Insulin secretion. We surveyed RALBP1 binding information from the database Uniprot and found AP2M1 to be a gene of particular interest. We used RNA sequencing data from p53 -/- mice that had methylated RALBP1 promoter regions to analyze AP2M1 and GLP1 expression levels. We used the bioinformatics database Cbioportal to reveal the relationship between RALBP1 and AP2M1 gene expression levels. We reviewed articles on the database Genecards that outlined the pathways AP2M1 participates in and its effects on endocytosis, immune response to cancer and blood sugar regulation. Data from RNA Sequencing revealed that AP2M1 was up-regulated in p53 -/- mice upon RALBP1 knockdown. AP2M1 binds CTLA-4 at residues 152-174 and reduces cell surface expression of CTLA-4 through endocytosis. AP2M1 binds to GLP-1 reducing cAMP concentrations from 2.3 pmol/L to 1.7pmol/L. Knockdown of AP2M1 results in GLP-1 induced insulin secretion increasing by 50%. AP2M1 may reduce Tumor expansion by inhibiting CTLA-4. It may also play a role in increasing insulin receptor sensitivity in RALBP1 knockout mice by decreasing GLP-1 induced insulin secretion. Based on the downstream effects of AP2M1 and the known effects of RALBP1 on these pathways, we hypothesize that RALBP1 down-regulates AP2M1 expression and up-regulates GLP-1 expression. It follows that RALBP1 may inhibit the immune response to cancer and play a role in Type II Diabetes.

## MS1-2 RUPPERT, MISTY

Human Neuroblastoma Cell Line SH-SY5Y Provides a Controlled Model To Study FXYD6 and Na+/K+-ATPase Regulation

Ruppert, Misty. Brogan, Joshua. Gregoire, Paola. Artigas, Pablo.

The Na+/K+-ATPase builds and maintains Na+ and K+ electrochemical gradients that are essential for the life of every human cell. There are many Na+/K+-ATPase isoforms with tissue-specific distribution, and their mutation has been implied in familial forms of migraines, childhood alternating hemiplegia and hyperaldosteronism. Seven members of FXYD family of proteins are known to regulate the Na+/K+-ATPase in a tissue-specific manner. It has been proposed that FXYD1, which is expressed in the heart and brain, also interacts with and regulates the Na+/Ca2+ exchanger and the L-type Ca+ channel in addition to its role in regulating the Na+/K+-ATPase.

The effects of FXYD6, which are highly expressed in the hippocampus, are poorly understood. Because of its homology with FXYD, we expected FXYD6 to interact with several different ion-transporting proteins in addition to the Na+/K+-ATPase. In order to learn more about the role of FXYD6 in a human cell line, we used immunohistochemistry in human neuroblastoma cells to test for signals of the different Na+/K+- ATPase isoforms and well as FXYD1, FXYD 6 and FXYD 7. The experiments were performed under two conditions: 1.) in undifferentiated cells, and 2.) after treatment with retinoic acid to induce cell differentiation of a neuron-like phenotype.

We have found that the human neuroblastoma cell line SH-SY5Y provides a controlled model in which one can effectively study the role of FXYD6 and how the Na+/K+-ATPase pump is regulated. Even though there are animal models available, FXYD6 seems to be highly expressed in the human cell line rather than in other cells. The Human Protein Atlas is a resource that can be utilized to learn about FXYD6, but it is complicated by the fact that many different cell lines have the same functions, further validating the human cell line as an appropriate model that uses a single cell type to study the role of FXYD6.

School: School of Medicine Campus: Lubbock

# MS1-2 SAA, LISA

Lubbock Centenarians' beliefs on factors affecting longevity: A pilot study through interview

Lisa Saa, Catherine Hudson, MS, Gordon Gong, MD, MS, Billy U. Phillips Jr., PhD

According to the US 2010 census, the number of centenarians has increased by 5.8% from 2000, with 7 male and 28 female centenarians per 100,000 population. Prior literature has explored individual behavior determinants of health, finding a wide variety of responses, as well as biological and genetic social determinants of health. However, studies comparing factors affecting longevity in urban versus rural centenarians have not been conducted. The purpose of this study is to determine centenarians $\hat{e}^{TM}$  self-perception on longevity.

Inclusion criteria required individuals to be a Lubbock county resident, aged >90 years old, and without dementia. Participants were recruited through word of mouth and local newspaper advertisement. Researchers met with participants in their homes to conduct interviews which consisted of 14 direct questions, and one open ended question. Topics included: most recent residences, earliest memories, most memorable events, hobbies, favorite jobs, lifetime heroes, places where they have been happiest, modern conveniences, attitude changes, physician access, self-perception of longevity, advice to a 20-year-old, and anything left they would like to accomplish.

Five males and five females were interviewed, with an average age of 92.4 years. The cohort lived in Lubbock County an average of 48.4 years. Earliest memories included living on a farm (3/10) and family-centered events (3/10). Their most memorable events included serving in or working with the military during WWII (5/10). When asked who were their lifetime heroes, 4/10 stated no one. They were happiest in places where they were with family or surrounded by community (8/10). Lastly, many participants stated they either had nothing left they wanted to accomplish or that they just wanted to live out their days well.

Most Lubbock centenarians believe a combination of good genes, diet and exercise, and productive work to do throughout life are contributing factors to their longevity.

## MS1-2 SANCHEZ, ASLEY

The Association Between Body Mass Index And Gas Exchange In Patients With Sepsis And Acute Respiratory Failure

Asley Sanchez, Hawa Edriss, Edna Juarez, Michele Lear, Shengping Yang, Kenneth Nugent

Obese patients with reduced chest wall compliance usually have reduced trans-pulmonary pressures, especially at the lung bases, during mechanical ventilation. This likely reduces regional lung volumes during mechanical ventilation and creates more abnormal ventilation/perfusion relationships. This study considers the effect of body mass index (BMI) on gas exchange measured by PaO2/FiO2 ratios and required PEEP levels during sepsis. The electronic medical records of patients hospitalized between 2010 and 2016 with sepsis who required mechanical ventilation were reviewed to collect demographic characteristics, clinical information including BMI, pressures required for mechanical ventilation, management requirements, and outcomes including mortality and length of stay in the ICU and in the hospital. PEEP pressures and PaO2/FiO2 were recorded 24 hours after admission to the medical intensive care unit and the initiation of mechanical ventilation. This timeframe allowed clinicians to adjust the ventilator and to stabilize the patient.

This study included 173 adult patients. The mean age was 58.5  $\hat{A} \pm 16.7$  years; 53.2% were men. The mean BMI was 29.6  $\hat{A} \pm 11.9$ . The mean white blood count was  $14.3\hat{A} \pm 8.0 \text{ k/}\hat{A}\mu\text{L}$ , 43.9% of the patients had pulmonary infections, and 34.7% had extrapulmonary infections. The overall mortality was 44.5%. The mean length of stay was 12.4  $\hat{A} \pm 11.8$  days in the ICU and 16.6  $\hat{A} \pm 13.6$  days in the hospital. The mean PaO2/FiO2 ratio decreased from 251  $\hat{A} \pm 14$  in the underweight patients to 185  $\hat{A} \pm 11$  in the obese patients. The mean PEEP level increased from 5.6  $\hat{A} \pm 1.3$  cm H2O in the underweight patients to 6.4  $\hat{A} \pm 2.6$  cm H2O in the obese patients. These trends in PaO2/FiO2 ratios PEEP levels across BMI categories were not statistically significant. These results suggest that gas exchange based on PaO2/FiO2 ratios is worse in obese patients with acute respiratory failure associated with sepsis, but these differences did not reach statistical significance.

School: School of Medicine Campus: Lubbock

#### MS1-2 SARAYUSA, ADAM

Innovative Treatment for Post-Operative Occipital Nerve Pain Following Posterior Fossa Decompression for Chiari I Malformation

Adam Sarayusa, Mark Stephens, Coby Ray, and Laszlo Nagy

Chiari I malformation is a disorder in the spectrum of Arnold-Chiari syndromes that consists of cerebellar changes that can present in both children and adults. Specifically, Chiari I is classified by characteristics that include a downward herniation of the cerebellar tonsils into the foramen magnum located at the base of the skull. Due to the herniation of the cerebellar tonsils, blockage of cerebrospinal fluid (CSF) contributes to the symptoms associated with Chiari I malformation. Symptoms of Chiari I are relieved surgically with a posterior fossa decompression where bones in the back of the skull and spine are removed. Post-operative complications are possible and the main one of interest is occipital neuralgia. In the cases of two patients, all were evaluated by Neurosurgery and subsequently diagnosed with Chiari I malformation. Each of the patients received a posterior fossa decompression to relieve symptoms of the malformation. After surgery, each of the patients returned presenting with post-operative occipital neuralgia. These patients were deemed candidates to receive an innovative treatment option to relieve their occipital nerve pain and were referred to receive epidural lysis of adhesions (LOA) which would show to provide the lasting relief of the pain that the patients were seeking. LOA is a procedure that has previously been used for lumbar nerve entrapments and includes using a needle, Racz catheter, and injectable contrast guided with fluoroscopy to locate the occipital nerve along with the associated scarred entrapment of the nerve.

## MS1-2 SMITH, JAKE

Usage of Small Molecules to Guide Trans-differentiation: A Literature Survey

Jake Smith, Murali Vijayan, Ph.D., Subodh Kumar, Ph.D., P. Hemachandra Reddy, Ph.D

The purpose of this literature survey was to describe the advancements made into the field of induced pluripotency stem cells and trans-differentiation. An emphasis will be placed on using small molecules alone to both induce pluripotency and to directly cause trans-differentiation into neural progenitor cells, astrocytes, and mature neurons.

In 2006, Yamanaka et al. first discovered that stem cells could be induced to form using a retrovirus and exogenously adding the transcription factors Oct-4, Sox2, c-Myc, and Klf4. In the years since then, changes have been made to the protocol to optimize the conversion efficiency. However, the use of a retroviral vector made transplantation of these stem cells into humans unsafe and, moreover, unethical. Through continuous efforts from research laboratories around the world, the original Yamanaka factors have been replaced and new research has gone into inducing trans-differentiation without the use of retroviral vectors.

As of recent years, it has been shown that mature neurons can be induced from adult fibroblasts using only small molecules. Hu 2015 showed that human adult fibroblasts could be trans-differentiated into neuronal cells positive for mature neuronal markers using a cocktail of the small molecules VCR, Forskolin, SP600125, GO6983 and Y-27632 followed by a second cocktail containing CHIR99021, Forskolin, and Dorsomorphin. Additionally, fibroblasts derived from patients with familial Alzheimerâ $\in$ <sup>TM</sup>s Disease were induced using the same protocol and were shown to exhibit abnormal amyloid  $\hat{I}^2$  production indicative of neurons from a patient with familial Alzheimerâ $\in$ <sup>TM</sup>s Disease.

School: School of Medicine Campus: Lubbock

## MS1-2 STRESEMAN, ASHLEY

Tetracycline Analogs Act Centrally to Reduce High Alcohol Consumption

A.N. Streseman, D.C. Curtis, J.M. Martinez, J.A. Groot, P.C. Marquardt, C.L. Allison, J-L. Redondo, J. Harper, C.R. Webb, M.B. Grisham, P.J. Syapin, T.W. Reid and S.E. Bergeson

Our previous studies have shown that tetracycline antibiotics reduced both binge and chronic ethanol consumption in mice. A screen of several FDA approved tetracycline analogs suggested a structure function relationship with C6' identified as important to be a hydrogen rather than a hydroxyl moiety. We wanted to know whether consumption was affected by bacterial lipopolysaccharidemediated systemic cytokine release, microbiota-vagal interaction, or if drug was acting centrally. We tested an overarching hypothesis that tetracycline analogs reduce alcohol consumption by a central mechanism. Four separate, specific hypotheses were tested: 1) Systemic cytokine neutralization will not reduce alcohol consumption. 2) Reduction of gut microbiota will not change consumption or drug efficacy; 3) I.C.V. drug treatment will be efficacious; and 4) chemically modified minocycline with loss of antimicrobial action will retain the ability to reduce alcohol drinking. Results from experiments 1 and 2 showed that neither i.p. Ab neutralization of CD4/8, IL1Î<sup>2</sup>, IL6, or Tnfα nor gut microbiota †sterilization' changed ethanol consumption or drug efficacy suggesting a systemic action was not driving consumption or a mechanism for drug action. Tigecycline given i.c.v. was effective and two modified minocycline analogs, with loss of antimicrobial action, given i.p. showed a significant reduction in alcohol consumption. These results are consistent with the hypothesis that tetracyclines with C6'-H are effective against high alcohol consumption by acting through centrally mediated mechanisms. Our experiments were an important step toward ruling out a role for the microbiome and the well-known alcohol leaky-gut syndrome. Most importantly, we have developed an improved drug with high translational potential for Alcohol Use Disorder treatment. Supported by NIAAA AA021142, Laura W. Bush Institute for Womenâ€<sup>™</sup>s Health, and the Bryan C. Miller, Jr. and Martha H. Miller Foundation.

## MS1-2 TANGELLA, NIKITA

Comparison of the Artifact Between Mid-Sagittal Rapid MRI and MRI Flow Study Post-ETV

Nikita Tangella, BS, Mark Stephens, MBA, Keith Hanson, BA, Peyton Presto, MS, Laszlo Nagy, MD

It is well known that MRI flow studies have significant artifact due to arterial or venous blood flow into the plane of the image at the time of imaging, resulting in error in the representation of the information; artifact is an undesired effect as it obscures the remaining image.1 If rapid MRIs can produce the same or less artifact relative to a flow study it could become the preferred diagnostic imaging in children. The benefits of rapid MRI are that it does not require anesthesia (unlike the MRI flow), it is much quicker (3-5 min), and it would likely result in higher patient compliance.

In addition to motion artifact, tissue artifact and technique artifact are two other causes of visual obstruction, but are less likely to be different between the two MRI options discussed here. While there are many articles that discuss artifact and its impact on image quality, there arenâ $\in^{TM}$ t any publications (pubmed/uptodate) that discuss the difference of artifacts between the different imaging modalities.2,3

School: School of Medicine Campus: Lubbock

#### MS1-2 THOMAS, JAXSON

Efficacy of Sm-p80 in Natural Mimic Condition in Baboon: Analysis of IgA Antibody Titer and Egg Burden

Jaxson Thomas, Ryan Alonzo, Priscilla Ortiz, Whitni Redman, Arif Siddiqui, Samra Lazarus, Adebayo Molehin, Souad Sennoune, Weidong Zhang and A.A. Siddiqui

Schistosomiasis is a neglected tropical disease with an estimated 400-600 million people currently infected. Despite control measures, such as praziguantel (PZO) treatment and snail eradication, the disease continues to spread to new areas. The discovery of a protective vaccine remains the most potentially effective means for disease control. The goal of a vaccine is to reduce the morbidity of schistosomiasis by lowering the parasitic load, hindering egg production and protecting against acute and chronic schistosomiasis. Previous work has shown that a vaccine based upon Schistosoma tegument protein Sm-p80 with adjuvant to elicit an effective immune response. In endemic areas, people with schistosomiasis are treated with PZQ which does not protect against reinfection. This study seeks to explore whether the vaccine provides greater protection than PZO treatment alone as a more effective control method. In order to mimic natural conditions in which this vaccine would be given, baboons have been challenged with a Schistosoma mansoni infection and then treated with PZQ. Experimental baboons were immunized with Sm-p80 + ODN and re-challenged with Schistosoma. At various time points fecal and serum samples were collected. At the end of the experiment organ, tissue and blood samples were collected. Results were obtained after counting eggs in liver, small intestine and large intestine samples. Fecal samples from 6 time points along the experiment were counted. ELISA tests were also performed for each baboon sera from 5 time points for IgA against Sm-p80. The vaccine was found to have a protective effect. We found that the amount of eggs in tissue samples was significantly reduced. The liver burden decreased by 32.6%, the small intestine by 53.8% and the large intestine by 49.6%. Fecal counts revealed that vaccinated baboons exhibited a reduced egg burden compared to non-vaccinated baboons. IgA titers showed responses to sm-P80 in both experimental and control animals.

# MS1-2 URIAS, EDUARDO

The synthetic retinoid fenretinide induces MYCN downregulation in neuroblastoma cell lines

Eduardo Urias, Thinh Nguyen, Balakrishna Koneru, Sun J. Wei, Min H. Kang, C. Patrick Reynolds

Use of 13-cis retinoic acid (13-cisRA) as part of maintenance-phase chemotherapy of high-risk neuroblastoma significantly improves outcome, prompting investigation of other retinoids with anti-cancer properties for treating neuroblastoma. Fenretinide is a synthetic retinoid currently in clinical trials for treatment of several types of cancer including neuroblastoma. Fenretinide acts in a p53-independent manner to induce apoptosis, by increasing intracellular levels of reactive oxygen species and dihydroceramides. MYCN genomic amplification is an oncogenic driver of many high-risk neuroblastomas and high MYCN-expressing neuroblastomas have been shown to be particularly sensitive to fenretinide. In the current study we determined the effect of fenretinide on MYCN expression in patient-derived neuroblastoma cell lines. MYCN expression was found to be downregulated both at the protein and mRNA level as early as 12 hours after exposure to clinically-achievable concentrations of fenretinide. These data point toward a mechanism by which fenretinide can contribute to tumor cell cytotoxicity in neuroblastoma by inducing a downregulation of this important oncogene.

School: School of Medicine Campus: Lubbock

#### MS1-2 WAGNER, CLAYTON

Clinical Case Series Evaluating Central Venous Catheterization Practices in Pediatric Burn Patients

Clayton Wagner, Andrea Hess, Nicole Van-Spronsen, Jose Olascoaga, John Griswold M.D.

Central venous catheterization is an important medical procedure which facilitates long term access to the circulatory system of patients. Central venous catheters allow administration of fluids, medications and blood products; these catheters also serve as an access point for blood draws for clinical laboratory analysis. Multiple techniques exist for the establishment of a central venous catheter, and each technique poses its own set of risks. The primary aim of this study is to evaluate the use of central venous catheters in pediatric burn patients. Using the burn registry at the University Medical Center in Lubbock TX, we tracked the incidence of catheter related complications in pediatric burn patients who received a central venous catheter between January 1, 2007 and November 1, 2017 (n=24) and present our findings here in a case series format.

School: School of Medicine Campus: Lubbock

#### MS1-2 WEAVER, AMANDA

Gender/Ethnic Differences In Seeking Healthcare Plus Time Of Recovery From Procedures For Shoulder/Knee Conditions

Dr. Mimi Zumwalt, Dr. George Brindley, Dr. Ali Ashraf, Dr. Adam Woolridge, Rhett Butler, Amanda Weaver, John Chapa, Anudeep Dasaraju

Previous papers in North America have demonstrated that females exhibit more severe pain in more locations on the body than males, but tend to wait longer before seeking help for musculoskeletal issues. Also, an unconscious bias exists within physicians/ surgeons in terms of recommending specialist referral and/or surgery for males over female patients. Finally, initial orthopedic presentation of joint pain in females usually is more severe which impacts the post-operative outcome as outcomes tend to be less successful for females.

## MS1-2 WILSON, SARAH

Does Hands-On Laparoscopic Swine Model Course Improve Surgery Resident'S Skills And Confidence?

Sarah E Wilson, Chanaka Kahathuduwa PhD, Quang N Nguyen MBA, Theophilus Pham MBA, Amir Aryaie MD

INTRODUCTION: A course evaluation study on the effectiveness of improving laparoscopic skills of surgical residents using swine models was evaluated through a self-report questionnaire administered before and after course completion. The purpose of the training is to provide surgical residents opportunities to practice and advance their laparoscopic proficiencies.

METHODS AND PROCEDURES: Participating residents in all post-graduate year levels were provided anesthetized pigs with which to perform a variety of simple to complex laparoscopic cases. Prior to training, residents were given a questionnaire composed of eleven questions requiring the subjects to rate their confidence in performing various laparoscopic procedures on a 1-5 Likert scale.

RESULTS: Responses to the questionnaire had a reasonable internal consistency in each of the pre-training and post-training administrations. Exposure to the training program significantly improved confidence in performance, as evidenced by a significant increase in the composite score ( $\hat{I}'' = 0.565$ , 95%CI = 0.281, 0.850, p < 0.001). This improvement remained significant, even after controlling for PGY (p = 0.0175). PGY was not significantly associated with change of the composite score (P = 0.434). On average, the participants rated the lab to be very helpful (4.294 ű 0.686 on a 5-point Liker scale) and indicated preference to attend the lab 4 times a year (4.000 ű 1.173).

CONCLUSION: Overall, one-day hands-on training using swine models improved residentâ€<sup>™</sup>s skills, confidence, and understanding of laparoscopic surgery. The information acquired through the questionnaire emphasized the importance of providing a laparoscopic training course as a standard requirement at all medical institutions. Allowing opportunities for surgical residents to practice their laparoscopic skillset will not only help in their individual academic advancements, it will allow them to provide optimum care for their patients.

School: School of Medicine Campus: Lubbock

# **MEDICAL STUDENTS YEARS 3-4**

#### MS3-4 AHMED, AHSEN

Steroidogenic acute regulatory protein gene amplification is associated with higher mortality in hormone sensitive breast cancer

Ahsen U. Ahmed, Kevin Pruitt, Pulak R. Manna

Steroid hormones play a critical role in the pathogenesis and progression of hormone sensitive cancers including a large majority of breast cancers which express estrogen and progesterone receptors. The dysfunction of steroidogenesis, most notably the elevated intratumoral production of estrogens due to the overexpression of the aromatase enzyme, which catalyzes the critical step of converting androgens to estrogens, has previously been implicated in the pathophysiology of hormone sensitive breast cancer. The steroidogenic acute regulatory protein (StAR), a key protein in steroidogenesis, predominantly regulates the rate-limiting step in steroid biosynthesis involving the transport of cholesterol, the substrate of all steroid hormones, from the outer to the inner mitochondrial membrane. Cholesterol is then converted to pregnenolone, the precursor to all steroid hormones. While StAR plays a critical role in all steroid hormone synthesis, its involvement in the pathophysiology of hormone sensitive breast cancer has not been well studied. To elucidate the role of StAR in breast cancer, we analyzed genomic data available through The Cancer Genome Atlas (TCGA) for StAR DNA copy number alterations and mutations, and its impact on survival in breast cancer. Our analysis indicated that StAR was amplified in 12% to 20% of tumors in several large TCGA breast cancer tumor data sets and this amplification was correlated with an increase in StAR mRNA expression. A significant majority of these tumors expressed estrogen (69-74%) and progesterone (48-64%) receptors, signifying the link between StAR amplification and hormone sensitive breast cancer. Most significantly, Kaplan Meier survival analysis based on the TCGA provisional breast cancer tumor data showed that StAR gene amplification is associated with greater breast cancer mortality. Our results point to the potential for StAR to be a novel target in the management and treatment of hormone sensitive breast cancer.

## MS3-4 ALKUL, SUZANNE

Removing Barriers to Dermatological Care in the Uninsured

Kendra Walker MSIII, Suzanne Alkul MSIV, Ashley Sturgeon M.D.

Skin cancer is generally considered a screenable malignancy and can be caught in early, pre-malignant stages. Uninsured patients are more vulnerable to development of skin cancer, especially more invasive types because of their decreased access to health care. Due to the lack of regular outpatient skin checks and, additionally, the general deficiency of dermatology services available for the uninsured and homeless populations, they are less likely to be diagnosed with pre-malignant lesions, and instead, present with more advanced skin cancer that may or may not be locally invasive.

The Lubbock Impact Free Clinic provides free dermatology services to the uninsured population of Lubbock County once a month. From a previous study, the incidence of nonmelanoma skin cancer (NMSC) in the Lubbock Impact Free Clinic population was 1.4%, which is higher than the general US population incidence of 1.05% in 2012.

On July 1, 2016, the Free Clinic was awarded a large grant to purchase supplies and medications needed for the dermatology night. Once in effect, our aim was to analyze the incidence of NMSC, the number of procedures performed, the time between diagnosis and achievement of clear margins, and the demographics of the patient populations before and after the grant. We obtained TTUH-SC IRB approval to perform a retrospective chart review and data collection for all dermatology encounters at the Free Clinic. We found that before our grant we were able to diagnose 0.95 NMSCs per month versus 1.47 after the grant. We were able to perform 2.76 skin procedures before the grant versus 4.05 after the grant. Our goal is to use this grant to decrease the disparity of dermatology services between the insured and uninsured.

School: School of Medicine Campus: Lubbock

#### MS3-4 AMODEO, MATTHEW

Retrospective Cohort to Guide a Surgical Strategy, Symptomatic Chiari I Patients Treated with Surgical Algorithm

Matthew Amodeo; Jeannie Lee; TuongVy Dang; Dr. Benedicto Baronia

Objective: Surgical treatment options for patients with Chiari I pathology vary depending on surgeon experience, urgency of treatment, and severity of symptoms. The rarity of the disease and the lack of robust, high-volume studies complicates both the standard of care and the natural pathogenesis of Chiari I malformations (C1M).

Appropriate treatment strategies for symptomatic C1M are controversial and evolving. Deciding when to decompress the posterior fossa, split the dura, perform C1 laminectomy, or reduce the cerebellar tonsils are difficult decisions to make without established guidelines to heed.

This project intends to review an established guideline for surgical treatment of symptomatic C1M malformations in a reproducible way.

Methods: We will review records of patients who underwent surgical treatment for symptomatic Chiari I malformations from 2014-2017 by a single surgeon, Dr. Baronia. Studying an algorithm for treatment developed in a previous study by Dr. Baronia and others, we can now evaluate the success of his surgical outcomes with greater statistical power and fewer confounding factors. Our aim is to assess symptom relief at post-op follow-ups.

Patients will be evaluated in two distinct treatment groups, with each group treated using the algorithm mentioned above. We will assess symptom improvement at follow-up, and compare the three groups. The assessment will be measured from office records (qualitatively as either improvement, no change from pre-op, or worsening of symptoms) and MRI scans.

The level of symptomatic improvement will guide determination of algorithm success or failure.

Comparisons to contemporary strategies will be made whenever possible.

Intended Results: We hypothesize that our algorithm will demonstrate several findings: That a consistent, simple strategy can be implemented; that surgical resection of cerebellar tonsils can be avoided; and that consistent, long-term symptom relief is achievable.

School: School of Medicine Campus: Covenant

### MS3-4 ATTALURI, PRADEEP

Myoglobin Levels in Burn Patients with Renal Failure

Pradeep Attaluri, Ellie He, Jonathan Henderson, Michael Tan

With an annual cost of 270 million dollars, electrical burn injuries place a significant burden on the healthcare system. These injuries often lead to lengthy hospital stays due to both primary burn injury as well as the added medical complications such as acute kidney injury (AKI). Depending on the severity of the injury, cellular damage will lead to the release of serum markers such as creatinine kinase (CK) and myoglobin. These markers can be used by physicians to monitor for potential renal damage and when it is necessary to implement protective therapies. Currently, CK is considered the standard serum marker used as predictive indication of renal damage; however, it is myoglobin that largely responsible for the mechanism of damage in the renal tubules and has the potential to be a more specific marker than CK and the potential to serve as a better, more specific, predictor of renal damage in high voltage burn injuries.

School: School of Medicine Campus: Lubbock

#### MS3-4 AZIZ, BEN

Efficacy of adaptive support ventilation weaning in SICU and BICU patients: A literature review.

John A. Griswold, M.D., FACS, Ben Aziz, M.S., Audrey Le, B.S., Adham Shoujaa, M.S., Dev Patel

Mechanical ventilation is a fundamental element of critical care medicine employed in the intensive care unit. Conventional mechanical ventilation requires the constant assessment and manual adjustment to wean the patient to extubation and successful spontaneous breathing. The clinician will augment ventilator requirements to discern the combination of tidal volume, respiratory rate, fraction of inspired oxygen (Fi02), and positive end-expiratory pressure (PEEP) according to the respiratory mechanics of the patient. Albeit, inherent risks are known with prolonged mechanical ventilation including ventilator-induced lung injury, acute respiratory distress syndrome (ARDS), and ventilator-associated pneumonia. The incidences of these morbidities are directly correlated with length of intubation, particularly in prolonged mechanical ventilation (PMV). Therefore, prognosis is highly dependent upon how aggressive the interdisciplinary team works to optimize ventilator requirements for successful extubation and decreased length of intubation. Recent studies have shown that weaning protocols reduced the duration of mechanically ventilated patients, however inconsistencies exist among hospitals and providers which may result in disparities in the delivery of quality respiratory care. These issues may directly be addressed with the use of a closed loop system such as adaptive support ventilation (ASV), which is designed to adjust the tidal volume and respiratory rate dependent upon the respiratory mechanics of the patient on a breath-bybreath basis and optimize a patient  $\hat{a} \in \mathbb{T}^{M}$ s work of breathing. Recent studies have shown ASV to facilitate a reduced intubation time and recovery of spontaneous ventilation compared to standard SIMV weaning protocol1,2. Our study will present a novel approach to evaluate the efficacy of ASV on duration of intubation compared to other methods of ventilation with a focus on the burn and trauma population at our institution.

## MS3-4 BURTON, ERIN

Acute Colonic Pseudo-obstruction in Burn Patients

Erin Burton, Niki Parikh, Dr. John Griswold

Burn injuries can cause various complications such as hyperglycemia, dehydration, infection, and musculoskeletal issues. One commonly overlooked complication is acute colonic pseudo-obstruction. While trauma can cause ileus, affecting both the small and large intestines, pseudo-obstruction is mainly confined to the large bowel and can vary in presentation. The clinical picture often associated with this obstruction includes rapid development, abdominal distension, abdominal pain, nausea, vomiting, and constipation. Burn patients are at a higher risk for acute colonic pseudo-obstruction due to increased opioid use, electrolyte imbalance, immobility, increased risk for sepsis, increased number of surgeries performed, and abdominal trauma. Physical exam will reveal a tympanitic abdomen with either a presence or absence of bowel sounds, depending on the patient, and diagnosis is established by abdominal imaging.

This presentation is a case series looking at patients at University Medical Center who have presented with acute colonic pseudoobstruction after a burn injury. Due to the varying modes of presentation as well as the multiple comorbidities facing burn patients, cecal dilatation is often pronounced, leading to an increased risk of perforation and death. A retrospective analysis of these cases was conducted and factors predisposing burn patients to this condition were examined. The current recommendation for treatment is a step-wise approach proceeding from conservative therapy, such as nasogastric decompression, IV fluids, and NPO, to treatment with neostigmine, colonic decompression, and lastly surgery. The aim of this analysis is to determine the futility of treatment approaches.

School: School of Medicine Campus: Lubbock

# MS3-4 CASTILLO, AUSTIN

Acute Respiratory Failure Following Scorpion Stings: Anaphylaxis Or Severe Systemic Envenomation?

Austin Castillo, Pradeep Attaluri

Case: A 58-year-old woman presented to her local emergency room with difficulty breathing after beings stung by a scorpion. She had labored breathing with retractions and was making grunting noises. She had a swollen tongue and throat, stridor, and diminished breath sounds; she had no skin rash. She was allergic to bee stings. Initial vital signs included blood pressure 160/93 mmHg, heart rate 95 beats per minute, respiratory rate 22 breaths per minute. Arterial blood gases included a pH 7.24, PaCO2 62 mmHg, and a PaO2 79 mmHg on a FiO2 100%. She did not receive corticosteroids or scorpion antivenom. Vital signs after transfer to our hospital included blood pressure 89/63 mmHg, heart rate 90 beats per minute, and respiratory rate 16 breaths per minute. Her oxygen saturation was 96% on a FiO2 of 45%. The patient received intramuscular epinephrine, norepinephrine, and methylprednisolone followed by prednisone throughout the hospitalization. She also received famotidine, diphenhydramine, and albuterol-ipratropium. A surgical tracheotomy was completed, and she required mechanical ventilation for 8 days. The patient was eventually placed on a tracheostomy collar and discharged.

Scorpion venom contains numerous toxins that target ion channels found in mammals. These toxins can stimulate both sympathetic and parasympathetic autonomic centers and can lead to severe symptoms, such as myocardial injury and cardiogenic shock. The treatment of scorpion envenomation includes symptomatic measures, vital function support, and administration of antivenom. Anaphylaxis is possible if the patient is allergic to scorpion venom, or if the scorpion venom cross reacts with venoms from insects, such as bees and ants, to which the patient is allergic. We think this patient had an acute anaphylactic reaction to scorpion venom resulting in upper airway obstruction. Patients who are allergic to insect venom should be aware of possible cross reactivity to venom from other species.

### MS3-4 CHOI, SIMON

Unique Considerations for Transgender Patients in the Psychiatric Wards.

Simon Choi (1st author), Ankia Chalia (2nd author)

Facilitating a supportive environment for transgender patients at the inpatient psychiatric unit is crucial because they are highly more likely to attempt suicide than the general population. Unique challenges include educating staff and providers about gender-related cultural sensitivities and lack of clear literature on how hormone therapy can affect psychiatric disorders. This poster aims to increase awareness of available guidelines for providing mental health care for transgender patients with psychiatric disorders.

School: School of Medicine Campus: Covenant

#### MS3-4 CHUECOS, MARCEL

Villous Vascular Tree 3D Morphology of Ex Vivo Perfused Human Placental Cotyledon

Marcel Chuecos, BS, Kushal Gandhi, PhD, James Maher, MD, Andrey Bednov, PhD, Daniela Pino, MD, David Lee Moore, MD, and Natalia Shlabritz-Loutsevitch, MD, PhD.

Introduction: In human pregnancy, the first half of gestation is associated with the prevalence of branching angiogenesis, and the second half of gestation is marked by prevalence of non-branching angiogenesis. Some adverse maternal conditions, e.g preeclampsia are associated with excessive branching and decreased flow-mediated vasodilation. The aim of this study was to evaluate 3D vascular structure of ex-vivo perfused human placental cotyledon and compare vascular tree morphology with physiological parameters.

Methods: Placenta was collected immediately after delivery and underwent ex vivo perfusion as previously described, subsequently placental cotyledons from three placentas were perfused with 1,1'-dioctadecyl-3,3,3',3'-tetramethylindocarbocyanine perchlorate (DiI), at the velocity of 6 ml/min during 5 min, fixed in 4% paraformaldehyde, stored in the fixative at +4C and embedded in 7.5% agarose. Tissues (3-4 specimens per cotyledon) were evaluated at 10X (Figure 1, red fluorescein - fetal endothelium). Images were quantified using Image-Pro Premier software (Media Cybernetics, Inc, Rockville, MD. USA) and Imaris 9 (Bitplane, USA). Number of branching points was calculated.

Results: Volume of fetal capillaries ranged from 16.8% to 50% of the volume of cotyledon and number of branching points was 31-285 per specimen (Fig.1, Table 1). Fetal initial inflow pressure and flow-mediated vasodilation (FMVD) did not correlate with these parameters.

Conclusion: Factors, other than vascular tree 3D composition, might be responsible for the umbilical arterial resistance in vivo.

School: School of Medicine Campus: Permian Basin

## MS3-4 DANG, TUONGVY

Familial Chiari Malformation Case Report: Genetic Implications

TuongVy Dang, Jeannie Lee, Matthew Amodeo, and Benedicto Baronia

Introduction: Chiari malformation (CM) is a structural anomaly characterized by caudal protrusion of the cerebellar tonsils through the foramen magnum, blocking the flow of cerebrospinal fluid (CSF). A general rule for CM diagnosis is cerebellar tonsillar descent of 5 mm or more below the plane of the foramen magnum, as seen on magnetic resonance imaging (MRI). Long considered to be a sporadic, non-hereditary condition, recent retrospective studies have found the prevalence of familial CM to be about 3% and the prevalence of patients with CM who had a close relative with CM and/or syringomyelia to be about 12%. We report a case of familial CM in which the parents and three out of four of their children have been diagnosed with symptomatic CM.

Cases: The mother is a 43-year-old Hispanic female who has been diagnosed with CM and pseudotumor cerebri. Subsequently, her three sons, 22-year-old, 21-year-old, and 16-year-old, have been diagnosed one by one with CM. Her husband, a 42-year-old Hispanic male, has also recently been diagnosed with the condition. Moreover, although the diagnosis has not been officially confirmed, her eldest son has reportedly been complaining of symptoms suggestive of CM per the family.

Discussion: Although cases of familial CM have been described in the literature, to our knowledge, such a large clustering of CM in one family has never been previously reported. This case strongly suggests the possibility of a genetic influence on the pathogenesis of CM. Several genes have been identified that may contribute to our understanding of this phenomenon, including PAX1, PAX2, PAX3, PAX6, Noggin, Hox, EFNB1, TBX6(16p11.2), FGF2, and 15q21.1-q22.3 and 9q22.31 mutations/microdeletions. Further genetic testing may help to elucidate the connections between these genes (and potentially others not previously identified) and the hereditary patterns that lead to the development of CM..

School: School of Medicine Campus: Lubbock

## MS3-4 DASARAJU, ANUDEEP

The Carney Triad: A New Neurocristopathy Syndrome

Pradeep Attaluri, Anudeep Dasaraju, Hillary Powers

The Carney Triad represents the association of a gastric tumor, pulmonary chondroma and an extra-adrenal paraganglioma. Only 79 cases of this rare condition have been described since it was first documented in 1977. Currently, the etiology of the Carney's triad is unknown with no agreement as to the pathology or possible common origin of the three tumors of the triad. Thus far, only the paraganglioma of the three tumors is known to be linked to the neural crest cell, which some consider the fourth germ layer after endoderm, mesoderm, and ectoderm. We comprehensively reviewed the clinical syndrome to unify all three disorders from one tissue type, namely, the neural crest cell line. Our goal is to unify all three tumors, GIST, pulmonary chondroma, and paragangliomas under a neurocristopathy syndrome due to abnormal development of the neural crest cells.

## MS3-4 DEITRICK, JENA

Cecal Herniation Through the Foramen of Winslow: Case Presentation and Literature Review

Jena Deitrick, William Sessions, Daniel Nguyen, Shane Harper, Richard Murray, Muhammad Nazim

Internal hernias cause 0.5-6% of all cases of intestinal obstruction. Of these, only 8% involve herniation through the Foramen of Winslow, the passageway between the greater sac and the lesser sac. Since this condition is very uncommon and not well-known, it often has delayed or missed diagnosis. For this reason, it was once estimated to have a mortality of up to 49%. We present a case of intestinal obstruction which was intraoperatively found to be due to an internal hernia through the Foramen of Winslow. We use this case to spur the discussion of how improvements in radiologic imaging and increased awareness can aid in establishing diagnosis and surgical intervention in order to produce improved outcomes for affected patients. Furthermore, we examine whether an open or laparoscopic approach lends to improved outcomes and speculate about how to prevent recurrence of this unique internal hernia.

School: School of Medicine Campus: Amarillo

#### MS3-4 DENNISON, JOEL

Prevalence of Malignancy in Small Renal Masses

Joel Dennison, Brady Miller, Douglas Russell M.D.

Background: Due to modern methods of cross-sectional abdominal imaging, the detection of small renal masses (SRMs) has increased in frequency. A SRM is defined as a renal mass measuring between 0-4cm in greatest diameter, which corresponds to a T1a tumor stage. Traditionally, these masses have been treated surgically with 80% being diagnosed as malignant masses on histology.

Questions/purposes: We reviewed 10 years of nephrectomies performed at University Medical Center/TTUHSC Department of Urology to determine: Does the prevalence of malignancy in small renal masses diagnosed at University Medical Center/TTUHSC Department of Urology match with the typical rate of malignancy of 80% found in accepted literature?

Methods: Nephrectomies performed at University Medical Center/TTUHSC Department of Urology between January 1, 2007 and December 31, 2016 were analyzed to determine the histologic features of the excised kidney/mass, mass size, and tumor stage. Kidneyâ€<sup>TM</sup>s removed for non-neoplastic diagnoses and tumors measuring &gt;4.0cm at greatest diameter were excluded from the study.

Results: Of the 150 patients who underwent nephrectomies for a small renal mass, 137 were found to be malignant (91.3%). Patients who underwent nephrectomies for reasons other than small masses (n=149) were excluded from analysis.

Conclusion: While the literature shows that 75-80% of small renal masses are malignant, our experience at TTUHSC over the last 10 years shows that the rate of malignancy is higher at 91.3%. More data and studies are required to explore possible causes for this increase in malignancy rate.

School: School of Medicine Campus: Permian Basin

# MS3-4 GARCIA, KYLE

Effect of Wearable Technology on Patient-Physician Interaction in a Family Medicine Clinic, a pilot study.

Lee, Chris; Garcia, Kyle; Mortensen, Zachary; Wright, Joseph; Cha, Isaac; Anderson, Nathan; Findley, Leland; Williams, Simon.

Purpose: Google Glass (GG) is a hands-free wearable device that has the capabilities of a smartphone and resembles a pair of eyeglasses. This technology has many potential applications in medicine but little research has been done regarding patient perception of a physicianâ $\in^{TM}$ s use of GG. This study aims to determine whether the use of GG by physicians impacts patient satisfaction in a Family Medicine outpatient setting.

Methods: Subjects were selected from patients with regular follow-up visits at TTUHSC Family Medicine Clinic. They were consented and randomly assigned to control or experimental groups. Resident physicians wore and briefly interacted with GG at the beginning of the visit with the experimental groups. The physicians did not wear or use GG with the control groups. Both groups were then given a validated patient satisfaction survey immediately after their visits. They were also asked to rate their overall visit. Average values of patient satisfaction for control versus experimental groups were analyzed for statistical significance with an independent t-test. Equality of variance was analyzed using Leveneâ $\in$ <sup>TM</sup>s test.

Results: 50 responses were collected (34% control, 64% intervention, 2% uncertain). All items on the questionnaire pertaining to the patient perception of the physician and the care that was received showed no statistically significant differences in responses between the two groups. When the two groups rated the overall visit the results showed no significant difference (P=.798).

Conclusions: Overall, patients in the experimental group demonstrated no difference in satisfaction with their care compared to patients in the control group, demonstrating that patients may be comfortable with Family Medicine physicians $\hat{a} \in \mathbb{T}^{M}$  utilization of GG in an outpatient clinic. These findings may encourage further exploration and development to make wearable technology, like GG, more useful in a clinical setting.

School: School of Medicine Campus: Lubbock

## MS3-4 GHOSH, NILOY

Rattlesnake envenomation in a third-trimester pregnancy

Niloy Ghosh, MSIII; Jon A Henderson, MSIII; Hyunyoung G Kim, MSIII; Farren M Ancar, DO

Background: Snakebites in pregnancy are rare and can be life-threatening to both the mother and baby due to inflammatory and toxic properties of the venom. Prompt medical treatment is critical to prevent adverse consequences. A review of the rattlesnake bite management shows no significant difference in the pregnant versus non-pregnant population in regards to hospital admission, antivenom administration, and overall outcomes.

Case: A 26-year-old female at 37+6 weeks of gestation was bitten by a rattlesnake on the right middle finger, resulting in severe pain radiating up to the upper arm and swelling involving the entire hand. The patient had a history of late prenatal care, smoking (0.8 ppd), vulvovaginal herpes simplex virus, acute urinary tract infection, major depressive disorder, gestational diabetes mellitus (GDM), and gestational hypertension. Laboratory workup showed elevated WBC, decreased H/H and platelets, normal PT/PTT, and elevated D-dimer/fibrinogen (within the normal ranges for pregnancy). Treatment was initiated following the antivenom dosing and administration guidelines. An initial loading dose of 6 vials of CroFab was administered followed by a second dose of 6 vials of CroFab due to inadequate response and 3 maintenance doses of 2 vials every 6 hours (A total of 18 vials of CroFab were administered). Three days after the incident, the patient vaginally delivered a female neonate weighing 3650g with normal APGAR scores. Both the mother and baby were well on one-month follow up.

Conclusion:

1. Proper evaluation of clinical signs and laboratory workup are important to appropriately manage rattlesnake envenomation.

2. Snakebite envenomation in pregnant women should be managed according to the same treatment protocol in the non-pregnant snakebite patients.

3. The CroFab antivenom is likely safe in pregnancy and should be given if clinically indicated.

School: School of Medicine Campus: Amarillo

### MS3-4 JAMESON, ROBERT

Spinal Epidural Abscess from S. Intermedius with non-Procedural Dental Origin

Robert Jameson, Ryan Major, Miguel Quirch, MD, Subhanudh Thavaraputta, MD

Spinal Epidural Abscess from S. Intermedius with non-Procedural Dental Origin

A spinal epidural abscess (SEA) is a serious infection - if left untreated, an expanding abscess can compress the spinal cord, leading to paralysis and death. Streptococcus intermedius is a gram-positive coccus that is a member of the oral flora. Lately, it has been reported to cause SEA following dental procedures in immunocompetent patients. We report a case of S. intermedius SEA in a patient with no risk factors aside from trauma and poor dentition.

A 59-year-old Caucasian female with no significant past medical history presented to our emergency department for a one-month history of back pain and a three-day history of fever, nausea and vomiting. The back pain began after she tripped at work and became progressively worse, reaching 10/10 intensity and becoming exacerbated by movement. The patient endorsed current tobacco use, but denied IV drug use. She reported a history of poor dental health with multiple tooth fillings and extractions, but denied any recent medical or dental procedures. Her last visit was a dental flipper fitting 1 year ago. Dental examination on day 5 revealed no symptoms or active infection. However, tooth #18 demonstrated periradicular periodontitis and necrotic pulp. To assess for endocarditis, a transthoracic echocardiogram was performed on day 2 and a transesophageal echocardiogram was performed on day 8. Both were negative for valvular vegetations.

On the day of admission (day 0), initial findings included fever, hypotension, tachycardia, dehydration, and leukocytosis. Empiric antibiotic treatment of vancomycin and cefepime was started. Further exam revealed tenderness of the lumbar spine without visible change, and no neurological deficits. A CT on day 0 demonstrated lumbar discitis at L5-S1, while a following MRI revealed osteomyelitis at L5-S2 and extension of the abscess into the epidural space. An abscess aspiration was lost due to communication er

School: School of Medicine Campus: Lubbock

#### MS3-4 KANANI, HASSAN

THE FACES MOOD LIKERT-TYPE SCALE: An ultra-brief screening instrument for major depression in patients with non-english first language

Hassan Kanani, MS4, Dr. Shelley Blancett, PhD

PURPOSE: Earlier this year, the U.S. Preventive Services Task Force (USPSTF) recommended primary care providers screen for depression in all adult patients.1 Depression screening instruments can be cumbersome to complete and interpret, and are not easily accessed by patients with certain disabilities. The authors conducted a pilot study exploring the possibility of the single item faces scale to be of greater utility amongst patient populations with a non-english first language.

METHODS: TTUHSC Permian Basin Family Medicine and Internal Medicine department adult patients were recruited to complete the Faces Mood Likert-type Scale (FMLS) and the Patient Health Questionnaire (PHQ-9). Preliminary analysis of sensitivities and specificities was conducted.

RESULTS: Sixty four participants correctly completed both instruments. In screening for moderate, moderately-severe or severe depression, a PHQ-9 score of 10 or higher2, the FMLS score of 4 or greater showed sensitivity of 86% and specificity of 76%. For a PHQ-9 score of 15 or higher indicating moderately-severe or severe depression, the FMLS score of 5 showed a sensitivity of 79% and specificity of 85%, while the FMLS score of 4 showed a sensitivity of 95% and specificity of 67%.

CONCLUSIONS: In a small, pilot study sample, the FMLS showed promise as a brief and accessible screening instrument. A cutoff score of 4 or higher on the FMLS may potentially identify the majority of patients who need further evaluation for major depression.

School: School of Medicine Campus: Permian Basin

### MS3-4 KARIMI, KAREN

Trichilemmal carcinoma  $\hat{a} \in \hat{}$  a rare cutaneous malignancy

Karen Karimi MS, Leigha A. Sharp MD, Natasha Klimas MD, Michelle Tarbox MD, Ashley Sturgeon MD, Russell Akin MD

Trichilemmal carcinoma is a rare cutaneous adnexal tumor originating from the outer root sheath of a hair follicle. We report the case of a 60-year-old Caucasian man who presented with an enlarging nodule over this left temple present for several years with intermittent bleeding for several months. On examination, there was a 3x3cm exophytic pink oval plaque with crust and necrosis over the left temple. A shave biopsy was performed and microscopic examination showed a large exoendophytic tumor comprised of moderately to severely pleomorphic keratinocytes with clear cell change. There was a pushing border and organization to the tumor that was suggestive of abortive hair follicle formation. A diagnosis of trichilemmal carcinoma was given. Mohs micrographic surgery was performed and the patient was tumor free after one stage. Trichilemmal carcinoma is a rare tumor of outer root sheath derivation and appears to develop within the wall of pre-existing pilar cyst. While the literature is limited and the optimal treatment remains to be determined, we contribute a case of trichilemmal carcinoma successfully treated with Mohs surgery.

School: School of Medicine Campus: Lubbock

### MS3-4 KIM, HYUNYOUNG

Giant anorectal condyloma acuminatum of Buschke-Löwenstein presents difficult management decisions

Hyunyoung G. Kim, MSIII; Jennifer E. Kesey, MSN; John A. Griswold, MD

Condyloma acuminata, or anogenital warts, caused by human papillomavirus are the most common sexually transmitted disease. In rare cases, the disease could progress to an extensive neoplasm called Buschke-Löwenstein tumor (BLT), also known as giant condyloma acuminatum. BLT differs from normal condyloma acuminata by presenting with locally invasive growth, lack of spontaneous resolution, tendency for recurrence after treatment, and potential for malignant transformation. We examine a BLT case reaching large dimensions in the anorectal region treated with neoadjuvant chemoradiation therapy and surgical excision of residual lesions. Furthermore, continuous follow-up care can help identify and prevent recurrence or malignant transformation of the tumor.

School: School of Medicine Campus: Amarillo

#### MS3-4 KING, ERIN

Arachnoid Cysts and Cerebral Venous Anatomy

Erin King, Tuong Vy Dang, Mark Stephens, and Dr. Laszlo Nagy

Arachnoid cysts are fluid collections within the arachnoid mater of the meninges that fail to drain via the ventricular system. They constitute approximately 1% of intracranial, space-occupying lesions. Most arachnoid cysts are believed to be congenital anomalies caused by the splitting of the arachnoid membrane during development, with a minority representing acquired cases secondary to trauma, hemorrhage, or meningitis. Arachnoid cysts are more common in the pediatric population, and there is a male predominance of 2:1 male to female that is noted in both children and adults. Recent studies on the prevalence and natural history of arachnoid cysts in the pediatric and adult populations via brain magnetic resonance imaging demonstrated that the most common locations were middle fossa (47% in children, 34% in adults), posterior fossa (38% in children), retrocerebellar (33% in adults), and convexity (14% in adults), and most were left-sided (45% in children, 39% in adults). Other significant sites of arachnoid cyst development include the interhemispheric fissure, the suprasellar region, the cerebellopontine angle, the interpeduncular cistern, the quadrigeminal cistern, and the ambient cisterns.

Arachnoid cyst can present as a patient with enlarged subarachnoid space and macrocephaly. They often lie in the lowest resistance locus in cases of incipient hydrocephalus and transiently or permanently elevated intracranial pressure (ICP). There is no substantial literature on the relationship between arachnoid cysts and cerebral venous anomalies. In the present work, we will describe and discuss the basic question of cause and consequence of 3 cases where a combination of arachnoid cyst with cerebral venous anomaly and elevated venous pressure coexist. We will then try to project future study plans and shortly describe our currently running IRB approved studies that will help solve the riddle.

School: School of Medicine Campus: Lubbock

#### MS3-4 LEE, JEANNIE

Spontaneous Resolution of Acute Subdural Hematoma in a Patient on Dialysis: Case Report

Jeannie Lee, Tuongvy Dang, Matthew Amodeo, Dr. Benedicto Baronia

Introduction: Acute subdural hematomas (ASH) develop within the potential space between the arachnoid and dura maters and are most commonly the result of tearing of the cortical bridging veins. Patients with coagulopathies or those on antiplatelet or antico-agulation medications are at increased risk of developing ASH.

Case: Patient is a 74-year-old male who presented at the ED for a ground-level fall precipitated by a syncopal episode. He has a past medical history significant for end stage renal disease on hemodialysis, diabetes mellitus, hypertension, and coronary artery disease on daily aspirin and Plavix. His surgical history is significant for a left upper extremity arteriovenous fistula and cardiac stent placement. CT scan of the head showed a left-sided acute on chronic subdural hematoma. Craniotomy with hematoma evacuation was planned. However, four days after admission, repeat CT showed almost complete resolution of the ASH. Surgery was cancelled, and the patient was discharged with instructions to return to clinic in 4-6 weeks.

Discussion: Symptomatic ASH is treated surgically with craniotomy and evacuation. Over time, the ASH may be broken down and resorbed, but this usually happens in a span of weeks. The rapid resolution of the ASH in this patient suggests that another factor may be involved, such as hemodialysis, which was the only significant intervention the patient received during his hospital stay. Previous studies in the literature have linked ESRD on hemodialysis (HD) with an increased risk of developing ASH. However, these studies have only compared patients with ESRD on HD with control patients with no renal disease. Thus, it is unclear whether renal disease may be the contributing risk factor and hemodialysis the alleviating factor for subdural hematoma, or both may be contributing risk factors. Further studies are needed to elucidate this.

## MS3-4 LEE, SUHEUNG

Handheld Raman Spectroscopy (Rs) Device As Point Of Care Diagnostic Tool

Suheung Lee, Kushal Gandhi, Gary Ventolini and Natalia Schlabritz-Lutsevich

Introduction. Current medical communities have an urgent need to develop rapid point-of-care techniques that effectively provide diagnostic information in a short period of time and allow instant analyses and distribution of data among providers. However, the most commonly used diagnostic modalities in clinical settings either lack easy accessibility, or take considerable time to provide results. We recently reported an application of Mira M-1 (Metrohm, CA, USA), a hand-held Raman spectrometer, for rapid diagnosis of placental hypoxia (JRS. 2017; 48(12): 1896-1899.). The objective of present study was to evaluate Mira M-1 as a diagnostic tool for separating normal and abnormal pregnancy patterns. Materials and Methods. Maternal serum samples were collected from 7 obese women and 8 non-obese women in the 1st and 2nd trimesters of pregnancy (IRB protocol # L17-136). Each sample was aliquoted in cryogenic vials, stored at -80°C. RS of each aliquot were obtained with Mira M-1, and the spectra was analyzed with MiraCal software (Metrohm, USA). Results. We detected several RS patterns and corresponding peaks. In addition, we found differences between the 1st and 2nd trimester of pregnancy in the obese women, whereas the non-obese women did not display differences during these pregnancy windows. Conclusion. Our study indicates that obese pregnant women have Raman spectroscopic "fingerprints" that differ from the ones of non-obese pregnant women. This result implies possible future application of Mira M-1 for identifying pathological conditions in obese pregnant women in macromolecular levels. This finding, in turn, implies that Mira M-1 can be further utilized to obtain useful diagnostic information about other diseases, in a faster and more accessible fashion than other current diagnostic modalities do. Acknowledgement: Authors are thankful to Clinical Research Institute for the help with this study.

School: School of Medicine Campus: Permian Basin

### MS3-4 LINDGREN, TAYLOR

Improving health self-efficacy at a community health fair in Lubbock, Texas

Taylor H. Lindgren, MBA; Chelsea Burroughs; Mark Burroughs; George Parker, MBA; Fatma Levent, MD

To improve the health self-efficacy of the Lubbock, Texas community, Texas Tech University Health Sciences Center School of Medicine (TTUHSC SOM) students organized a health fair to promote patient education and improve awareness of health issues such as diabetes, heart health, hypertension, skin care, hypercholesterolemia, LGBTQ health, nutrition, stress management, cancer screenings and recommendations, physical fitness, and mental health. An evaluation of 57 health fair participantsâ€<sup>TM</sup> self-reported self-efficacy on a scale from 0 to 10 before and after visiting the health fair revealed an average increase in self-efficacy of 0.87 (before: 7.96, after: 8.83, p&lt;0.0001, std=1.78). Although the health fair was successful in marginally improving patient self-efficacy, patient education and overall community health can continue to be improved by expanding educational opportunities for health promotion and illness prevention, furthering overall access to care, and broadening the health fairât<sup>TM</sup> starget population.

### MS3-4 LYUKSYUTOVA, MARIA

Pure Squamous Cell Carcinoma of the Gallbladder Masquerading as a Hepatic Mass

Maria Lyuksyutova, MDc, Drew Rasmussen, MPHc, Hafiz Khan, PhD, Abhilash Perisetti, MD

Gallbladder carcinomas are adenocarcinomas (AC) in the majority of the cases. Adenosquamous carcinoma (ASC) and pure squamous cell carcinoma (SCC) of the gallbladder are rarely encountered and comprise of 1-3% of gallbladder cancer cases. Pure squamous cell carcinoma of the gallbladder is rarer with less than 1% of the incidence. Most of the published literature is based on case reports and case series. The survival rates of ASC and SCC of the gallbladder are significantly lower (mean ~ 5 months) compared to the AC of the gallbladder (mean survival of 11.4 months). Surgery remains the mainstay of treatment for localized tumors with possible adjuvant chemotherapy and radiation as a further treatment option. We report one such case of SCC GB presenting as a hepatic mass.

School: School of Medicine Campus: Lubbock

# MS3-4 MCCOY, COLTON

A 45-year-old male with massive right-sided varicocele secondary to portal hypertension

Adham Shoujaa, Taylor Lindgren, Colton McCoy, Ben Aziz, George Parker

Due to the angle at which the left spermatic vein enters the left renal vein, there is more turbulent blood flow and increased venous pressure in the left testicular veins compared to the right. Therefore, varicoceles are diagnosed almost exclusively on the left side. This report details a rare isolated right-sided varicocele in a 45-year-old male secondary to portal hypertension. This is only the second case reported of an association between isolated right-sided varicocele and portal hypertension.

School: School of Medicine Campus: Lubbock

#### MS3-4 MOON, JEREMY

Cannabinoid hyperemesis syndrome in pregnancy

Hyunyoung G. Kim, MSIII; Jeremy Moon, MSIII; Heather Dixon, DO; Paul Tullar, MD

Background: Cannabinoid hyperemesis syndrome is a condition characterized by chronic cannabis use and cyclic episodes of nausea, vomiting, and abdominal pain, relieved by compulsive bathing. The syndrome is likely to be underdiagnosed in pregnant women due to its similarity with the symptoms of early pregnancy and hyperemesis gravidarum in the presentation.

Case: We report a 20-year-old pregnant woman with the history of chronic cannabis use and multiple admissions for recurrent nausea and vomiting who was observed to be taking frequent hot showers. Without other identifiable causes, she was diagnosed with cannabinoid hyperemesis syndrome and managed with antiemetics and abstinence. The patient vaginally delivered a healthy infant at term without any complications.

Conclusion: Abstinence from cannabis use is highly recommended in pregnant women due to its potential harm in fetal development and stimulation of intractable nausea and vomiting. Recognition of the symptoms and proper history taking prompt early diagnosis, allowing timely and adequate treatment of the syndrome.

School: School of Medicine Campus: Amarillo

# MS3-4 MORTENSEN, ZACHARY

Commonly associated comorbidities associated with retinopathy of prematurity in Lubbock Texas region

Zachary Mortensen, MS3; Tysen Weber MS4; Adam Schwalm, DO, PGY1; Coby Ray, MD; Melissa Piepkorn, MD; Kelly Mitchell, MD

Background: Retinopathy of prematurity (ROP) is a retinal vascular disease of the premature infant. However, not all premature infants develop ROP. Identifying potential ROP developers by recognizing unique comorbidities could be helpful to successfully screen all patients at risk for ROP. Patients treated in the Texas Tech University Medical Center (UMC) NICU represent a diverse population that has not been studied in the context of ROP. This study aims to identify significant comorbidities that frequently accompany ROP in the unique patient population treated in Lubbock TX, at UMC.

Methods: A retrospective chart review of neonatal patients, age less than 1 year, who have been diagnosed with ROP at UMC between 2015-2016. A matched control group of patients with negative ROP screening exams between 2015-2016 at UMC is still a work in progress and diagnosis and severity will be correlated with other recorded diagnoses. Commonly associated comorbidity counts and means from ROP patients were obtained. Statistical analysis will include p-value and correlation coefficients.

Results: 19 neonates were diagnosed with ROP with a mean gestational age of 26.14 +/- 1.73 weeks and mean birthweight of 863.37 +/- 188.23 grams. Of those who developed ROP, 19 (100.00%) were also diagnosed with respiratory distress syndrome (RDS), 15 (78.94%) with sepsis, 8 (42.11%) with intraventricular hemorrhage, 2 (10.53%) with pneumothorax, and 1 (5.26%) with necrotizing enterocolitis. 17 (89.47%) were given oxygen therapy > 30 days, 12 (63.16%) were given >3 RBC transfusions and 10(52.63%) were given inotropes for >48 hours. 12 (63.16%) had poor weight gain. Correlation coefficients and control results pending control results.

Conclusion: These results can aid clinicians in identifying potential ROP patients. This may assist in further developing additional screening criteria as well as increasing physician awareness of common comorbidities of ROP.

School: School of Medicine Campus: Lubbock

# MS3-4 NGUYEN, DANIEL

Rhabdomyolysis Secondary to Systemic Lupus Erythematosus?

Daniel Nguyen, Farah Alsaati, Jena Deitrick, Kamal Azhar, Evelyn Sbar

Systemic lupus erythematosus (SLE) in the acute setting is a very unique challenge to a physician and will require a thorough analysis of the entire body. Besides looking for cutaneous and arthritic manifestations, patients presenting with SLE should also be examined for renal issues, other autoimmune disorders, and myopathies. In our case, we present a 36 year old African American woman who presented with a rare and unusual presentation of SLE. Her SLE presented in an acute setting which lead to severe rhab-domyolysis without evidence of lupus nephritis. The case showcases a rare complication from SLE that can be fatal if not treated rapidly and shows the process of treatment in such a rare case.

School: School of Medicine Campus: Amarillo
### MS3-4 NOOR, RABIYA

Is a previous positive GBS screen a risk factor for early onset sepsis and meningitis in subsequent pregnancies?

Rabiya Noor, B.S., Fatima Levent, M.D.

Background: Streptococcus agalactiae, also known as Group B Streptococcus (GBS), is a gram positive, beta-hemolytic bacterium that colonizes the gastrointestinal and genital tract of 15-40 percent of pregnant women. This colonization is usually asymptomatic in adults, however, it can be transmitted vertically during labor or after the rupture of membranes. GBS infection in a neonate can be early-onset or late-onset and can manifest as sepsis, pneumonia, or meningitis. GBS transmission can be prevented with intrapartum antibiotic prophylaxis of a GBS positive pregnant woman during labor. The current guidelines recommend intrapartum prophylaxis for pregnant women who test positive for GBS colonization at any point during the current pregnancy, who are in labor with an unknown GBS status, and who had a previous infant with invasive GBS disease. Case Presentation: We present a case of a 2 day-old baby girl who was brought in to the emergency Department (ED) for decreased intake and activity, and a fever of 103.9 °F rectally. The patient was born at term to a mother who was tested GBS negative before delivery but tested positive during a previous pregnancy. The patient was admitted and diagnosed with early-onset sepsis and bacterial meningitis with GBS. She received penicillin G for 21 days and improved with treatment. She had a normal physical examination at discharge. Conclusion: Current GBS intrapartum prophylaxis guidelines only recommend prophylaxis with penicillin if the mother had an infant with GBS infection previously. It is important to raise awareness about the presentation of GBS infections in neonates, especially in mothers who have had a previous GBS colonization even if they test negative. Although intrapartum prophylaxis has greatly reduced the burden of GBS disease, GBS still remains the leading cause of sepsis and meningitis in young infants. The development of a GBS vaccine is in trial and can ultimately prevent neonatal GBS disease.

School: School of Medicine Campus: Lubbock

### MS3-4 PARIKH, NIKI

Suprapubic Catheter Placement through Ileal Mesentery Causes Mechanical Small Bowel Obstruction Six Years Later in a Female Patient with Turners Syndrome

Niki Parikh M.B.A., M.S.B.A., Robert Grand M.D., Jayne McCauley M.D., Ari Halldorsson M.D., Cynthia Smith M.D.

Introduction: Percutaneous Suprapubic Cystostomy (SPC) is a procedure performed to manage urinary retention when urethral catheterization is contraindicated or to improve the quality of life in cases such as neurogenic bladder. Although a simple procedure, it is associated with serious complications, increasing the morbidity and mortality. This case study demonstrates a delayed presentation of small bowel obstruction caused by a suprapubic catheter traversing through the ileal mesentery in a patient with no prior bowel surgeries. There are few case reports this complication and this is possibly the first case to be reported six years after SPC placement.

Case Presentation: A 65-year-old female with neurogenic bladder and suprapubic urinary catheter was admitted with complaints of abdominal pain, nausea, and vomiting. Further work-up confirmed the diagnosis of small bowel obstruction. Emergency laparotomy was performed with resection of the distal ileum. The catheter was found to be traversing through the mesentery, mechanically obstructing the ileum. The patient had lived with this catheter for six years and complained of abdominal pain twice, once in December 2013 and once in March 2017.

Discussion: This procedure carries with it a complication rate of up to 10% and a mortality rate ranging from 0.8 to 1.8%. Complications include infection at insertion site, bleeding, trauma to bowel, catheter migration in ureter, and ureteral obstruction. Common risk factors are obesity, prior lower abdominal surgeries, small bladder capacity, and a short distance between the symphysis pubis and umbilicus. The patient $\hat{a} \in \mathbb{T}^M$ s obesity and short stature placed her at increased risk.

Conclusions: If there are any risk factors, the technique should incorporate the use of ultrasound, CT, MRI, or fluoroscopy to reduce incidence of complications. Any patient who has a suprapubic catheter and presents with any abdominal complaints should be evaluated for complications related to the catheter.

### MS3-4 PHAM, HANNAH

Repeat Computerized Tomography Scans for Ureteral Stones in the Emergency Department

Hannah Pham, Kyle Garcia, Dr. Pranav Sharma

Introduction: A subset of patients with ureteral stones who present to the emergency department (ED) will return with recurring symptoms. Although repeat imaging is not warranted, it is often re-performed in patients who represent with renal colic. Unnecessary computerized tomography (CT) scans cause excess radiation to the patient and costs to the health care system. We sought to identify clinical predictors of repeat imaging performed on ED revisits for urolithiasis.

Methods: We retrospectively identified 112 patients from 2012–2016 diagnosed with at least one ureteral stone on CT at our institution who returned to the ED within 30 days. Patients were stratified based on presence or absence of repeat CT scan imaging. Means were compared with independent T-test and proportions with chi-square analysis. Multivariate logistic regression was performed to determine independent predictors of repeat imaging.

Results: In our study, 68 patients (60.7%) underwent repeat CT scan imaging upon representation to the ED within 30 days of being diagnosed with urolithiasis. On univariate analysis, younger age, non-diabetics, narcotics prescribed on discharge from the first ED visit, and longer mean time between ED visits were associated with repeat CT scan imaging being performed (p<0.05). On multivariate analysis, however, only prescription of narcotic pain medications was an independent predictor of repeat CT scan imaging (odds ratio [OR]: 3.18, 95% confidence interval [CI]:  $1.22\hat{a}\in$  8.28; p=0.018).

Conclusions: Repeat CT scan imaging is not warranted in patients who represent to the ED within 30 days with recurring renal colic symptoms who have a known history of ureteral stones. Use of narcotics for pain control on initial presentation is associated with a higher likelihood of repeat imaging being performed on representation. Non-steroidal anti-inflammatories should primarily be used for pain control in these patients to avoid unnecessary testing.

School: School of Medicine Campus: Amarillo

### MS3-4 QUEZADA, MORGAN

Dangerous Trifecta: Anemia, Menorrhagia, Hypothyroidism

Morgan Quezada, MSIV., Daina Dreimane, MD, Tammy Camp, MD, Marcela Nur, MD

Menorrhagia, defined as heavy or prolonged menstrual bleeding, is a common problem in adolescents. It is largely caused by anovulatory cycles, and could result in anemia, in some cases severe enough to cause hemodynamic instability requiring blood transfusion. Hypothyroidism, also frequently diagnosed in the adolescent population, can present with menstrual disorders including menorrhagia. The cases of two 13 year-old girls presenting with menorrhagia leading to anemia will be discussed. The first patient presented to an outside ER with a hemoglobin of 2.8 g/dL after several days of heavy menstrual bleeding. Following a brief hospital stay it was discovered in the outpatient adolescent medicine clinic that her linear growth was stunted. Laboratory results done at an outside gynecologistâ $\in$ TMs office were consistent with primary hypothyroidism (TSH of 198 uIU/mL, normal level 0.6 â $\in$  7.4). The second case features a 13 year-old girl with Maffucci syndrome who presented to her pediatrician with prolonged menstrual bleeding. She was found to have a hemoglobin of 10.3 g/dL, and TSH of 73.02 uIU/mL. Growth parameters for her were normal upon review.

Multiple reports of menorrhagia secondary to hypothyroidism have been documented, most of them in adult women. Currently, thyroid testing in women presenting with menorrhagia is only indicated if the patient has symptoms or a positive family history. Because symptoms of anemia can be indistinguishable from those of severe hypothyroidism, these two cases illustrate the importance of screening for thyroid dysfunction in adolescent females presenting with menorrhagia.

### MS3-4 RUIZ, CHRISTINA

Case report: Costello Syndrome with heterozygous alpha1-antitrypsin Z allele and exocrine pancreatic dysfunction

Eduardo Urias1, Christina Ruiz1, Mohamad Al-Rahawan1,2

- 1. Texas Tech University Health Sciences Center School of Medicine, Lubbock, TX
- 2. Southwest Cancer Center, University Medical Center Children's Hospital Lubbock, Texas

Costello syndrome (CS) is rare congenital disorder that presents with a constellation of symptoms. A definitive diagnosis is made by detection of a mutant HRAS gene (chr.11p15). The H-ras protein is a GTPase that plays a crucial role in the MAPK/ERK signaling pathway. In the past, three independent case studies have reported CS patients with pancreatic abnormality. The authors consistently report hyperplasia of endocrine pancreatic tissue in infants with CS. Here we report the case of a 5 year-old female child with CS who presents with the characteristic features of the syndrome, including heavy-set thick evebrows, sparse coarse hair, wide spaced eyes, loose skin folds, coarse facies, and cardiac manifestations. She reported chronic abdominal pain culminating in intense abdominal pain for four days, lethargy, loss of appetite, and lack of bowel movements. She was diagnosed with pancreatitis, consistent with her clinical presentation and elevated serum lipase and amylase. After bowel rest, fluids, and pain medication at home, repeat labs showed a prompt drop in her lipase and amylase levels. Ultrasound at that time showed no evidence of pancreatitis and no obstruction was evident. Repeat ultrasound one month later showed findings consistent with autoimmune pancreatitis, including heterogeneous echogenicity with increased size. She had persistent abdominal pain and diarrhea for which she was started on an H2 blocker and pancreatic enzymes. These medications did not completely resolve her abdominal pain and diarrhea suggesting exocrine pancreatic dysfunction. Comprehensive evaluation by gastroenterology and immunology failed to identify the etiology of her pancreatitis. Evaluation revealed that the patient is heterozygous for the dysfunctional alpha-1-antitrypsin (AAT) Z allele. Serum AAT levels were slightly below the normal range. To our knowledge, this is the first reported case of CS with a clinical exocrine pancreas abnormality and the heterozygous AAT Z genotype.

School: School of Medicine Campus: Lubbock

### MS3-4 SANTUCCI, MARGARET

Van Wyk Grumbach: Hypothyroidism Presenting as Bilateral Granulosa Cell Ovarian Tumors in a 6 Year Old

Margaret Santucci, Archana Ayyar, Mark Reedy, MD

We describe a case of a 7-year-old female who presented to the emergency department (ED) with acute onset of vaginal bleeding, bilateral pelvic masses, and acute abdominal pain. Gynecologic oncology consultation resulted in surgery with bilateral ovarian cystectomies demonstrating adult-type, granulosa cell tumors. During the hospitalization, bone age determination was found to be one year younger than her numeric age. After researching pediatric syndromes characterized by juvenile hypothyroidism, isosexual precocious puberty, granulosa cell tumors with delayed bone age, a rare condition called Van-Wyk Grumbach Syndrome was identified. Importantly, multiple case reports document how adequate thyroid replacement can result in resolution of the ovarian pathology and normalization of the signs and symptoms of this syndrome [1,2].

Our research identified a lack of scientific reports in the gynecologic oncology literature. Since this gynecologic sub-specialty is commonly consulted to surgically manage these pediatric patients, unnecessary surgeries and their potential complications could possibly be avoided by adequate thyroid replacement [3].

### MS3-4 SCHMIDT, KYRA

Effects of comorbidities on multiple sclerosis clinical and MRI outcomes.

Kyra Schmidt, BS, Mirla Avila, M.D., Dept. of Neurology

Objective: Measure the extent to which comorbidities affect clinical and MRI outcomes in multiple sclerosis patients.

Background: While the cause of MS in unknown, there has been recent interest in the incidence and progression of MS in patients with comorbidities. With the identification of correlations between comorbidities and MS onset and progression, physicians may be able to slow the progression or limit the onset of MS in at risk patients. Physicians can be more vigilant in identifying and treating comorbidities that are more likely to occur with MS. Additionally, the identification of high risk comorbidities may give insight into physiological factors leading to the progression of multiple sclerosis.

Design/Methods: EMR data from 103 patients at TTUHSC Department of Neurology. MRI outcomes, comorbidities (diabetes mellitus, tobacco use, hypertension, depression, coronary artery disease, and autoimmune disorders) were documented.

Results: HTN (31%), Depression (35%), and Smoking (35%) were the most prevalent comorbidities in this patient population. Significant correlation of DWI lesions with the presence of black holes (P=0.000001) was found. DWI lesions were less in patient with other autoimmune disorders (p-0.039). The total number of comorbidities we not associated with MS MRI findings or clinical outcomes. Gender and ethnicity had no correlation to clinical outcomes. Hispanic ethnicity was associated with increased presence of gadolinium lesions, p value 0.010.

Conclusion: This study suggests that clinical severity and MRI findings are not entirely associated to patientâ $\in$ <sup>TM</sup>s comorbidities. DWI changes in the MRI may indicate disease severity, since there was a significant correlation with the presence of black holes. Further studies needed to access the connection between autoimmune disorders and DWI lesions.

School: School of Medicine Campus: Lubbock

### MS3-4 SINGER, JUSTIN

Peripartum Depression: Identifying and Reducing Barriers to Care

Justin P Singer, M.S.; Sarah M Wakefield, M.D.

Peripartum depression is estimated to affect between 10-15% of all perinatal women, though the number of women experiencing depressive symptoms meeting criteria for major depression in the peripartum period may be even higher. The DSM-5 helped to expand the definition from a postpartum disorder to one that incorporated the antepartum period as well, providing a specifier of  $\hat{a}$ Cœwith peripartum onset $\hat{a}$  for patients whose symptoms meet criteria for major depression during pregnancy or within the first four weeks after delivery. The importance of identifying and providing care for women with peripartum depression is being actively recognized beyond just mental health field. The American College of Obstetricians and Gynecologists in 2015 changed practice guidelines from stating there was  $\hat{a}$ Cœinsufficient evidence to screen $\hat{a}$  to recommending that all clinicians use a standardized tool to screen mothers at least once in perinatal period. However, despite these steps, many women fail to seek or receive treatment, with one study reporting less than 15% of women who screened positive for peripartum depressive symptoms sought professional assistance during the perinatal period. This poster presentation explores barriers to care reported by women with peripartum depression symptoms from multiple research studies, and examines if any significant barriers are consistently mentioned across these different papers.

### MS3-4 STEPHENS, MARK

Intracranial pressure and Chiari malformation

Mark Stephens, TuongVy Dang, Erin King, Laszlo Nagy

A Chiari I malformation is characterized by descent of the cerebellar tonsils with or without syringomyelia. Since the advent of MRI technology, Chiari malformations have been linked to small posterior fossa size, tethered cords, and scoliosis. During the evolution of the neurosurgical management of the disease, position-related intermittent obstruction of the foramen magnum (Gardner) and positional effects of the pulsing tonsils (Oldfield) have been verified as pathophysiologic components of the symptomatology, most notably the positional headaches (Dyson). Additionally, Chiari malformations related to hydrocephalus and idiopathic intracranial hypertension (IIH) are a well-known consequence of elevated intracranial pressure. While Chiari malformations are managed surgically, IIH is primarily managed medically. Here, we present three cases of mixed Chiari malformation and IIH wherein the patients had perioperative intracranial pressure monitoring during surgery. These cases should help guide the management of complex, atypical Chiari/IIH patients in the pediatric population.

School: School of Medicine Campus: Lubbock

### MS3-4 TAN, MICHAEL

Ablative CO2 Laser in Burn Scar Revision

Michael Tan, Kendra Walker, Anceslo Idicula, M.D., John Griswold, M.D.

Scar therapy often requires a multimodal treatment approach to manage. Scar characteristics can be categorized under color, scar type, thickness, and body location. Burn scars can result in altered vascularization, dyschromia, structural changes, tension, and contour abnormalities. Burn wounds are more likely to result in hypertrophic scars due to the inflammatory process that occurs and the prolonged time for wound healing. Recently, the treatment for scars have shifted to the use of lasers, which has proven to be useful in scar revision. Pulsed-dye laser (PDL) and fractional lasers are the most commonly used lasers. Fractional lasers are able to split the laser beam into pixelated pattern of microbeams, which allows it to create hundreds of small thermal injuries to the skin within a confined area. The microbeams create microscopic wounds that penetrate deep to allow for a rapid healing response while the untreated skin act as a reservoir of tissue to help drive neocollagenesis and tissue remodeling. Fractional lasers can be further divided into nonablative or ablative. Ablative fractional lasers deposit thermal energy at greater depths compared to nonablative fractional lasers. The greater depth achieved may be better at treated thicker scars. UMC purchased their fractional CO2 laser machine in 2008, becoming one of five institutions that possess their own laser machine. We present two cases of scar revisions that underwent CO2 laser therapy, tracking their cost-benefit, patient satisfaction, and outcome. We believe that the CO2 laser provides an immensely useful tool that proves to be a cost-efficient method of scar revision.

### MS3-4 THOMPSON, JEREMY

Dysfunction of potassium (SK) channels in the amygdala in a rat model of neuropathic pain

Jeremy M Thompson, Vadim Yakhnitsa, Lenin Mahimainathan, Guangchen Ji, and Volker Neugebauer

Neuropathic pain is an important healthcare issue with significant emotional-affective components. Increased amygdala activity contributes to emotional-affective aspects of pain. Small-conductance calcium-activated potassium (SK) channels are expressed in the amygdala and inhibit neuronal excitability through actions including mediating the medium afterhyperpolarization (mAHP), shunting excitatory synaptic transmission, and enhancing inhibitory synaptic transmission. SK channels have been implicated in peripheral and spinal nociceptive processing, but their involvement in pain-related plasticity in the brain has not yet been assessed. Here we test the hypothesis that SK channel dysfunction in the central amygdala (CeA; output nucleus) contributes to pain-related amygdala plasticity and behaviors. Audible (nocifensive) and ultrasonic (affective) vocalizations and mechanosensitivity were measured in neuropathic rats (L5 spinal nerve ligation model, SNL) and sham controls. SNL rats had increased vocalizations and reduced withdrawal thresholds. Stereotaxic administration of an SK channel blocker (apamin) into the CeA by microdialysis increased vocalizations in sham but not SNL rats. Patch-clamp recordings of regular firing lateral CeA neurons in brain slices from SNL rats found reduced mAHP, increased action potential frequency-current (F-I) relationship, and enhanced excitatory synaptic transmission. Apamin blocked the mAHP and increased excitability and excitatory transmission in brain slices from sham but not SNL rats, indicating that SK channel blockade under normal conditions mimics neuropathic pain-related changes. Western blotting and reverse transcription polymerase chain reaction (RT-PCR) revealed decreased levels of SK2 subunit protein and mRNA in the amygdala of SNL rats, suggesting pretranscriptional SK channel downregulation. The data indicate that SK channel dysfunction contributes to maladaptive neuropathic pain-related amygdala plasticity and behavior.

School: School of Medicine Campus: Lubbock

### MS3-4 TORRES, HARRISON

Bilateral Emphysematous Pyelonephritis

Harrison Torres, Dr. Pranav Sharma

Emphysematous Pyelonephritis (EPN) is a rare disease caused by a necrotizing urinary tract infection and defined by the radiologic presence of gas within the urinary system and associated tissues. This disease remains a urologic emergency associated with a high rate of mortality. We present the rare case of bilateral EPN complicated by initial misinterpretation of radiologic findings. Current treatment focuses on the conservative approach of urgent fluid resuscitation, glucose control, antibiotic therapy and minimally invasive techniques such as stent or drain placement. However, traditionally radical nephrectomies were indicated, but their use is currently under debate. In our case, conservative management was chosen as the patient's condition was deemed too critical for surgical intervention. Bilateral ureteral stents and percutaneous drains were placed, though the patient eventually expired. EPN is an emergent urological disease relying on early diagnosis via computed tomography scan imaging to provide for immediate intervention. The present case demonstrates the need for clinical awareness of the radiologic findings of this disease to avoid misinterpretations, and further investigation into the management of severe cases of EPN in patients deemed poor surgical candidates.

School: School of Medicine Campus: Amarillo

### MS3-4 TREVINO, SORLEEN

#### Tertiary Syphilis Presenting with Psychiatric Symptoms

#### Sorleen Trevino MSIII, Ashish Sarangi MD

Tertiary syphilis is a late manifestation that presents after years of untreated infection. As a chronic and multisystemic disease, it can mimic other disorders depending on the organ system affected. Invasion into the CNS, termed neurosyphilis (S-NS), can exhibit as coordination difficulties, motor/sensory deficits, altered behavior, & dementia. While more common in the preantibiotic era, it's variable presentation and latency make it easily missed even today, especially with neuropsychiatric comorbidities. We present such a scenario in a 52-year-old female with a history of dementia, major depressive disorder, psychosis, and bipolar. She presented to the psychiatric ward for suicidal ideation and was found to have a MOCA of 12 with both short and long term memory deficits. She exhibited generalized weakness, wide-based gait, strongly positive Romberg sign, and reported auditory hallucinations. CT was unremarkable but treponemal screen was positive and she was transferred to the medical unit where infectious diseases began parenteral ceftriaxone for 21 days for possible S-NS with tabes dorsalis. Although serologies and spinal fluid analysis revealed a positive FTA-ABS, negative RPR, and negative CSF VDRL, it was believed that either she had previously been treated or was presenting with advanced stage, thus warranting treatment. Our review of literature offers additional guidance for dealing with patients that screen positive for syphilis. First, VDRL does not perform as well in the late/tertiary stage. Authors agree that a negative CSF treponemal-specific test may not exclude diagnosis when clinical suspicion is high. Also, failure to treat is associated with prolonged or refractory psychosis and dementia. We found that neuropsychiatric symptoms are the most common manifestation in S-NS, and many report cognitive impairment. Therefore, screening for S-NS holds important implications so that neuropsychiatric symptoms can be effectively and appropriately managed.

School: School of Medicine Campus: Lubbock

### MS3-4 WALKER, KENDRA

Double Jeopardy: Darier's Disease with Herpes Simplex Virus -1 and -2 Infection

Kendra Walker, Kleesy Thomas, Michelle Tarbox

Darier disease (DD), also known as keratosis follicularis, is a rare keratinizing disorder classically inherited via autosomal dominant mutations in the ATP2A2 gene, which encodes SERCA2, a calcium pump of the sarco/endoplasmic reticulum. It clinically presents as hyperkeratotic, warty papules that coalesce into plaques affecting the seborrheic and intertriginous areas. Whether clinically active or in remission, DD patients are prone to infectious complications such as herpes simplex virus (HSV), varicella zoster virus (VZV), or pox virus, but often the atypical clinical presentation can lead to delayed diagnosis and treatment. When DD patients are infected with HSV, it is most commonly with only one type, which is usually HSV type 1 (HSV-1). We discuss a DD patient who presented with subacute onset of increased tenderness of his lesions on his back, arms, and hands. He was found to have disseminated HSV-1 and -2 infections which is unique to the literature.

### MS3-4 WAN, STEVEN

#### Impact of Depression in Teenage Pregnancy

Steven Wan, MSIII, Luis Ruiz, MSIII, Hyunyoung G Kim, MSIII, Fizza Naqvi, MSIV, Farren Ancar, DO, Hena Tewari, MD.

Teenage pregnancy is an intimidating experience for the teenagers. In addition, both mom and child face many disabling factors. Even though the teen birth rate has fallen, it is still of public health and societal concern. While many studies on teen pregnancy have explored demographics and risk factors, less data have evaluated the depression as an associating factor. In this study, we investigated a correlation between diagnosed depression and pregnancy during the teenage years. We conducted a retrospective review of female patients, under the age of 20, diagnosed with depression and/or adolescent pregnancy at Texas Tech University Health Sciences Center clinics (including Obstetrics and Gynecology, Pediatric, and Family Medicine clinics) in Amarillo, Texas from January 1, 2013 to December 31, 2016. The analysis was done on the patients with both depression and pregnancy. It excluded those with PPD and focused on the patients with clear documentation. The average age at depression occurred first. The number of teens that were depressed before pregnancy was nearly doubled that of the number of pregnant teens that went on to develop depression, outside of postpartum depression. These findings give further support to previous studies that have shown that pre-existing depression, and mental illness as a whole is, is a risk factor for teen pregnancy. One future study would be to follow the cohort in this study with depression and pregnancy to see if these individuals have a difference in the severity, duration, and efficacy of the treatment of their depressive symptoms. This research shows that depression remains an important risk factor for teen pregnancy. Public policy and medical management should thus be further encouraged to address this issue.

School: School of Medicine Campus: Amarillo

# SCHOOL OF NURSING

### NURSE BROWN, KRISTI

Medical Care or Comfort: Why do we have to choose? Implementing a Geriatric Trauma Palliative Care Program

Kristi Brown, MSN, RN, FNP-BC

School: School of Nursing

### NURSE BUMPUS, SERENA

Workflow Redesign: Interdisciplinary Rounds—From Redesign to Reality

Serena Bumpus MSN, RN; Nora Frasier MBA, RN; Jahnett Gray, MHSM, MBA, BSN, RN, Valerie Gibbs, MSN, RN; and Genia Wetsel MBA, BSN, RN

School: School of Nursing

### NURSE CARR, R.

The State of Nursing Education in Texas

R. Carr MSN, RN; B. McDonald MSN, RN, CMSRN, CNML; L. Mason MBA, MHA, RN; & J. Withaeger MSN, RN

School: School of Nursing

### NURSE GIBSON, MICHELLE

Diagnosis of a Urinary Tract Infection: Symptoms versus Urinalysis and Urine Culture

Michelle Gibson BSN, RN and Anika Lockhart BSN, RN

School: School of Nursing

### NURSE STEVENS, CYNTHIA

The Challenges and Benefits to Underserved Populations by Incorporating Behavioral Health into a West Texas Community Health Clinic

Cynthia Stevens MSN, RN (TTHSC DNP Student); Irene Fuentes BA, MSSW; Dean Schultz MD; Tonia Cook MSN, RN, FNP-C; Thaddee Uwimana MSN, RN, FNP-C; Jody Manuel PA-C; Lisa Herrera LVN; Timothy Gallimore LVN; Mary Klein, PharmD BCACP, BC-ADM; Kayley Will PharmD, BCACP; Tom Winter EdD, LCSW; Rachel Slaymaker MSW, LMSW; Wayne Paris PhD, LCSW

School: School of Nursing

### NURSE THRASH, NICHOLAS

Physical Rehab of Adolescents with Minor Traumatic Brain Injury: Bed Rest versus Normal Physical Activity

Nicholas Thrash BSN, RN, CCRN

School: School of Nursing

### NURSE WHITE, ASHLEY

Antibiotic Administration in Laparoscopic Cholecystectomy

Ashley White BSN, RN and Valerie Trevino BSN, RN

School: School of Nursing

# **RESIDENTS & CLINICAL FELLOWS**

# **R&CF ATKINS, RANDY**

Albendazole alopecia: A case report of child abuse poisoning from delusional infestation by proxy

Bridget Walker, Randy Atkins, MD; Ashley Sturgeon, MD; Patty Patterson, MD

Poisoning is a rare form of child abuse and is often caused by caregiver psychopathology, most commonly factitious disorder imposed on another (formerly Munchausen syndrome by proxy).1 Delusional infestation by proxy, where the caregiver erroneously believes the child is infected with parasites, has not been well documented as a cause of child abuse. We describe a case of siblings with alopecia caused by albendazole administered by a delusional mother. To our knowledge, this is the first reported case of delusional infestation by proxy resulting in poisoning as a form of child abuse.

School: Texas Tech University Health Sciences Center Campus: Permian Basin

### **R&CF ACHUTA**, AYNAMPUDI

Metabolic Monitoring of Child and Adolescent Patients on Atypical Antipsychotics by Psychiatry versus Pediatrics or Family Medicine Providers in Primary Care Clinics of a University Medical Center.

Achuta Aynampudi, M.D;Sarah Wakefield, M.D.; Manish Aligeti, M.D., MHA; Vivekananda Rachamallu, M.D.

Objective: The objective of this study was to compare the metabolic monitoring of child and adolescent patients on atypical antipsychotic medications in psychiatry (PSY) versus pediatrics (PED) or family medicine (FM) outpatient clinics of an urban university medical center.

Methods: In this retrospective review study, a total of 149 charts meeting the inclusion criteria were reviewed. Inclusion criteria: (1) patients of ages 5-18 years, (2) initial visit in PSY, PED or FM outpatient clinics at TTUHSC in Lubbock, TX from 7/1/2013 to 12/31/2014, and (3) newly prescribed one or more of atypical. Metabolic monitoring parameters were evaluated for the initial and subsequent clinic visits and included personal and family history, BMI, waist circumference, blood pressure, fasting plasma glucose (GLU) and fasting lipid profile (LIP). A parameter was considered  $\hat{a} \in \mathbb{C}$  completed  $\hat{a} \in \mathbb{T}^{M}$  if the relevant procedure was completed on the scheduled date of encounter +/- 2wks.

Results: A total of 110 child and adolescent patients in PSY and 39 in PED/FM clinics were newly prescribed antipsychotics during the study period. BMI was the parameter most regularly followed by providers at baseline (PSY 88.3%, PED/FM 97.4%; NS), 12wks (PSY 86.4%, PED/FM 85.0%; NS), & 24wks (PSY 91.8%, PED/FM 100%; NS). GLU was completed at low rates at baseline (PSY 18.9%, PED/FM 25.6%; NS) and 12wks (PSY 8.6%, PED/FM 10.0%; NS). LIP was also completed at low rates at baseline (PSY 12.7%, PED/FM 25.6%; P=0.032) and 12wks (PSY 7.0%, PED/FM 10.0%; NS). No statistically significant difference was seen for metabolic monitoring at baseline, 12 wks, and 24 wks for male vs female or among other racial/ethnic groups.

Conclusions: The rate of metabolic monitoring of child and adolescent patients on atypical antipsychotics was low overall. There was no statistically significant difference between PSY vs PED/FM clinics.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF BARTELS, HEATHER**

A Case of Ischemic Autoimmune Retinal Vasculitis Secondary to Atypical Hemolytic Uremic Syndrome

Heather Bartels, MD; Coby Ray, MD; Leo Dominguez, MD

A 51-year-old Caucasian female presented to the TTUHSC Ophthalmology clinic with complaints of white spots and blurred vision in the left eye for one week. She reported a recent diagnosis of anemia and elevated blood pressure. Her initial visual acuity was 20/20 OD and 20/80 OS. On exam, her retina showed multiple cotton wool spots and flame shaped hemorrhages bilaterally. Optical coherence tomography showed mild macular edema of the right eye and significant macular edema of the left eye. Fluorescein angiography showed blocking defects, macular edema, and temporal periphlebitis bilaterally. Due to the patient  $\hat{a} \in \mathbb{T}^{M}$ s worsening shortness of breath, she was transported directly from clinic to the emergency department. The patient was admitted for four weeks where a subsequent work up by the primary team and subspecialists identified the underlying disease of atypical hemolytic uremic syndrome. The patient was treated with hemodialysis and eculizumab, a humanized monoclonal antibody. She also received an intravitreal injection of Bevacizumab in her left eye which resolved the significant macular edema and vision loss. Her response to both systemic and ocular therapy showed promise as she clinically improved. Her last visual acuity was 20/100 OD and 20/80 OS due to worsening choroidal infarctions bilaterally. The patient was discharged to outpatient rehabilitation to continue treatment, but was re-admitted to the hospital on two occasions. During her second re-admission, she presented with sepsis and was diagnosed with spontaneous bacterial peritonitis. Unfortunately, the patient died of presumed septic shock. This case highlights the importance of both the early diagnostic findings of the complete eve exam and the multi-disciplinary diagnostic and treatment collaboration of the ophthalmology, internal medicine, infectious disease, hematology-oncology, and nephrology services when evaluating and treating a patient with a serious multi-system disease.

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF BEHRENS, EMILY**

A Critical Case of Psoriasiform Dermatitis

Karen Karimi MD, Emily Behrens MD, Kyle Richardson BS, Michelle Tarbox MD

A 42-year-old Hispanic male patient with a history of alcoholic cirrhosis and substance abuse presented a three-month history of thick scaly eruption affecting his extremities and scalp. The patient was hospitalized for septic shock, upper gastrointestinal bleeding and acute renal failure. Collaborating history revealed that the lesions were relatively asymptomatic, starting as small red well-demarcated lesions on legs, gradually enlarging and spreading to his palmar hands, soles, arms, and scalp. Concomitantly, the patient also developed new-onset blurry vision, as well as joint pain limiting his ambulation. Cutaneous exam showed yellow hyperkeratotic papules and plaques with hemorrhagic fissures and streaks on the palmar hands, fingertips, arms, palms, legs, and soles. Notably, several horn-like plaques with alopecia were noted on the scalp. There was desquamation and mild erosion noted on his penile shaft. A punch biopsy was taken from right upper arm displayed an impressive confluent parakeratosis overlying a mildly acanthotic epidermis, small collections of neutrophils within the stratum corneum consistent with Munro micro-abscesses. Within the dermis, there was a lymphocytic inflammatory infiltrate surrounding the superficial vascular, consistent with psoriasiform dermatitis. Polymerase chain reaction testing was negative for RPR, gonorrhea, chlamydia, and HIV. Blood culture was positive for Escherichia coli. Additional testing revealed negative HLA-B27. Clinicopathological correlation favored the diagnosis of kerato-derma blennorrhagica in the setting of reactive arthritis from E. coli sepsis. Unfortunately, despite intervention with intravenous broad-spectrum antibiotics, hemodialysis, mechanical ventilation, and vasopressors, the patient eventually died from liver failure and septic shock.

School: Texas Tech University Health Sciences Center Campus: Permian Basin

### **R&CF BENHAMMUDA, MOHAMED**

#### Depression in elderly

Mohamed Benhammuda, John Culberson

Late-onset depression is common in the elderly, and often presents atypically. In this case, an 84 yo male with a history of Major Depressive Disorder (MDD) and mild cognitive impairment was seen in the Geriatric consultation clinic for evaluation of MDD resistant to therapy for the past three years. He was previously very active with no history of mental illness, stroke or traumatic brain injury. He lives with his wife and daughter, both of whom are treated for MDD, in Abilene. Psychiatric therapy included numerous classes of antidepressant medication without improvement. Over the past year, he has experienced a 40 lb weight loss, profound isolation, and some suicidal ideation. He sleeps well. Admission to a skilled nursing facility for rehabilitation was ineffective, and his family is seeking referral for ECT. He has recently relocated to Lubbock to live with his son.

Physical exam was unremarkable, MOCHA 24/30 with losses in short-term memory. Well-dressed, minimally verbal. No focal numbness/weakness, tremor, or gait disorder. Medications included donepezil, nortriptyline, and oxybutynin. We initiated mirtazapine, continued nortriptyline, and discontinued donepezil and oxybutynin.

After a period of improved symptoms, he experienced a relapse of primarily vegetative symptoms, and reported a new symptom of dysphagia. Mirtazepine dose was increased and augmented with bupropion. Nortriptyline was discontinued. Speech and Physical Therapy consultation were obtained. In follow-up, dysphagia, physical activity, and mood improved. Relocation to live with his local son provided a setting conducive for interdisciplinary patient and family education in the importance of a structured, goal-oriented environment. Regular visits to his home in Abilene provided hope that he will eventually be able to his wife. ECT, while an effective option for depression in older adults, is often accompanied by significant memory loss.

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF BHAKTA**, SUHANI

Linezolid Associated Hypoglycemia

Felix Morales M.D., Suhani Bhakta M.D., Herman Johannesmeyer Pharm.D

Linezolid is an oxazolidinone antibiotic with broad-spectrum activity against gram-positive microbes and negligible activity against gram-negative microbes. It also has the ability to induce serotonin syndrome when co-administered with serotonergic medications. In addition to its antibacterial effects, linezolid has pharmacologic activity as a monoamine oxidase inhibitor. MAOIs have previously been described to have properties that may both promote insulin production and increase insulin sensitivity. Linezolid may put patients being treated with serotonergic medications at risk for serotonin syndrome and, potentially, why our patient experienced such profound hypoglycemia. Additionally, linezolid medication labeling has recently been mandated by the Food and Drug Administration to contain a warning that a relationship between linezolid and hypoglycemia has been demonstrated. Our case describes a 77-year-old African American male prescribed linezolid 600 mg twice daily for 14 days for the treatment of a Staphylococcus hominis urinary tract infection. Nine and a half days into therapy the patient began experiencing recurrent hypoglycemic episodes, which resulted in two emergency department visits and one inpatient admission. These episodes persisted despite repeated intravenous dextrose boluses. After a brief lag period after the final linezolid administration, the patient  $\hat{a} \in \mathbb{T}^{M_s}$  blood glucose level stabilized within normal limits. The patient had a follow-up appointment with his primary care physician two weeks after discharge with no noted blood glucose complications. Two months after discharged he entered hospice care for his advancing heart failure and later expired due to causes unrelated to blood glucose complications. This case bears other similarities to previous reports of linezolidinduced hypoglycemia published in the literature.Linezolid may have cause hypoglycemia in our patient and may potentially be an adverse effect in the older population with DM type II.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF BOKAIE**, HASSAN

Improved human papillomavirus vaccination rate in a pediatric resident clinic after implementation of a quality improvement project.

Hassan Bokaie, MD, Blayne Street, DO, Fatma Levent, MD, Marcela Nur, MD

Purpose: Human papillomavirus is the most prevalent sexually transmitted infection worldwide. HPV vaccine has been available since 2006 for females, and 2009 for males. Since initiation and completion rates of HPV are low in the United States, multiple quality improvement (QI) projects have been undertaken. One such project was implemented in 2015 at the pediatric resident clinic affiliated to Texas Tech Health Sciences Center in Lubbock, Texas. The purpose of this study is to explore the impact the QI project had in HPV vaccination when comparing the pediatric resident clinic with the other three academic pediatric clinics at the same institution.

Methods: Secondary data analysis from a previously IRB approved study looking at HPV vaccine completion rates in different outpatient clinics was used to calculate the total number of HPV vaccines given from 2010 to 2016. Statistical analysis was performed using SPSS software version 23. Differences in HPV vaccination among the four clinics before and after 2015 were analyzed using Chi Square. A p value of < 0.05 was considered statistically significant

Results: HPV vaccination was initiated for a total of 3069 of children and adolescents at the four different pediatric clinics affiliated with TTUHSC between 2010 and 2016. Of the total, 217 (7.1%) were seen at the pediatric resident clinic where 78/217 (35.9%) initiated HPV vaccination after implementation of the QI project in 2015. The percentage of HPV vaccines given after 2015 was significantly higher in the pediatric resident clinic than in the other three clinics where there were no ongoing QI projects to improve HPV vaccination (X2 = 16.69; p < 0.001).

Conclusion: Low HPV vaccination rates in children and adolescents of West Texas demonstrate the need for use of quality improvement projects in clinics. The QI project implementation in a pediatric resident clinic appeared to improve HPV vaccine uptake compared to other pediatric clinics.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF CHALIA**, ANKIT

Munchausen Syndrome by Proxy: The Overlooked Diagnosis

Ankit Chalia<sup>1</sup>, Maninder Kaur<sup>2</sup>, Manish Aligeti<sup>1</sup>

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Introduction: Munchausen Syndrome by Proxy (MSBP) involves the intentional production or feigning of physical or psychological signs or symptoms in another person for indirectly assuming the sick role. Perpetrator is usually the biological mother (children under the medical care of others are also at risk) who deceives medical personnel by altering records, falsifying medical history, contaminating laboratory samples or by directly inducing injury or illness on the victim. Victims are typically 4 years old or younger. An average of 21.8 months elapse between the onset of symptoms and the diagnosis, and 6% of the victims are dead prior to diagnosis.

Case: We describe a case of 4-year-old male with G-tube dependency, evaluated in child psychiatry clinic. He was initially diagnosed with Autism Spectrum Disorder and Developmental Delay. Perpetrators were adoptive parents using clonidine more than the medically approved dose, obtaining it from different medical providers. Diagnosis of MSBP was made by a Multidisciplinary Team (MDT) involvement with subsequent removal of the child from home which alleviated the symptoms.

Discussion: Our case is unique because the perpetrators were adoptive parents (maternal aunt and her husband). Adoptive dad was a former nurse whose license was revoked due to diversion of opioids. Law enforcement found clonidine syringes at perpetratorâ€<sup>TM</sup>s house. Overmedicating the child by perpetrators posed significant diagnostic challenge and explained the discrepancy between parental report and in-clinic observation of child. Due to collaborative care and MDT involvement, diagnosis was made within 3 months after presentation to our clinic.

Conclusion: It is important to differentiate between the children whose signs and symptoms are fabricated by their caregivers from those with an underlying disease. Failure to properly diagnose MSBP can lead to further abuse by the caregiver and potential death of child.

# **R&CF GRAND, ROBERT**

PSA Screening since the U.S. Preventive Services Task Force Decision in 2011: Review of the Literature

Grand, Robert MD; Sessions, William; Ibilibor, Christine MD; Cammack, Thomas J. MD; de Riese, Werner T.W. MD, PhD

Introduction: Since the introduction of prostate-specific antigen (PSA) screening in the 1980s, prostate cancer mortality has improved by more than 40%. Therefore, the U.S. Preventative Services Task Forceâ $\in$ <sup>TM</sup>s (USPSTF) decision to label PSA screening with a grade D recommendation came as a surprise to many clinicians. Following the USPSTFâ $\in$ <sup>TM</sup>s controversial decision, numerous papers have been published regarding PSA and screening recommendations by both the medical community and by news organizations targeting the layperson. While previous authors have demonstrated that most mainstream news articles recommend against PSA screening, no one has specifically addressed the reflection within the academic medical community. This review analyzes publications by professional organizations and individual practitioners after the USPSTFâ $\in$ <sup>TM</sup>s published recommendation against PSA screening in May 2012 and categorizes these papers as â $\in$  efforâ $\in$  or â $\in$  eagainstâ $\in$  PSA screening.

Methods: Using  $\hat{a} \in \alpha$ Pubmed $\hat{a} \in a$ s the source for this review, publications from May 2012 to October 2017 were filtered using specific medical subject heading terms. Articles were reviewed and labeled as  $\hat{a} \in \alpha$ In favor $\hat{a} \in \alpha$ Against $\hat{a} \in PSA$  Screening based off set criteria.

Results: Ninty-six articles met the review criteria. Analysis of these publications revealed 71 articles that were "in favor†of PSA screening.

Conclusions: The majority of publications regarding PSA screening support the use of PSA testing in prostate cancer screening since the decision of the U.S. Preventive Services Task Force (USPSTF) in 2011 to give PSA screening a grade D recommendation.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF HALFMANN, SARA**

Thiamine Deficiency Encephalopathy Following Prolonged Gastroenteritis

Sara Halfmann, M.D., Thivakorn Kasemsri, M.D, Shawn Reeves, MSN, RN, CPNP, Clayton Womack, MSN, RN, CPNP

Thiamine is a water-soluble B1 vitamin involved in many cellular metabolic activities which result in the production of ATP. The primary source of thiamine is from the diet including whole grains, pork and legumes. Thiamine deficiency is uncommon in the United States and most western civilized cultures due to a high prevalence of thiamine-containing foods. Dietary stores can be depleted in as little as 18 days if not replaced, resulting in inadequate ATP production that significantly disrupts organ systems with high metabolic demands such as the cardiovascular and nervous systems, leading to the clinical presentations of wet and dry beriberi.

A fifteen-month-old male presented with a 2-3 week history of diarrhea, intermittent emesis, worsening generalized weakness and altered mentation. During the hospital course, he exhibited extreme weakness, abnormal eye movements and rhythmic facial movements consistent with seizure activity. MRI revealed symmetric abnormal signal with restricted diffusion within the putamen and caudate nucleus with increased T2 signal in the bilateral thalami and periaqueductal white matter, consistent with thiamine deficiency or a mitochondrial disorder. Later dietary history revealed recent change to almond milk, a low-thiamine containing milk, so thiamine deficiency was suspected pending metabolic evaluation. Patient's blood was obtained for thiamine level. He was treated empirically with thiamine with rapid and sustained improvement in neurological symptoms. Thiamine (B1) level was found to be low at <7 nmol/L (normal: 74-222 nmol/L).

Infantile thiamine deficiency has multiple clinical presentations. Testing for this disease should be considered when there is a history of low thiamine diet or clinical manifestations. Recommended biochemical diagnosis include thiamine level (blood or urine), erythrocyte transketolase activity (ETKA) and thiamine pyrophosphate effect (TPPE). Once thiamine is replaced, full recovery can be achieved.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF HERNANDEZ, FERNANDO**

#### Often Forgotten Ossicles

Fernando E. Hernandez, MD, David S. Edwards, MD

A 23-year-old female mixed martial artist presented describing a four-month history of intermittent pain in the dorsolateral aspect of the left midfoot. Patient described that inciting trauma occurred while attempting to escape a foot lock during sparring, and she felt and "popping sensation". Patient sought medical attention approximately 1 month after initiation of symptoms at a local urgent care clinic. X-ray imaging of her left foot taken during this initial medical evaluation demonstrated no acute abnormality. The patient described additional traumatic events after initial imaging, with the most recent being a an ankle inversion sprain two weeks prior to our evaluation at the sports medicine clinic. She described minimal relief in symptoms pain with intermittent use of over-the-counter oral NSAIDs. On physical exam of the left foot, the patient demonstrated significant tenderness of the cuboid bone and calcaneal cuboid joint and of the fifth metatarsal proximally. The remainder of the physical exam was within normal limits. Repeat complete 3-view x-ray of left foot demonstrated a multipartite Os Peroneum. This x-ray finding was later confirmed with bedside musculoskeletal ultrasound on subsequent visit. The patient was officially diagnosed with Painful Os Peroneum Syndrome (POPS). She was managed conservatively with specific physical home therapy exercise regimen and the use of a hard soled shoe for ambulation. Follow-up visits for reassessment were done at both 4 weeks and 9 weeks. At the 9 week visit the patient demonstrated complete resolution of symptoms with painless full range of motion. Patient was able to resume MMA training as tolerated. POPS is often unnoticed or misdiagnosed as a potential pain generator of the midfoot. The presence of an os peroneum predisposes patients to distal rupture of the peroneous longus tendon via friction. Familiarity with the characterization of this pathology is essential for early diagnosis and appropriate care.

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF HORAK, JEREMY**

Marching Band Mishap- A Clinical Vignette

Almond Toledo, DO, Jeremy Horak, DO, Jim McDonald, MD, David Edwards, MD

History: A 19-year-old Italian, Norwegian male presented with diffuse muscle soreness worse in the legs for two days and cola-colored urine for one day. Denied other urination symptoms. He is a trombone player in the marching band. Band conditioning began three days prior and had no trauma. Conditioning was outdoors through midday. The reported high was 93F. No cardiac or respiratory symptoms reported. Negative history for chronic disease or surgeries. He was physically active at baseline; running 3.5 miles daily along with body-weight exercises and whey protein supplement. Negative family history for sickle cell or metabolic diseases.

Exam:

Vital signs: Temp: 97.7F, BP: 121/83, HR: 75, RR: 18, BMI: 21. 16, SaO2: 96% on room air.

General: No acute distress, afebrile

HEENT: Atraumatic

Gastrointestinal: Non-tender, no organomegaly

Genitorurinary: No pain

Musculoskeletal: Trace knee effusions. Diffuse lower extremity tenderness

Integumentary: No lesions

Neuro: Alert and oriented. DTR's, sensation, and motor were intact

DDx

Exertional Rhabdomyolysis

#### Compartment syndrome

#### Substance abuse

Infectious myositis

Autoimmune

Results: Initial CK was >100,000, CK-MB 71.0, AST/ALT 1601/245, BUN/Cr 21/1.4, ALP of 93. TSH and Free T4 were 1.1 and 5.93. Day three, Continued CK >100,000, AST/ALT 1242/368, BUN/Cr of 6/0.7. Day five, day of discharge, CK 40,500, AST/ALT 884/368, BUN/Cr of 10/0.8. EBV screen and Hepatitis B/C panel were negative. UDS upon admission was negative for drug abuse

Diagnosis: Exertional Rhabdomyolysis

Treatment: Aggressive IV hydration and close monitoring of metabolic panel and CK levels. At discharge, pigmenturia resolved and had improvement of myalgias

Outcome/Return to Play

- CHAMP (Consortium for Health and Military Performance) Criteria

- Patient returned to the marching band with limited physical activity
- Conditioning was limited to running 1.5 miles daily with no strength training after myalgia resolved

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF KAUR, MANINDER**

Sarcoma as second cancer in pediatric cancer survivors.

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Introduction: Survivors of pediatric cancer have a 3-6 folds increase in the risk of developing second cancer. As cancer therapies continue to increase survival, so does the risk of carcinogenesis. Sarcomas is a heterogeneous group of cancers that may develop as second malignancies in childhood cancer survivors. Our study investigates sarcomas as second cancers in pediatric cancer survivors.

Method: We report a child who developed sarcoma after surviving treatment for hepatoblastoma. Additionally, we review relevant statistics from the Surveillance, Epidemiology, and End Results (SEER) database. The SEER database includes 28% of the U.S population and data from 18 state cancer registries (SEER-18). Data about patients who developed second cancer, not relapse, was extracted from SEER using variables: primary site, sequence number, and ICCC site recode ICD-O-3/WHO 2008.

Results: We present a 4.5-year-old male who survived embryonal hepatoblastoma at 22 months of age. He presented with a left submandibular mass that turned out to be a non-metastatic primitive neuroectodermal tumor. Only chemotherapy (Cisplatin, 5-Fluorothiouracil, Vincristine, and Doxorubicin) was used to treat hepatoblastoma; however, a combination of chemotherapy (Vincristine, Doxorubicin, Cyclophosphamide, Etoposide, and Ifosfamide) and radiation was used to treat PNET. He has no evidence of recurrence of either disease three years after finishing all therapy. However, he has evidence of mild congestive heart failure. Out of 75,665 cases of primary pediatric malignancies in the SEER database, only 1536 (2.03 %) developed second cancer. Among those, 193 patients (12.56%) developed sarcoma. No treatment information was reported by SEER.

Conclusion: Advances in therapies for pediatric cancer have led to improved survival rates, but their long-term effects, including second cancer, are not negligible. We report on the incidence of second cancer, specifically sarcoma, in survivors of childhood cancer

# **R&CF KOLLIPARA, RAMYA**

Pityriasis rubra pilaris treatment targeting IL-23/Th17 axis with ustekinumab

Karen Karimi MS, Ramya Kollipara MD, Russell Akin MD

Pityriasis rubra pilaris is a rare chronic inflammatory condition of the skin that is characterized by follicular hyperkeratotic papules and pink-orange scaly plaques. Histologically, the condition features skin changes falling within the spectrum of psoriasiform dermatitis. Treatment may be challenging as the it is often refractory to commonly utilized treatments such as topical corticosteroids, systemic retinoids, methotrexate, cyclosporine A, or phototherapy. The role of the IL-23/Th17 axis in pityriasis rubra pilaris has recently been described, thus the use of a monoclonal antibody targeting IL-23 may be beneficial. While ustekinumab has been proven effective in the treatment of several diseases including psoriasis, psoriatic arthritis, and  $Crohnâe^{TM}s$  disease, there is still a paucity of data on its efficacy in treating pityriasis rubra pilaris. Herein, we present the case of a patient with pityriasis rubra pilaris, reddishorange colored scaling patches with well-defined borders, who improved on ustekinumab therapy targeting IL-12 and IL-23.

School: Texas Tech University Health Sciences Center Campus: Permian Basin

### **R&CF MEDWAY, ALLEN**

Failure Mode Effect Analysis of a Robotic Assisted Laparoscopic Left Nephrectomy Requiring the Emergent Conversion to an Open Nephrectomy.

#### Allen Medway, James Cammack

Robotic assisted surgeries are common and, in urology, nephrectomies, prostatectomies and cystectomies are some of the surgeries that can be done with the assistance of a robot. Safety is a concern for all surgeons including ones that use a robot to assist. Rarely, it is unsafe to complete a surgery with a robot. These cases require the surgeon to abort a robotic surgery and convert to an open surgery. Such instances included when the patient has unusual anatomy or extensive abdominal adhesions from a previous surgery. Occasionally, there is an iatrogenic injury to blood vessels that requires a surgeon to  $\hat{a} \in \alpha$ go open $\hat{a} \in$  in an emergency. Unfortunately, there is a paucity of data in the surgical literature that provides protocols for converting to an open case in emergent situations. Since having to convert to an open case is so rare, but also so vital in order to save a patient $\hat{a} \in \mathsf{TM}$ s life, the value behind having such data would be great. It would allow other surgeons to learn and be prepared for such an emergent situation before they experience it live.

W present a case of a 28 yo female undergoing a robot assisted laparoscopic left partial nephrectomy. She suffered an iatrogenic injury to her common iliac artery. This required the surgery team to quickly convert emergently to an open case. The massive transfusion protocol was initiated and the patient required 32 units of packed red blood cells, 22 units of fresh frozen plasma, and 4 units of platelets before the bleeding was controlled. We also present a protocol that allows other robotic surgery teams to not only be able to convert to an open case efficiently and effectively, but we also present strategies for these teams to be prepared and to train for such events. Lastly, we present our finding from our Failure Mode Effect Analysis, which is systematic way of assessing failure and allowed us to be able to form recommendations in robotic cases that must be emergently converted to open cases.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF MORGAN, MICKINZIE**

Resource Utilization for Pediatric Patients with Acute Gastroenteritis in the Emergency Department (ED): Comparison of Children $\hat{a} \in \mathbb{T}^{M_{S}}$  vs. General EDs

Morgan, Mickinzie; Bokaie, Hassan; Hayes, Jacob; Johnson, Lara W.

Background: Acute gastroenteritis is a common complaint in the ED.

Objective: Determine the frequency with which diagnostic testing and treatment are utilized for pediatric patients presenting with acute gastroenteritis in child vs. general EDs.

Methods: We utilized data from the 2005-2012 National Hospital Ambulatory Medical Care Survey, a nationally representative sample of ED visits at US non-federal hospitals, utilizing a four-stage probability sampling method. We included all pediatric patients with a diagnosis consistent with acute gastroenteritis based on ICD-9 codes. We examined resource utilization including laboratory testing (urinalysis, electrolytes, complete blood count, liver function tests), imaging, and medication use for selected anti-emetics, antibiotics, and intravenous fluids. We defined a child ED as one with an average age of less than 18. We generated descriptive statistics with weighted percentages. We used chi-square tests to compare resource utilization between child and general EDs. All analyses were conducted with SAS 9.3 and SUDAAN 11.0.

Results: There were 7,270 pediatric ED visits for acute gastroenteritis comprising 11.1% of ED visits, consistent with a national estimate of 3.4 million ED visits annually. Only 15.5% of patients were seen in a child ED. Children seen in child EDs were less likely to have laboratory testing (complete blood count 18.6% vs 31.1%, p<0.001, urinalysis 18.4% vs 27.0%, p&lt;0.001, and electrolytes 8.5% vs 15.6%, p=0.01). Both types of EDs had similar ondansetron usage (23.6%). In general EDs, 8.7% of patients received promethazine while in child EDs few children received it. Imaging occurred at similar rates (22.7%) but CT imaging occurred less often in child-focused EDs (2.45% vs 4.66%, p=0.02).

Conclusion: Lab testing was done often for pediatric patients with acute gastroenteritis. Anti- emetic use occurred frequently and promethazine use was common in general EDs. CT scans were done less in child EDs.

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF NANTHAN, AMY**

#### The Un-TIMELY Fracture!

Primary Author: Amy Moses-Nanthan, MD, George W. Brindley, MD, Eric Wait, MD, Niska Blevins, DO, Suzanne Graham, MD, Jennifer J. Mitchell, MD, FAAFP

16 yo WM severe Right leg pain and pop when running

PMHx: Osteofibrous dysplasia (OFD)

PSHx: Curettage of R Tibial lesion, 2009

Fam/Soc Hx: Non-contributory

Meds: none

NKDA

ROS: entirely negative except leg

Physical Exam:

Gen: Healthy appearing, moderate distress

Right Lower Leg: Large hematoma, Swelling mid-shaft tibia, obvious deformity (see photos)

Severe TTP Lower leg, No crepitus, Compartments soft and compressible, DP/PT pulses 2+, cap refill <2 sec

Decreased ROM in knee/ankle due to pain. Painful active ROM of foot

Motor: 5/5 Sensation: Intact, Equal B/L in all dermatomes

Left Leg: WNL

DDX: Tibial Fracture; Tibial Contusion; Osteofibrous Dysplasia, recurrence

Tests & Results:

X rays: Acute, comminuted, pathologic fracture of the midshaft of the right tibia, similar to prior radiographs from 2008

Biposy of lesion by Interventional Radiology was comparable to pathology from 2008 consistent with OFD

Final Diagnosis: Pathologic Fracture of Right Tibia d/t Osteofibrous Dysplasia

Discussion: This case presents a spontaneous pathologic tibial fracture associated to OFD.

This repeat fracture was surprising and untimely, as recurrence of OFD is rare, especially after puberty.

OFD is a rare tumor, <1% of all bone lesions, typically seen in the anterior mid-shaft of the tibia. It is found in children and young adults, males&gt;females. Diagnosis is based on exam, clinical findings and pathologic assessment of bone biopsy and/or FNA with immunohistochemical stain. The concern is OFD may progress to Adamantinoma (&lt;1% risk), which is a slow growing cancer that may metastasize. With progression to adamantinoma there would be associated epithelial cells noted in pathology, none were present.

Treatment of OFD is usually symptomatic.

Outcome- Surgery was performed for curettage, confirmatory pathology and intramedullary rod placement to stabilize the fracture. Bone allograft was placed in the defect to expedite healing.

Surgical path report: OFD ch

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF PHAM, TERESIA**

Saved by the car crash

Teresia Pham, MD. Thinh Nguyen, MSIII. Mohamad Al-Rahawan, MD. Daina Dreimane, MD. Marcela Nur, MD

Thyroid cancer is very rare in children. Less than 2% of thyroid cancer in the United States occurs before 20 years of age. Incidental discoveries of thyroid nodules are increasing from imaging studies performed for diagnostic reasons unrelated to thyroid symptoms or disease.

Here, we present a case of an asymptomatic, previously healthy 13-year-old female who presented to the ER after a motor vehicle accident (MVA) with subsequent discovery of a large neck mass. She was riding in a car driven by an unlicensed 16-year-old friend and sustained multiple lacerations and head hematoma but no loss of consciousness. CT scans of the head, chest and spine obtained after the trauma revealed an enlarged left thyroid mass with abnormal regional lymph nodes. On further questioning, she denied having any difficulty swallowing, voice changes, shortness of breath, or any awareness of the thyroid mass. Complete thyroidectomy revealed classic papillary thyroid carcinoma with bilateral nodal involvement. She then developed hypoparathyroidism with hypocalcemia, which was managed with calcitriol and calcium supplementation. Her chest CT was suspicious for lung metastasis initially. She then underwent I-131 remnant ablation and whole body I-123 uptake scan that did not show any lesions anywhere else.

Based on the rarity of thyroid cancer among the pediatric population, it was very unusual to have discovered papillary thyroid carcinoma in this patient after a MVA. Literature has shown that differentiated thyroid cancer (DTC) may simply present as a cervical adenopathy with or without a palpable thyroid lesion, or sometimes only after finding distant metastases in children. This patient is fortunate enough to have survived the crash, let alone the discovery of a cancerous mass that has led to timely treatment with excellent prognosis.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF QUIRCH**, MIGUEL

Incidence and risk of hand foot syndrome (HFS) in patients with cancer treated with regorafenib

Miguel Quirch, Kyaw Z. Thein, Anita Sultan, Sriman Swarup, Somedeb Ball, Lukman Tijani, Catherine Jones, Fred Hardwicke

Background: Hand foot syndrome (HFS) or palmar-plantar erythrodysesthesia (PPE) has significant impact on the quality of life (QOL) of cancer patients receiving chemotherapy. Regorafenib is an oral small molecule multi kinase inhibitor and has been employed in many malignancies. Yet, the risk of HFS is substantial. We undertook a meta-analysis of phase 3 randomized controlled trials (RCT) to determine the incidence and risk of HFS among patients with cancer treated with regorafenib.

Conclusions: Our meta-analysis demonstrated that patients on regorafenib group experienced a significant increase in all grades of HFS with a relative risk of 29 for grade 3 and 4 HFS. HFS contributes a major cause of morbidity affecting QOL, drug dosing inconsistencies and adds financial burden among patients undergoing chemotherapy. Recognizing HFS helps clinicians in providing early intervention and good supportive care and thereby enhancing patients' QOL.

School: Texas Tech University Health Sciences Center Campus: Lubbock

### **R&CF RIVERA**, ROBERTO

Psychosis in deaf patients: a case study of a 47-year-old male with deafness and schizophrenia

Roberto Rivera MD, Ankit Chalia MD, Terry McMahon MD

Introduction: Schizophrenia is a mental disorder characterized by the combination of positive symptoms of perceptual disturbances and negative symptoms of affective reduction. While rates of mental health disorders are high in the deaf community, the concurrence of schizophrenia and mutism remains an infrequent occurrence in psychiatric hospitals.

Case: 47-year-old Hispanic male who presented to the emergency center complaining of auditory command hallucinations. Patient has congenital deafness, and his primary preferred method of communication is through sign language. The patient's experience of "voices" was distressing enough that he cut his wrist in an attempt to alleviate stress and appease commands to remove devices from his stomach and brain. The patient's wife was available to provide history and interpretation during initial evaluation and on subsequent visits and family meetings. During this admission, meaningful communication with the patient was made possible through a video interpreting service on a tablet device that could be used by multiple hospital teams, which includes medical, nursing, social work, and activity therapy. Patient was also able to communicate through written English and written Spanish in a limited capacity. The patient quickly improved with resumption of his home medications Risperdal 2 mg and Citalopram 40 mg. He was administered a long-acting injectable of Risperdal intramuscularly that would be managed by his primary care physician.

Conclusion: The patient's case evokes many considerations for the challenges of and recommendations for psychiatric evaluation of members of the deaf community. These considerations include maintenance of therapeutic alliance with deaf patients, use of interpreters, and therapists' cultural competency with the deaf community. Basic awareness of these factors is likely to improve the care and health of this vulnerable patient population.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF ROBBINS, ESTHER**

Prevalence of Dental Health Information in a Primary Care Clinic

Robbins, Esther MD, Burkes, Sarah MD, Mataska, Jared MD, Chen, Leon MD, Rubio, Leila MD, Blume, Jeffery

Objective: Our aim is to survey parents of children 4 years and under who are seen in a primary care clinic to evaluate the risk and prevalence of tooth decay.

Background: Despite the decline in the prevalence of dental caries in children in the western countries, caries in pre-school children remains a problem in both developed and developing countries. Studies suggested that early childhood caries (ECC) are more common in children who live in poverty or in poor economic conditions, who belong to ethnic and racial minorities, who are born to single mothers, whose parents have low educational level The TTUHSC Family Medicine clinic accepts Medicaid/CHIP funded pediatric patients which implies a family of four meeting the federal poverty guideline of \$24,600 or less annual income. A majority of the well child checks are to Medicaid/CHIP funded patients.

Methods: A 14 question survey was designed to give to the parent/caregiver at routine well-child check visits at the TTUHSC Family Medicine Clinic. A crude analysis was done, and further analysis will be performed to evaluate dental health risk in ages with risk factors such as dental visits, type of liquid put in bottles/toddler cups, type of snacks, etc.

Results: 324 surveys were completed by parents for children ranging from 0 to 48 months. 224/324 (69.1%) of children surveyed had teeth and 6.2% of parents responded that their child had teeth problems. 5.2% overall had been diagnosed with cavities and 40.2% had been seen by a dentist in the past 6 months. The results of the survey will be used by TTUHSC Family Medicine Clinic to reassess education approaches by physicians to parents and children during well child checks.

Conclusions: Based on preliminary information from surveys, the TTUHSC Family Medicine Residency program has taken initiative to offer fluoride varnish application. A Texas Health Steps CME course was presented to faculty and residents for training.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF RUIZ, ANASTASIA**

A case report and review of literature: Bupropion induced Hyponatremia

Anastasia Ruiz, Ankit Chalia

Antidepressant induced hyponatremia are a known side effect of SSRIs. It is not as common in other classes of antidepressants. In this case report, we have a patient treated at UMC who is observed to have Bupropion induced Hyponatremia. Our poster will review the prevalence of antidepressant induced hyponatremia, as well as comparing the different agents and its incident of inducing hyponatremia. We then will review our case of possible Bupropion induced hyponatremia and its prevalence, reviewing current literature on this topic.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF STANLEY, RUSSELL**

Complete Uterovaginal and Full-thickness Rectal Procidentia Associated with Urolithiasis

Dr. Russell Stanley, DO, Dr. Charles Thompson, MD, Dr. Bennett Boyd, MD

Introduction: Urogenital prolapse is on the rise in the United States. 200,000 surgeries are done for urogenital prolapse every year with over half of those patients requiring more than one procedure for their defects. One rare area in the realm of urogynecology that deserves some attention is the phenomenon of total urogenital prolapse with total rectal procidentia, further complicated by stasis-induced urolithiasis and hydronephrosis. Case: We seek to report a case of a 71 year old multiparous woman who presented to UMC from an outside facility complaining of increased pelvic and rectal pain due to uterovaginal prolapse. She first prolapsed in 2001 and then became permanently prolapsed in 2011. At the time of her presentation, she had total urogenital prolapse with total rectal procidentia complicated by stasis-induced urolithiasis and hydronephrosis. A supracervical hysterectomy was performed. General surgery performed a rectosigmoid colectomy with primary end to end anastomosis, which reduced the rectal prolapse. The gynecology team then performed a sacrotrachleopexy, directly attaching the cervix to the anterior longitudinal ligament at S2 vertebra. A Burch urethropexy, posterior vaginal plication and high perineoplasty were also performed. The reason the case deserves attention results from the rare occurrence of the connection between the bladder calculi and complete uterine procidentia throughout the literature. We seek to discuss the relationship between the carbonate apatite stones which contributed to the urinary stasis and ultimately the hydronephrosis in connection with the urogenital prolapse. Conclusion: Although rare, bladder urolithiasis from urinary stasis and urinary infection may be a hidden complication of uterovaginal procidentia, and may not be seen by imaging techniques, but should be considered in the workup of severe prolapse

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF THEIN, KYAW**

A systematic review and meta- analysis of randomized controlled trials to evaluate the incidence of venous thromboembolism among patients with hormone receptor-positive HER2-negative metastatic breast cancer treated with CDK 4/6 inhibitors

Kyaw Z Thein, Myo H Zaw, Aung M Tun, Catherine Jones, Saba Radhi, Fred Hardwicke, Thein H Oo

Background: The cyclin dependent kinases (CDK) along with their partners, the cyclins, have a crucial role in regulation of the cell cycle. Several CDK-targeted agents have been employed in hormone receptor positive metastatic breast cancer (MBC) with noteworthy safety concerns. Nevertheless, the impact of this agent on risk of venous thromboembolism (VTE) remains uncertain. We performed a systematic review and meta-analysis of randomized controlled trials (RCT) to determine the risk of VTE among patients with hormone receptor-positive HER2-negative MBC treated with CDK 4/6 inhibitors.

Methods: We systematically conducted a comprehensive literature search using MEDLINE, EMBASE databases and meeting abstracts through June 2017. Trials that mention deep vein thrombosis and pulmonary embolism as adverse effects were incorporated in the analysis. The estimated pooled risk ratio (RR), and risk difference (RD) with 95% confidence interval (CI) were obtained utilizing fixed effects model.

Results: A total of 2671 patients with hormone receptor-positive HER2-negative MBC from four phase 3 studies and one phase 2 study were eligible for analysis. The study arm used palbociclib-letrozole, palbociclib-fulvestrant, ribociclib-letrozole and abemaciclib-fulvestrant while the control arm utilized placebo in combination with letrozole or fulvestrant. The I2 statistic for heterogeneity was 13.6, and the heterogeneity X2 (Cochran's Q) was 4.6 (P= 0.3), suggesting homogeneity of results among the randomized trials. The VTE incidence was 24 (1.46%) in CDK 4/6 group vs 4 (0.39%) in control group. The pooled RR for VTE was 2.736 (95% CI: 1.115  $\hat{a} \in 6.714$ , P = 0.028) and the absolute RD was 0.010 (95% CI: 0.002  $\hat{a} \in 0.018$ , P = 0.010).

Conclusion: Approximately 1% of patients on letrozole or fulvestrant alone developed VTE in previous studies. Our meta-analysis demonstrated that the addition of CDK 4/6 inhibitors to letrozole or fulvestrant, contribute to higher incidence of VTE.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF VALLABHANENI, ANUHYA**

Baclofen induced Psychosis and Withdrawal Delirium in a Patient with Alcohol Use Disorder

Ankit Chalia, Anuhya Vallabhaneni, Ashish Sarangi, Terry McMahon

Introduction: Baclofen is a GABA-B receptor agonist that is approved for spasticity. Recently, the off-label use of baclofen for reducing alcohol use or prevention of relapse in alcohol use disorder (AUD) has increased. Baclofen overuse can cause psychosis and abrupt withdrawal causes specific baclofen withdrawal syndrome (BWS), that is, confusion, agitation, seizures, and delirium.

Case: 46-year-old female with history of alcohol use disorder abusing baclofen (350mg/day) prescribed for spasticity, presented to the emergency department (ED) on several occasions with psychosis and developed delirium and rhabdomyolysis after abrupt withdrawal of the drug. She was treated successfully with full supportive management and was discharged from the hospital on the 6th day following admission.

Discussion: The psychosis may have been a manifestation of baclofen's alteration of cerebral dopaminergic mechanisms. Baclofenwithdrawal delirium can be difficult to distinguish from delirium of other etiologies, and unrecognized and inadequately treated baclofen-withdrawal delirium is associated with significant morbidity and mortality. This case demonstrates the importance of monitoring neuropsychiatric adverse drug reactions after starting baclofen use in patients with a current or history of alcohol use disorder.

Conclusion: Withdrawal from muscle relaxants requires a high index of suspicion but should be considered in patients who manifest signs and symptoms of withdrawal from the medications, particularly visual hallucinations, rigidity and autonomic dysfunction. In the absence of detailed past medication history, an acutely confused patient complicated with rhabdomyolysis should have baclofen overdose included in the differential diagnosis, as routine toxicology screening does not include baclofen. Such atypical signs should be recognized early, as drug discontinuation and full supportive treatment result in good outcome.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# **R&CF VORAKUNTHADA, YUTTIWAT**

Life-threatening extensive purpura; a rare presentation of acquired hemophilia

Yuttiwat Vorakunthada, M.D. Texas Tech University Health Sciences Center, Lubbock, TX; Weerapong Lilitwat, M.D. University of Iowa Hospital and Clinics, Iowa City, IA

Spreading violaceous rash can be a fatal condition. We describe a rare case of massive purpura in an 81-year-old, male presented with worsening bruising of upper and lower extremities following ground level fall. He noticed easy bruising for the past three months. His laboratory results showed a hemoglobin of 8.5 g/dL, hematocrit of 25.5 %, and prolonged activated partial thromboplastin time (aPTT) of 104.2 s. Factor VIII level was low (< 5%) and mixing study was not corrected. Factor IX, XI, XII levels were normal. Phospholipid antibody and ANA screening were negative. Interestingly, factor VIII inhibitor level was elevated at 24.8 Nijmegen Bethesda units. These findings lead to the diagnosis of acquired factor VIII deficiency. The patient was treated with recombinant factor VIII, prednisone, and rituximab. His aPTT trended down, and he was discharged with follow up in hematology clinic for rituximab infusion.

Acquired hemophilia (AH) is an extremely rare clinical condition. Bimodal age distribution in the mid-20s and 70s has been reported. Our case shows that AH can be a diagnosis in age older than 80 years old. The proposed mechanism involves the production of autoantibody against factor VIII, resulting in neutralization and accelerated destruction. This theory can explain easy bruising and superficial hematoma in our patient. However, the patient had no any hemarthroses in contrast to congenital hemophilia. Also, we do not find any secondary cause of AH such as autoimmune diseases, malignancy, and medication. The goal of treatment in our patient involves establishing hemostasis and elimination of factor VIII inhibitor. We decided to use prednisolone and rituximab with a satisfactory outcome. However, prophylactic factor VIII should be considered before surgery. Acquired hemophilia should always be on differential diagnosis for elderly patients with extensive unexplained purpura. Prompt diagnosis and treatment can decrease the risk of fatal bleeding.

School: Texas Tech University Health Sciences Center Campus: Lubbock

# SCHOOL OF HEALTH PROFESSIONS

### SHP KAPILA, JEEGISHA

The Effect of a Volitional Preemptive Abdominal Contraction on Trunk and Lower Limb Biomechanics in People with Low Back Pain.

Troy L. Hooper, PT, DPT, ATC, C. Roger James, PhD, Jean-Michel Brismée, PT, ScD, Toby J Rogers, PT, PhD, Kerry K Gilbert, PT, ScD, Phillip S. Sizer, PT, PhD, Jeegisha Kapila, PT, DPT, OCS

Introduction: Low back pain (LBP) causes altered neuromuscular and biomechanical control resulting in reduced lumbopelvic stability and altered lower extremity (LE) control during movements. This results in an unstable base for the LE, affecting performance during functional tasks. LBP causes delayed muscle responses, increasing injury risk and increased dependence on distal control strategies. Voluntarily preemptive abdominal muscle contraction (VPAC) may improve lumbopelvic stability in those with LBP. The abdominal bracing maneuver (ABM) is a VPAC strategy that may help optimize LE movement patterns. However, the effect of ABM performance LE biomechanics is not well investigated. Therefore, the purpose of this study was to determine the effects of ABM performance on reach distances and neuromuscular and kinematic variables during the Y-balance test (YBT), a clinical test capable of detecting balance deficits in people with LBP.

Design: Mixed factor repeated measures design.

Methods: Forty-two subjects (ages 18-50 yrs) were assigned to control, LBP history, and current LBP groups. Subjects performed three YBT trials with and without ABM in three directions (anterior, posterior medial, and posterior lateral). Electromyography was collected from three trunk muscles bilaterally and six stance limb hip and thigh muscles. Additionally, reach distance relative to leg length and trunk, pelvis, and stance limb 3-dimesional kinematic data were collected.

Results: Largely, ABM performance decreased LE and increased abdominal muscle activity. Further, ABM resulted in trunk and LE kinematic changes that improved LE alignment, particularly during anterior reach for the control group. Reach distances were not affected by ABM.

Discussion: Improved proximal stability via the ABM provides a stable proximal base for the distal kinetic chain during functional tasks. Decreased LE muscle activity during reach movements suggests that ABM improves LE control in addition to improvement i

School: School of Health Professions Campus: Lubbock

### SHP MURPHY, BRANDI

Bimodal Sensory Processing in Adults with Autism: EEG & fMRI

Brandi Murphy, Elizabeth Hames, Ravi Rajmohan, Ronald Anderson, Mary Baker, Steven Zupancic, Michael O'Boyle, & David Richman

Researchers have found some populations struggle with sensory integration. Sensory integration difficulties may have negative effects on speech and communication, such as: speech discrimination, speech intonation, and understanding speech in noise. Specifically, our area of research involves visual and auditory representations. Researchers involved in multisensory inputs seek to identify areas of weakness. Finding areas of weakness can be used to improve therapeutic techniques involving speech and language. In this study, we use Electroencephalography (EEG) and Functional Magnetic Resonance Imaging (fMRI) to explore neural correlates related to sensory integration. EEG is used to identify patterns in the brain that can be associated with activation location, strength/ weakness, and sensory integration links via 65 electrode-cap resulting in 64 waveforms. The fMRI (3T) machine captures the human dynamic response function of oxygenated blood in the brain during stimulus presentations. Together, EEG and fMRI analyses allow for insight into sensory integration processing in adults with autism to evaluate: power, correlation, reduction, and brain region activations.

School: School of Health Professions Campus: Lubbock

# SHP STRICKLAND, KEVIN

#### The Angel Sound Study

Kevin Strickland, Alexa Mehaber, Ryanne Tindell, Yang-Soo Yoon

This study focused on the potential correlation between temporal processing via amplitude module distribution and spectral processing via frequency discrimination, and their potential effects on melodic intonation testing and word discrimination utilizing eleven students from the 2021 Au.D. class, and one from the Ph.D. Communications Disorders program.

School: School of Health Professions Campus: Lubbock

### UNDERGRADUATE

### **UNDG CRISTY, SHANE**

Human serum significantly enhances the expression of pyoverdine genes throughout the growth cycle of Pseudomonas aeruginosa strains PAO1 and PA14

Shane A. Cristy, Kellsie Beasley, Jane Colmer-Hamood, and Abdul Hamood Department of Chemistry, Texas Tech University, Lubbock, TX Honors College, Texas Tech University, Lubbock, TX

Pseudomonas aeruginosa is an opportunistic pathogen that causes serious infections in immunocompromised hosts including patients with severe burns. In these patients, P. aeruginosa infect burned tissues and spread systemically leading to septic shock and death. P. aeruginosa produces numerous virulence factors including those involved in iron acquisition, pyoverdine and pyochelin, which are collectively referred to as siderophores. These molecules are produced when P. aeruginosa encounter iron-deficient conditions. While previous studies analyzed the influence of infection sites on P. aeruginosa virulence, little is known regarding the effect of blood during systemic infection. We recently used RNA-seq analysis to compare the global expression of the P. aeruginosa strain PAO1 that was grown in either a laboratory medium (Luria Bertani broth, LB) or whole blood from healthy volunteers. In comparison with its growth in LB broth, the growth of PAO1 in blood significantly increased the expression of different P. aeruginosa pyoverdine-related genes. Since serum is a major blood component, we hypothesized that serum enhances the expression of P. aeruginosa siderophores. In this study, we examined the effect of human serum on the expression of different pyoverdine genes throughout the growth cycle of the fully virulent P. aeruginosa strains PAO1 and PA14. The strains were grown in either LB broth or LB broth containing 10% pooled human serum. Transcriptional analysis, using qt-RT-PCR and lacZ transcriptional fusion systems, revealed that human serum significantly enhanced the expression of the pyoverdine structural genes pvdD and pvdA as well as the pyoverdine transcriptional regulator pvdS throughout the growth cycle of PAO1 and PA14. We also detected a concomitant increase in the pyoverdine level within the supernatant fraction of each strain. These results suggest that during sepsis, serum influences P. aeruginosa virulence by enhancing its ability to obtain iron.

# **UNDG GAITHER, BRITTANY**

Electrical Current Measurements of Mutations to Cysteine 939 Elucidate Structural Relationship Between Proton Pathway and Sodium Binding in Na/K pump

Brittany Gaither, Victoria Young, Pablo Artigas

The Na/K pump is a highly conserved membrane pump, found in all animal cells, and essential for our existence. The transduction of nerve signals and contraction of cardiac muscle are two vital functions that rely on the electrochemical gradient set by this electrogenic pump. It is a P-type ATPase, extruding 3 Na+ ions out of the cell and importing 2 K+ ions in each catalytic cycle, using the energy from ATP hydrolysis. The pump has an  $1\pm$  and a  $1^2$  subunit, with the  $1\pm$  subunit containing three ion-binding sites. Sites I and II bind Na+ ions intracellularly and K+ ions extracellularly. Site III binds sodium exclusively and it has been proposed to protonate when Na+ is not bound there. Such proton has been proposed to transit a pathway, from site III to the cytoplasm, which is lined by cysteine, which occupies position 939. In several illness-producing mutants, extreme acidosis, or when Na+ and K+ are below their normal values, this pathway is part of a larger conduit that transports protons passively into the cell, producing an inward current. Our lab has shown (Holm et al. 2017) that substitutions Leu and Phe at 939 dramatically reduce Na+-affinity. Here we use two-electrode voltage clamp of Xenopus oocytes expressing mutant pumps, to measure the proton currents and sodium-binding reactions of substitutions at 939. Analysis of these measurements will elucidate the relationship between the proton pathway and Na+ binding. Additional experiments and analysis currently underway will further clarify the structural nature of this relationship.

School: Texas Tech University

### **UNDG HOANG, BRITTNEY**

Effect of Early Type 2 Diabetes on Male Fertility

Visualizing dysfunctional parvalbumin interneuron networks in a new transgenic mouse model of Alzheimer's Disease

Alzheimer's Disease (AD) is a progressive disease that affects memory, thinking, and behavior. The most common type of dementia is AD, which leads to memory loss and interferes with daily motor function. Because there is no cure, new treatments are needed to slow or stop disease progression. Hippocampal parvalbumin (PV)-positive interneurons play a central role in network activity and spatial working memory. Several lines of evidence point to PV interneuron networks becoming dysfunctional early in AD pathogenesis. However, as a class, PV interneurons are diverse in morphology, cellular and synaptic functions, and network contributions, making it challenging to study specific inhibitory neuron types systematically. PV-positive interneurons subdivide into basket, bistratified, axo-axonic, and the oriens-lacunosum moleculare cells, which occupy different domains of pyramidal cells. Although PV-positive interneurons have been implicated in AD pathogenesis, essentially nothing is known about specific PV subtypes in the context of AD. Here, we aim to investigate which specific PV interneurons are most vulnerable in AD by using a transgenic mouse line to permit precise visualization and identification of distinct PV interneuron subtypes. By crossing PV-CRE and tdTomato (tdT) mice, we generated a homogenous PV-CRE+/+;tdT+/+ mouse line. This enables tdT, a red fluorescent protein, to be expressed in only PV interneuron subtypes. We then crossed homozygous PV-CRE+/+;tdT+/+ into the J20 AD mouse model, obtaining our triple transgenic PV-CRE+/+;tdT+/+;J20+/- mouse. Our study sheds light on how specific PV interneuron subtypes contribute to the etiology of AD, further advancing knowledge that may lead to new treatments for AD.

### UNDG MCCORD, JON

#### Structure of Dnase1L3 and Systemic Lupus Erythematosus

Jon McCord1,2, Faraz Harsini1, R. Bryan Sutton1,3, and Peter Keyel2 1Department of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center, Lubbock, TX, USA 2Department of Biological Sciences, Texas Tech University, Lubbock, TX, USA 3Center for Membrane Protein Research, Texas Tech University Health Sciences Center, Lubbock, TX, USA

One debilitating autoimmune disease that afflicts about 1.5 million Americans is Systemic Lupus Erythematosus (SLE). SLE is a multifactorial disease, and can arise from disruptions in two genes: Dnase1 and Dnase1L3. While the structure is known for Dnase1, the structure for Dnase1L3 is unknown. Dnase1L3 is a secreted endonuclease that degrades chromatin in apoptotic microparticles. To study the structure and function of the Dnase1L3 enzyme, we designed a heterologous expression system and purification protocol in Rosetta-gami E. coli. This system allows us to characterize the enzymatic activity of the wild-type enzyme. Towards solving the 3D structure of Dnase1L3 with X-ray crystallography, we successfully crystallized Dnase1L3. A variety of culturing conditions, purification methods, and characterization techniques were performed on purified DNase1L3. After testing different methods, we successfully expressed DNase1L3 in E. coli using Rosetta-gami cells as a fusion protein with a His6 tag and Maltose Binding Protein. The fusion enzyme was isolated via nickel NTA affinity column. After elution from the affinity column, the enzyme was cleaved with TEV protease and further isolated on strongly cationic sulphopropyl sepharose resin. Finally, Dnase1L3 was further purified using size exclusion chromatography. The identity of Dnase1L3 was confirmed by Western blot. Recombinant Dnase1L3 robustly degraded plasmid DNA, with a specific activity of 1.83 x 10<sup>4</sup> U/mg. We found Dnase1L3 had a propensity for small mosaic crystals in a Tris and MgCl2 crystallization buffer. However, larger crystals were grown at 7 degrees C, compared to 22 degrees C. Overall, we have developed new purification method for generating active Dnase1L3 with implications in crystallography and enzyme therapy. These findings will advance our understanding of Dnase1L3 structure and its function in SLE.

School: Texas Tech University

### UNDG SMITH, DANEISHA

#### Unraveling the neural mechanisms of resilience to stress

DaNeisha J. Smith, Nabeela Manal, Sagufta Garasia, Daniel Cherkowsky, Erik X. Lee and Karina Alvina

Unfamiliar situations and environments usually become stressful stimuli. These can affect the development of brain circuits and ultimately impact behavior. The hippocampus, area of the brain involved in learning and memory, is particularly vulnerable to such stressful conditions. For example, chronic stress results in significant dendritic retraction and even reduction in number of hippocampal cells. Amongst the numerous pathways involved in stress processing in the brain, neuropeptide Y (NPY) has emerged as a promising  $\hat{a} \in \alpha$  resilience molecule  $\hat{a} \in \omega$  due to its robust anti-anxiety, anti-epileptic and pro-neuronal growth properties. Moreover, NPY levels in the hippocampus are decreased by stressful conditions, yet the role of endogenous NPY and the impact of stress-induced changes in NPY on hippocampal function are not clear. Furthermore, the brain-derived neurotropic factor (BDNF) has also been implicated in mediating stress effects in the hippocampus, however the exact mechanisms underlying such detrimental processes are not clear.

To answer these questions, we are combining specific gene-expression manipulation and behavior in a mouse model of chronic stress. Using a viral-delivery system we are manipulating the levels of NPY or BDNF directly in the hippocampus of both female and male mice and will examine the resulting behavior, with and without exposure to chronic stress. Results from our project will expand our view of specific neural processes modulated by stress and therefore provide potentially novel avenues for the development of therapies to prevent and ameliorate the deleterious effect of stress in brain function.

# UNDG SPONTARELLI, KERRI

#### Kerri Spontarelli, Daniel Infield, Chris A. Ahern, Pablo Artigas

Brittney Kinikin, Brooke Ponder, Domonique Valle, Brianna Diaz, Laura Griffith, Allison Coltisor, and Yang-soo Yoon

The Na/K pump is a heterodimeric (alphabeta) P-type ATPase that exports three Na^+ ions and imports two K^+ ions against their electrochemical gradients via the energy of ATP hydrolysis. Studies confirm the presence of three ion-binding sites in the catalytic alpha subunit. Site-I and II can bind either Na<sup>+</sup> or K<sup>+</sup>, while Site-III, the focus of this work, exclusively binds Na<sup>+</sup>. To determine the relative energetic contribution to Na<sup>+</sup> binding of the hydroxyl group or the pi-electrons of Tyr780 in site-III, we introduced the mutation Y780tag into the alpha-subunit cDNA for the purpose of using nonsense suppression. Y780tag-alpha- and beta3-cRNA were co-injected in Xenopus oocytes with synthetic tRNA (ligated to Tyr, Phe or Phe derivatives) to compare the functional consequences of the chemical modifications at this position using two-electrode voltage clamp. Square voltage pulses in the absence of external K $^+$  (K $^+$  o) and presence of external Na $^+$  (Na $^+$  o) produce transient currents. The voltage dependence of steady-state charge moved by these transients is described by a Boltzmann distribution with a center (V 1/2) related to the relative apparent affinity for Na<sup>+</sup> o (deltaV  $1/2=\hat{A}25$  mV per 2-fold reduction in affinity). The centers of the distribution where V  $1/2=\hat{A}46.9$  plus or minus 2.5mV (n=10) for the wild-type Tyr, V\_1/2=Â123 plus or minus 9mV for Phe, and V1/2=-54.6 plus or minus 2.1mV for mono-fluorinated at the 3â€<sup>TM</sup> position (mono-F)-Tyr. These results indicate an ~8-fold reduction in apparent affinity for Na<sup>++</sup> o by removal of the hydroxyl group and a much smaller reduction (<&lt; 2-fold) by partial disruption of the cation-pi interaction capability of the phenol ring by monofluorination. The apparent affinity for  $K^+$  o estimated from the  $[K^+]$  o dependence of Na/K pump current activation in the absence of Na<sup>+</sup> o was significantly reduced by both Phe (~4-fold) and mono-F-Tyr (~1.5-fold). Measurements with other derivatives are underway. NSF-MCB 1515434.

School: Texas Tech University

#### Identification of miRNA(s) Involved in Prostate Cancer Cells Acquired Resistance to Cabazitaxel.

Weston Ward, Courtney Jarvis, Thomas Nelius, Kameswara Kottapalli and Stephanie Filleur

Castration-Refractory metastatic Prostate Cancer (mCRPC) remains incurable despite the recent approval of new therapeutic agents. Taxanes, represented by docetaxel and cabazitaxel, is the main chemotherapeutic drug family which demonstrates survival benefits in patients with mCRPC. Still resistance emerges urging for more investigation. Although docetaxel resistance has been widely described, acquired resistance to cabazitaxel is incompletely characterized and study models are often inapt. In lab, we have recently created an in vitro model of acquired resistance that mimics the development of cabazitaxel resistance observed in patients. As comparison, we have also created paired docetaxel-resistant and age-matched cell lines. In this experimental model, we have demonstrated that cabazitaxel-resistant cells acquired an elongated morphology and migrated more compared to docetaxel-resistant and age-matched cell lines suggesting an Epithelial-Mesenchymal Transition (EMT) phenomenon. Using microRNA sequencing (miRNA-seq), we have also identified multiple non-coding small RNAs significantly up- or down-regulated in cabazitaxel-resistant cells. While preliminary, our data emphasize on the urgent need to identify among these deregulated miRNAs the ones which are directly involved in cabazitaxel resistance. To accomplish the proposed project, we will first validate our miRNA-seq findings in cabazitaxel-resistant, docetaxel-resistant and age-matched cells using quantitative RT-PCR. We will then evaluate the role of the validated miRNAs by gain and loss of function studies among multiple CRPC cell lines (Du145, PC3, CL1 and 22rv1) in correlation with EMT and resistance to cabazitaxel. In summary, this study should allow us to identify specific miRNA responsible for cabazitaxel resistance in CRPC cells. Identified targets will be then validated in prostate cancer patientsâ€<sup>™</sup> specimens. This project may lead to the identification of new therapeutic targets for prostate cancer.

# **UNDG WELCH, GARRETT**

Pathogenesis Of Schistosomiasis Evaluated Via Non-Human Primate Cytokine-Response Following Immunizaton With Various Sm-P80 Vaccine Formulations

#### Garrett S. Welch, Whitni K. Redman, Samra Lazarus, Adebayo J. Molehin, Afzal A. Siddiqui

Schistosomiasis, also known as Bilharzia, is a neglected tropical parasitic disease. Mainly prevalent in third world countries such as Africa and parts of Asia, this disease affects over 250 million people. Infection occurs when an individual interacts with infected water during activities such as bathing or swimming. While treatment is necessary to help those who are currently infected, it is not preventative in any way, allowing re-infection to occur. With the existence of a vaccine, individuals living in epidemic areas would be able to perform their daily activities without risking infection. Our vaccine is based on the protein Sm-p80 which is involved in the biogenesis of the parasite. Our Sm-p80 based vaccine is a promising candidate because it has been shown to have both prophylactic and therapeutic properties. Within our previous baboon studies, we have shown a 38-58% protection rate against Schistosoma mansoni. Since many people who will be vaccinated are already infected with Schistosomiasis, it is important to make sure our vaccine is not triggering an immune response that increases the pathogenicity of the disease, such as increasing liver granulomas. Currently, this is being tested by using RT-PCR. This allows us to observe how our vaccine is affecting gene expression related to immunological cytokines that have been correlated with the pathogenesis of Schistosomiasis. By completing this study, we will ensure that our vaccine does not negatively impact those individuals who will be vaccinated with a current infection present.

# **POSTER ASSEMBLY**

#### **GENERAL INFORMATION:**

Your poster should be self-explanatory so that you are free to supplement and discuss particular points raised in inquiry. The poster session offers a more intimate forum for information discussion than a slide presentation. This becomes difficult if you are obliged to devote most of your time to merely explaining your poster to a succession of visitors. Your poster must include a statement to clarify the significance of your work: How does it fit into the big picture? Limit jargon usage. Judges and viewers are from varied backgrounds and may not be familiar with terms used in your field. Define all abbreviations used in your poster. Your main priority is to get your point across to the viewer and to fulfill the judging criteria. Many posters are on display in the basic science departments at any time. If this is your first time to present a poster, we recommend that you view these examples.

#### **CREATING YOUR POSTER:**

Although some bulletin boards are larger, the maximum bulletin board space allowed for your poster will be <u>44"Vertical X</u> <u>44" Horizontal</u>. Please do not write on or damage the bulletin boards.

Arrange materials in columns rather than rows. It is easier for viewers to scan a poster by moving systematically along it rather than zig-zagging back and forth in front of it.

Make sure that your poster includes the following information:

- Title
- Authors (contributors to your work; your advisor)
- Institution where the work was performed
- Abstract/Introduction

This should be placed at the upper left in large typeset. There is no need to include the abstract number as it will be on the bulletin board in the upper left-hand corner.

- The **Body** of the poster should contain figures, and may include a hypothesis, a methods/approach section, and a discussion.
- Figures and Figure Legends

Bear in mind that Figures may be viewed from a distance. To assist the viewer, you may indicate the correct sequence of your Figures with numbers or letters at least 1 inch high, preferably in bold print. Each Figure (graph, table, diagram, etc.) should have a heading and a brief summary.

Figure legends should be concise, describing the content of each figure and the conclusions derived from them.

#### • Conclusions and Future Directions

This should be placed at the lower right in large typeset.

#### **MOUNTING MATERIALS:**

If multiple pieces, they should all be mounted on colored poster board or matting materials. Other appropriate formats include the laminated/un-laminated "all in one or one piece" large posters. Push pins will be provided at your assigned bulletin board for hanging. You may want to group logically consistent sections or columns of the poster on backgrounds of the same color.

#### **POSTER PLACEMENT AND REMOVAL:**

All poster presentations, both Wednesday and Thursday, will take place on the 1<sup>st</sup> and 2<sup>nd</sup> floor of the Academic Classroom Building (ACB) lobby.

#### Please see below for instructions regarding your specific presentation time slot:

Wednesday March 21, 2018, morning session (8:00 AM-12:00 PM) and afternoon session (1:30 PM-4:30 PM)

Poster boards will be available for presenters to hang their posters on Tuesday evening at 4 PM. All presenters must have their posters in place by 7:30 AM Wednesday. Posters must be taken down by 5 PM on Wednesday. Any poster not hung or removed by this time will be disqualified- no exceptions.

Thursday March 22, 2018, morning session (8:00 AM – 12:00 PM) and afternoon session (1:30 PM-4:30 PM)

Poster boards will be available for presenters to hang their posters on Wednesday evening at 5 pm. All presenters must have their posters in place by 7:30 AM Thursday. Posters must be taken down by 5 PM on Thursday. Any poster not hung or removed by this time will be disqualified- no exceptions.

#### **PRESENTING YOUR POSTER:**

If you are not in front of your poster at the beginning of your designated time you will forfeit your opportunity to present your poster. The total allotted time for each poster presentation will be ten (10) minutes. During that time, there will be no interruptions by the judges. Two (2) additional minutes of questions from the judges will follow each presentation. Point deductions will be enforced if the 12 minute time frame is exceeded.

In the case of group presentations, only one individual may verbally present their poster to the judges. However, the remaining members of the group may participate in discussions during the open presentation during the 'Poster Exhibit' (see below).

#### POSTER EXHIBIT SESSION

Similar to a conference poster session, the 'Poster Exhibit' serves as an open poster session for students to discuss their research with attendees. This event will follow the afternoon poster sessions on Wednesday and Thursday from 12:00 - 1:00 pm. THIS EVENT IS REQUIRED BY ALL PARTICIPANTS to be considered for poster competition prizes. We hold this session to encourage participants to learn about exciting new research and network with other students and professors.

# Please check the time and date of your poster presentation and attend your respective Poster Exhibit Session time below:

For all Wednesday (morning and afternoon) poster competition participants:

Attend the Wednesday Poster Exhibit Session 12:00 - 1:00 PM

For all Thursday (morning and afternoon) poster competition participants:

Attend the Thursday Poster Exhibit Session 12:00 - 1:00 PM

# PARKING MAP

# Texas Tech University Health Sciences Center - Lubbock October 6, 2017



TTUHSC Students from Lubbock, Amarillo, El Paso, or Odessa with valid TTUHSC permits may park in student parking: F-2, F-3, E-3, and Z-1.

TTUHSC faculty and staff from Lubbock, Amarillo, El Paso, or Odessa with valid TTUHSC permits may park in faculty parking F-1, E-2, D-3, C-3, A-0, A-1, A-2, and A-3.

Out of town guests and those without TTUHSC parking permits, including those with valid TTU permits may park in visitor parking: D-2, C-2, B-2, B-3, and Z-1.

# VENDORS

# A special thanks to our vendors



























