Chhanda Bose

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Ph. D. (1989)	Gorakhpur University Gorakhpur, India (Zoology)
M.Sc. (1980)	Gorakhpur University, India (Zoology)
B.Sc. (1978)	Awadh University, Faizabad, India (Botany, Chemistry, Zoology)

Positions and Honors

Pool Scientist Award—from Council of Scientific and Industrial Research (CSIR) New Delhi, India, (1996- 1998)
Research Associate Award—from Council of Scientific and Industrial Research (CSIR), New Delhi, India (1990-1996)
Junior and Senior Research Fellow Award—from University Grants Commission, (UGC), New Delhi, India (1982-1989)

Academic Appointments

03/19-present	Research Associate Professor, Division of Hematology and Oncology, Internal Medicine, Texas Tech University Health Science Center, Lubbock, TX.
11/16-02/19	Research Assistant Professor, Donald W. Reynolds Institute on Aging, University of Arkansas for Medical Sciences (UAMS), Little Rock, AR
08/08-10/16	Research Assistant Professor, Nephrology Division, Department of Internal Medicine, University of Arkansas for Medical Sciences (UAMS), Little Rock, AR
09/04-8/08	Research Instructor, Geriatrics Department, UAMS, Little Rock, AR
09/99-9/04	Post-doctoral Fellow, Geriatrics Department, UAMS, Little Rock, AR
09/98-9/99	Post-doctoral Fellow, Division of Gastroenterology, Department of Internal Medicine, UAMS, Little Rock, AR
05/96-8/98	Pool Scientist (CSIR), Immunopharmacology, Ultra Structure & Histochemistry lab, National Institute of Immunology, New Delhi, India
01/90-5/96	Research Associate, Central Drug Research Institute (CSIR) Division of Biochemistry, Lucknow, India
11/88-11/89	Junior/Senior Research Fellow, University Grants Commission, New Delhi At Gorakhpur University, India
05/96-8/98	Pool Scientist (CSIR) (Immunopharmacology, Ultrastructure & Histochemistry lab) National Institute of Immunology, New Delhi, India

01/90-5/96	Research Associate (CSIR) Division of Biochemistry Central Drug Research Institute, Lucknow, India
11/8-11/89	Junior/Senior Research Fellow, University Grants Commission, New Delhi, at Gorakhpur University, India

Grant Support

07/2019 -12/31/2019
abSynapTex PAS-17-065
Small Inhibitor Therapeutic Target for Alzheimer's disease.
Role: PI

08/15/18 - 8/14/2021
DoD W81XWH-18-1-0534
Prevention of Breast Cancer by Haploinsufficiency of RALBP1
Role: Co-I

01/02/2014-9/30/2014
Sturgis Foundation
Role of iron in collagen-secreting angiogenic macrophages in diabetic nephropathy
Role: PI

2012-2014
South Central VA Healthcare Network Grants Program (VISN16, Project #0002)
Impact of hydroxychloroquine on experimental model of cardiovascular disease in chronic kidney disease
Role: Co-PI

10/01/10-9/30/12
South Central VA Healthcare Network Grants Program (VISN16**,** Project #0009)
Role of $CD163^{+}$ macrophages and iron in nephrogenic systemic fibrosis
Role: Co-PI

04/01/10-03/31/12
UL1R R0298884 — UAMS Translational Research Institute (TRI) Pilot Study
Proteins in vascular calcification of chronic kidney disease
Role: Co-PI

08/01/10-07/31/12
UAMS Translational Research Institute (TRI) KL2 Career Development Award
Role of $CD163^{+}$ macrophages and iron metabolism in type 2 diabetes
Role: Co-PI

07/01/2009-9/30/2009
UAMS Sturgis Diabetes Foundation
Role of angiogenic macrophages in human diabetic nephropathy
Role: Co-PI

01/01/2010-12/31/2011
UAMS Translational Research Institute (TRI) Pilot Study
The UAMS Center for Clinical and Translational Research (CCTR) Investigator-initiated award
Novel therapy to slow progression of diabetic nephropathy using deferiprone
Role: Co-PI

Committees/Administrative responsibilities

2008-2019	Faculty Interviewer, Office of Student Admissions, College of Medicine, University of Arkansas for Medical Sciences
2008-2019	Member of Dr. Bhuvan's Endowment Committee, UAMS
2012-2019	Member of animal use committee, (IACUC), Central Arkansas Veterans Healthcare System, Little Rock, AR

Professional Societies membership

2002-2007	Gerontological Society of America
2009-2016	American Society of Nephrology (USA)
1993-present	Indian Society of Parasitology

List of Publications

1. **Bose, C.,** Singh, S.P., Igid, H., Green, W.C., Singhal, S.S., Lee, J., Palade, P.T., Rajan, A., Ball, S., Tonk, V., Hindle, A., Tarbox, M., Awasthi, S. (2019) Topical 2′-Hydroxyflavanone for Cutaneous Melanoma. Cancers 11, 1556.
2. **Bose, C.,** Awasthi, S., Sharma, R., Beneš, H., Hauer-Jensen, M., Boerma, M., and Singh, S. P. (2018) Sulforaphane potentiates anticancer effects of doxorubicin and attenuates its cardiotoxicity in a breast cancer model, PloS one 13, e0193918.
3. Marquis BJ, Louks HP**, Bose C,** Wolfe RR, Singh SP. (2017) A New Derivatization Reagent for HPLC-MS Analysis of Biological Organic Acids. *Chromatographia* 80 (12):1723-1732. doi: 10.1007/s10337-017-3421-0. Epub 2017 Oct 29. PMID: 29213145
4. **Chhanda Bose,** Sudhir V. Shah, Oleg K. Karaduta, and Gur P. Kaushal. (2016) Carbamylated low-density lipoprotein (cLDL)-mediated induction of autophagy and its role in endothelial cell injury. *PLoS One* Dec 14; 11(12):e0165576. doi: 10.1371/journal.pone.0165576. PMID: 27973558
5. Shukla AM, **Bose C**, Karaduta OK, Apostolov EO, Kaushal GP, Fahmi T, Segal MS, Shah SV. (2015) Impact of hydroxychloroquine on atherosclerosis and vascular stiffness in the presence of chronic kidney disease. *PLoS One* 10(9):e0139226. PMID: 26414017
6. **Bose C**, Megyesi JK, Shah SV, Hiatt KM, Hall KA, Karaduta O, Swaminathan S. (2015) Evidence suggesting a role of iron in a mouse model of nephrogenic systemic fibrosis. *PLoS One* 10(8):e0136563. PMID: 26305890
7. Shah SV, Shukla AM, **Bose C**, Basnakian AG, Rajapurkar M. (2015) Recent advances in understanding the pathogenesis of atherosclerosis in CKD patients. *J Ren Nutr* 25(2):205-208. PMID: 25556310
8. Swaminathan S, **Bose C**, Shah SV, Hall KA, Hiatt KM. (2013) Gadolinium contrast agent-induced $CD163^{+}$ 1 $ferroportin^{+}$ osteogenic cells in nephrogenic systemic fibrosis. *Am J Pathol* 183(3):796-807. PMID: 23867799
9. **Bose C**, Udupa KB. (2008) Erythropoietin enhancement of rat pancreatic tumor cell proliferation requires the activation of ERK and JNK signals. *Am J Physiol Cell Physiol* 294 (2):394-405. PMID: 18550701
10. Chowdhury P, **Bose C**, Udupa KB. (2007) Nicotine induced proliferation of isolated rat pancreatic acinar cells: effect on cell signaling and function. *Cell Prolif 40:125-141.* PMID: 17227300

11. **Bose C,** Zhang H, Udupa KB, Chowdhury P. (2005) Activation of p-ERK1/2 by nicotine in pancreatic tumor cell line AR42J: effect on proliferation and secretion. *Am J Physiol Gastrointest Liver Physiol* 289:G926-G934. PMID: 16051920

12. Udupa KB, **Bose C**. (2005) Identification of erythroid cell stimulating factor as a unique protein. Quiescin6: role in erythropoiesis. *Blood* 106(11):4270.

13. **Bose C**, Chidambaram B, Udupa KB. (2005) Age related alteration in hepatic acyl-CoA: cholesterol acyltransferase and its relation to LDL receptor and MAPK. *Mech Aging Dev* 126:740-751. PMID: 15888329

14. **Bose C**, Bhuvaneswaran C, Udupa KB (2004). Altered mitogen activated protein kinase signal transduction in human skin fibroblasts during in vitro aging: Differential expression of low density protein receptor. *J Gerontol A Biol Sci Med Sci* 59(2):126-135. PMID: 14999025

15. **Bose C**, Guo J, Zimniak L, Srivastava SK, Singh SP, Zimniak P, Singh SV. (2002) Critical role of allyl groups and disulfide chain in induction of Pi class glutathione transferase in mouse tissues *in vivo* by diallyl disulfide, a naturally occurring chemo preventive agent in garlic. *Carcinogenesis* 23(10):1661-1665.

16. Srivastava SK, Chauhan PMS, Agarwal SK, Bhaduri AP, Singh SN, Fatma N, Chatterjee RK**, Bose C,** Srivastava VML. (1996) Syntheses and antifalarial profile of 5-amino and 5,8-diaminoisoquinoline derivatives: A new class of antifilarial agents. *Bioorg Med Chem Lett* 22:2623-2628.

17. **Bose C**, Chatterjee RK, Bhaduri AP, Srivastava VML. **(**1996). Effect of two macrofilaricides on glucose metabolism in Litomosoides carinii and Acanthocheilonema viteae. *Med Sci Res* 24:387-389.

18. **Bose C,** Agarwal RA. (1996) Carbaryl induced changes in biogenic amine levels and acetylcholinesterase activity in the cockroach Periplaneta Americana. *Biogen Amines* 12:19-26.

19. **Bose C**, Agarwal SK, Chatterjee RK, and Srivastava VML. (1994). Carboline antifilarials: Effects on carbohydrate metabolizing enzymes in Litomosoides carinii female, *Indian J Exp Biol* 32:431-433.

20. **Bose C.** (1991) Malathion induced changes in biogenic-amine levels and acetylcholine esterase activity in the cockroach, Periplaneta Americana. *Curr Sci* 60(12):707-709.

21. **Bose C.** (1991) Changes induced by Malathion in the carbohydrate metabolism of cockroach, Periplaneta Americana. *Proc Nat Acad Sci India* 61(B).

22. **Bose C.** (1991) Malathion and carbaryl induced changes in enzymes of cockroach Periplaneta Americana. *Proc Nat Acad Sci India* 61(B) II.
23. **Bose C**. (1990) In vivo inhibition of acetylcholine esterase by carbamate and organophosphorus compounds in the cockroach, Periplaneta Americana. *Biol Memoirs* 16:16-22.
24. **Bose C.** (1989) Contact toxicity of two insecticides to common cockroach, Periplaneta Americana. *Biol Memoirs* 14:175-180.
25. Manuscript "Interleukin-1β drives NEDD8 nuclear-to-cytoplasmic translocation, fostering parkin activation via NEDD8 binding to the P-ubiqiutin activating site" Meenakshisundaram Balasubramaniam, Paul Andrew Parcon, **Chhanda Bose**, Ling Liu, Richard A. Jones; Martin R. Farlow, Robert E. Mark, Steven W. Barger, Sue Griffin Journal of Neuroinflammation -JNEU-D-19-00605-**Under Review**.

Patents Issued

Upadhyay SN, Vishakarma RA, Gosal S, Shukla S**, Bose C,** Kamra A. (1999) Process of isolation and synthesis of 1-(3, 4-Methylenedioxy-phenyl)-1E-Tetradecene and its analogues and a method for activation of effectors mechanisms of the immune system against tumor/and or infections using formulations containing these compounds **(US Patent # 5962515 issued on October 5, 1999).**

Papers presented in various scientific meetings

1. Sanjay Awasthi, **Chhanda Bose**, Catherine Jones, Rakhshanda Rahman, Sharad S. Singhal, and Sharda P. Singh. Partial RALBP1 loss depletes DNA repair pathway genes. Accepted for presentation in The 42nd Annual San Antonio Breast Cancer Symposium, San Antonio, Texas, United States, December 10 – 14, 2019.
2. Griffin Sue W, Parcon P, Balasubramaniam M**, Bose C**, JoAnn Biedermann, Robert E Mark. IL-1Facilitaion of Autophagy by Parkin Activation via NEDD8 Binding to the pUb site is foiled by downregulating PINK1 and favoring plaque and Tangle pathology. Presented in 14th International Conference on Alzheimer's and Parkinson's disease, Lisbon, Portugal, March 26-31, 2019.
3. Griffin Sue W, Parcon P, Balasubramaniam M**, Bose C**, JoAnn Biedermann, Robert E Mark. IL-1Influences Autophagy by mediating upregulation of Parkin and Parkin neddylation in cell culture and animal models, and mimics the pattern seen in AD brain. Presented in 46th Annual Meeting of Society For Neuroscience, San Diego, CA, Nov.3-7, 2018.
4. Griffin Sue W, Parcon P, Balasubramaniam M, **Bose C**, Farlow Martin, Mark Robert. IL-1 and NEDD8 Demonstrate divergent Effects on Parkin and PINK-1. Presented in 47th Annual Meeting of Society For Neuroscience, Washington DC, Nov.11-15, 2017.

5. Malik Bilal, **Bose C,** Shah SV. Iron Chelation Ameliorates Fibrotic Pathways in ZSF1 Obese Rat. Presented in 49th Annual Meeting of the American Society of Nephrology, Chicago, IL Nov. 15-20, 2016.
6. **Bose C**, Shah SV, Karaduta OK, Basnakian AG, Kaushal GP. Induction of autophagy and its role in endothelial cell injury in response to carbamylated low-density lipoprotein (cLDL). Presented at the 48th Annual Meeting of the American Society of Nephrology, San Diego, CA, Nov. 5-8, 2015.
7. **Bose C**, Shah SV, Gokden N, Megyesi J, Karaduta O, Swaminathan S. Collagen-secreting angiogenic macrophages in diabetic nephropathy. Presented at the 46th Annual Meeting of the American Society of Nephrology, Atlanta, GA, Nov. 5-10, 2013.
8. Swaminathan S, **Bose C**, Hiatt KM, Shah SV. Omniscan-induced $CD163^+$ $ferroportin^+$ osteogenic cells in nephrogenic systemic fibrosis. Presented at the 45th Annual Meeting of the American Society of Nephrology, SanDiego, CA, Nov 1-4, 2012.
9. **Bose C**, Gokden N, Shah SV, Swaminathan S. Effect of iron chelator deferiprone on progression of chronic kidney disease in mouse models. Presented at the 44th Annual Meeting of the American Society of Nephrology, Philadelphia, PA, Nov. 2011. *J Am Soc Nephrol* 22:852A, 2011
10. Swaminathan S, **Bose C**, Shah SV, Hiatt KM. Effect of gadolinium contrast on iron metabolism pathway and inhibition by iron chelator. Presented at the 43rd Annual Meeting of the American Society of Nephrology, Denver, CO, Nov. 16-21, 2010. *J Am Soc Nephrol* 21:720A, 2010.
11. **Bose C**, Shah SV, Hiatt KM, Swaminathan S. Oral iron chelator deferiprone prevents nephrogenic systemic fibrosis in mice. Presented at the 43rd Annual Meeting of the American Society of Nephrology, Denver, CO, Nov. 16-21, 2010. *J Am Soc Nephrol* 21:770A, 2010.
12. Swaminathan S, **Bose C**, Hall KA, Hiatt KM, Shah SV. Iron metabolism pathway in NSF: *In vitro e*ffect on Omniscan and inhibition by iron chelator. Presented at the Fourth Annual Symposium on Nephrogenic Systemic Fibrosis and Gadolinium Based Contrast Agents, New York Academy of Sciences, New York City, NY, May 14-15, 2010.
13. **Bose C**, Hiatt KM, Shah SV, Swaminathan S. Oral iron chelator deferiprone prevents nephrogenic systemic fibrosis in mice. Presented at the Fourth Annual Symposium on Nephrogenic Systemic Fibrosis and Gadolinium Based Contrast Agents, New York Academy of Sciences, New York City, NY, May 14-15, 2010.
14. Swaminathan S, **Bose Chhanda**, Shah SV, Hiatt KM. Role of CD163+, Tie-2+ collagen secreting angiogenic macrophages in gadolinium-induced cardiac vascular and systemic fibrosis. Presented at

the 42nd Annual Meeting of the American Society of Nephrology, SanDiego, CA, 2009. *J Am Soc Nephrol* 20:693A, 2009.

15. **Bose C**, Udupa KB. Low density lipoprotein receptor expression and mitogen-activated protein kinase activation during *in vitro* aging. Presented at the 60th Annual Scientific Meeting of the Gerontological Society of America, San Francisco, CA, Nov.16-20, 2007.
16. **Bose C**, Udupa KB. Involvement of Mitogen Activated protein Kinase Signals in Erythropoietin Induced proliferation Of Tumor Cells. Accepted for Oral presentation at the XXXIth Annual Scientific Meeting of the International Society of Hematology, Casino Punta del Este, Uruguay, March.20-24, 2007.
17. Udupa KB**, Bose C.** Identification of erythroid cell stimulating factor as a unique protein. Quiescin 6: role in erythropoiesis. Presented at the 47th Annual Meeting of the American Society of Hematology, Atlanta, GA, Dec.10-13, 2005.
18. Udupa KB**, Bose C.** Erythropoietin signaling in tumor cells: differential activation of mitogen activated protein kinases and their effect upon cell survival. 10th Congress of the European Hematology Association, Stockholm, Sweden, June 2-5, 2005.
19. **Bose C**, Bhuwaneshwaran C, Udupa KB. Reduced Signalling by extracellular regulatory kindases (ERK) is one of the causes for the decreased low density lipoprotein receptor expression in old fibroblasts. 56th Annual Scientific Meeting of the Gerontological Society of American, San Diego, CA, Nov. 22-26, 2004.
20. **Bose C,** Bhuwaneshwaran C, Udupa KB. Expression and activation of mitogen activated protein kinase (MAKP) in normal human fibroblast- Effect of *in vitro* aging. 55th Annual Scientific Meeting of the Gerontological Society of America, Boston, MA, Nov. 22-26, 2003.
21. **Bose C**, Bhuwaneshwaran C, Udupa KB. 54th Annual Scientific Meeting of the Gerontological Society of America, Chicago, IL, Nov.14-19, 2002.
22. **Bose C**, Saini M, Upadhyay SN. Tumor-bearing immunocompromised mice as a model for evaluating immunomodulatory compounds against opportunistic infections. Indo-French symposium on Immunopharmacology. National Institute on Immunology, New Delhi, India, Dec.1-5, 1997.
23. **Bose C**, Singh SP, Chatterji RK, Srivastava VML. Susceptibility of rodent host to *Litomosoides carinii infection:* Role of macrophage effector system. Global Meet on Parasitic Diseases, New Delhi, India, March 18-23, 1996.

24. **Bose C,** Agarwal SK, Chatterji RK, Srivastava VML. Effect of carboline antifilarials compounds on metabolism in *Litomosoides carinii.* Twelfth National Congress of Parasitology, Panjim Goa, India, Jan. 23-25, 1995.
25. Zaidi A, Singh SP, **Bose C**. Effect of diaminoalkane antileishmanial compound on metabolic activities of *L. donovani amastigotes.* Eleventh National Congress of Parasitology, Udaipur, India, Jan 23-25, 1994.
26. **Bose C,** Agarwal SK, Chatterji RK, Srivastava VML. Carboline antifilarials: Effect on sugar metabolism in *Litomosoides carinii.* Eleventh National Congress of Parasitology, Udaipur, India, Jan 23-25, 1994.
27. **Bose C,** Chatterji RK, Srivastava VML. Effects on carbohydrate metabolizing enzymes in *Litomosoides carinii*63rd Annual Meeting of Society of Biological Chemists (India) CDRI, Lucknow, India, Dec. 19-22, 1993.
28. **Bose C**, Chatterji RK, Srivastava VML. Diaminoalkane antifilarials: Effect on sugar metabolism in *Littomosoides carinii.* 62nd Annual Meeting of Society of Biological Chemists (India) CDRI, Lucknow, India, Dec. 19-22, 1992.
29. **Bose C**, Chatterji RK, Srivastava VML. Effect of carboline antifilarials on sugar metabolism in *Litomosoides carinii.* CSIR Golden Jubilee Symposium on Tropical Diseases: Molecular Biology and Control Strategies (India), Central Drug Research Institute, Lucknow, India. Feb. 17-20, 1992.

Research Experience

Projects working on are:
March2019—present
Internal Medicine Department, Texas Tech University for Health Science Center, Lubbock, TX

Explore the role of RLIP76 (a mercapturic acid pathway transporter), and proteins that regulate this pathway (p53 and HSF1) in carcinogenesis and cancer therapy. This project addresses the overarching challenges of: (a) Identify what drives breast cancer initiation; determine how to prevent it; and (b) Identify mechanisms of effective treatment regimens to refine or replace them with ones that are more effective, less toxic, and impact survival, *In Vivo and in Vitro.* The projects are:

1. **Treatment of triple negative breast cancer xenografts:** Nu/Nu Athymic Nude female mice (NOD/scid) injected sub-cutaneous with TMD231-luc2 or MDA-MB-231BR-luc2 cells (firefly luciferase expressing derivatives of MDA-MB-231 that develop lung or brain metastases, respectively). Primary tumor growth as well as metastases are determined by in-vivo bioluminescence imaging IVIS LUMINA XR in vivo imaging system (CALIPER LIFE SCIENCES) weekly.

2. **Rlip depletion by antisense phosphorothioate oligodeoxynucleotide (APO) R508 and/or 2HF,** *In Vitro in Vivo*. Nu/Nu athymic nude mice are used to create subcutaneously implanted human cancer xenografts of cultured human cancer cells from non-small cell and melanoma cell lines with differing functionality of the P53, ALK-kinase or B-Raf genes.
3. **Prevention of chemical carcinogenesis** by utilizing female C57Bl6 mouse model to assess the chemo preventative activity of 2HF.
4. **Prevention of Spontaneous Carcinogenesis:** Study the effect of chemo preventative substances in MMTV-ErbB2/P53-/- (p53 null) and MMTV-ErbB2/P53+/- mouse models.
5. **Small Inhibitor Therapeutic Target for Alzheimer's disease.** Studying the efficacies of a small molecule 'DDQ' in amyloid beta precursor protein transgenic mice for Alzheimer's disease.

Projects undertaken are:
November 2016-February 2019
University of Arkansas for Medical Sciences, Little Rock, AR
Research Assistant Professor (Donald W. Reynolds Institute on Aging)

- Early Events in Alzheimer Pathogenesis Neuroinflammatory, oxidative, and proteostatic mechanisms in neuropathogenesis. Molecular aspects of endocrine and metabolic dysregulation in neurodegeneration. Determined cellular and molecular changes in specific cell types of brain tissue relative to normal controls in disease-affected regions from patients with AD, HD, PD, or DS. Defined neuronal responses to a variety of stressors that elicit neuronal-glial interactions favoring neuroinflammation, and its downstream consequences.
- Smell, voice and nasal swabs as markers for neurodegenerative disorders: Isolated proteins from nasal and buccal swabs from ENT patients, and checked inflammatory and neuronal markers by ELISA and wester blotting. DNA isolation from swabs to check the genotyping (EPOE3, 3/EPOE4, 4) for association between smell, voice and neuronal markers inflammatory cytokines and genotype.
- The relationship between psychological disorders (e.g., depression) and stress. Salivary cortisol concentration was used as a biomarker of stress, to examine the psychological stress with repeated measurements. The saliva samples were collected through the use of absorbent swabs from patients and normal subjects at different time points. Isolated Saliva from the swabs and measured cortisol and melatonin by Human Circadian/Stress markers magnetic bead panel.

2008-October 2016
University of Arkansas for Medical Sciences, Little Rock, AR
Research Assistant Professor (Nephrology Division)

- Successfully developed mouse model for nephrogenic systemic fibrosis with kidney disease. Evaluated the novel risk factors and mechanisms in the pathogenesis of gadolinium induced nephrogenic systemic fibrosis.
- Identified and evaluated a variety of biomarkers in the human blood cells and serum/plasma samples, responsible for the development of Gadolinium-induced nephrogenic systemic fibrosis, in patients with chronic kidney failure, by ELISA, qPCR, WB and FC. Identified and evaluated a variety of biomarkers leveraging ELISA, Multiplexed Bead-Based Immunoassays, cell based assays, FC, Western Blotting, qPCR and IF, IHC, responsible for the development of nephrogenic systemic fibrosis, diabetic nephropathy in patients with chronic kidney failure.

- Studied and examined the role of $CD163^+/CXCR4^+$ cells expressing bone matrix proteins in vascular calcification in patients with chronic kidney disease, by analyzing the total PBMC isolated from the blood to identify other circulating cells responsible for the development of vascular calcification and diabetic nephropathy in the patients with chronic kidney failure.
- Identified cells and studied adipose tissue, pancreas, and kidneys of diabetic mice to examine the role of CD163+ Macrophages and Iron Metabolism in Type 2 Diabetes, and its relationship to the onset of hyperglycemia, fibrosis, diabetic nephropathy, and atherosclerosis
- Analyzed biomarkers in serum and plasma to study the role of endothelial cells in the development of atherosclerosis, and the impact of hydroxychloroquine on an experimental model of cardiovascular disease in chronic kidney disease.
- Investigated the role of iron in collagen-secreting angiogenic macrophages in diabetic nephropathy *in vitro* in human peripheral blood mononuclear cells. Analyzed the expression of angiogenic (acetylated LDL and lectin) and fibrotic (procollagen-1) phenotypes, and the presence of $CD163^+$ and $CD68^+$ macrophages and the regulators of iron metabolism, ferroportin and hepcidin in hyperglycemic conditions.
- Studied the role of autophagy in endothelial cell injury in response to carbamylated low-density lipoprotein (cLDL).
- Examined the role of iron in skeletal muscle sarcopenia in aging muscles of mice models, klotho-/- and young and old C57Bl/6 mice.
- Supervised and provided mentorship to medical students, summer interns, research associates and graduate students. Possess a sound background in GLP compliance and other applicable regulatory standards.
- Managed multiple clinical studies, provided resolution, strategies and risk management.
- Experienced in establishing, managing and oversight of CROs collaborations; managed multiple projects, milestones, program budgets and project management.
- Managed internal team of scientists and fostered collaboration with cross-functional teams to generate key pharmacology data to prioritize portfolio and to shape strategy in an emerging and competitive landscape.
- Worked as an IACUC committee member, ensured that the animal care and use program is in compliance with PHS Policy on Humane Care and Use of Laboratory Animals. Actively participated in animal facility inspections and prepared reports/recommendations to the IO and OLAW if needed. Participated in meeting with AAALAC. Reviewed animal protocols submitted by other PIs. Developed and submitted protocols for studies as needed.
- Facilitated the medical school admissions process through execution of annual candidate interviews, and developed and presented recommendations to the Selection Committee.
- Executed full-time research as a leader within the Nephrology Division to increase and enhance research capabilities. Writing technical procedures, study protocols, SOPs, reports, manuscripts, and grant proposals.

- **1998-2008**

University of Arkansas for Medical Sciences, Little Rock, AR
Research Instructor (Donald W. Reynolds Institute on Aging)

- Studied the role of MAPK and its correlation with cholesterol metabolism and LDL receptor expression in young and old C57black/6 and BDF-1 mouse models, and in early and late passage human skin fibroblasts *in vitro*.
- Executed studies aimed to understand the role of erythropoietin and nicotine on MAPK (MEK/ERK, MEKK/JNK and JAK/STAT pathways) signaling in various cancer cell lines by performing cell-based assays (cell cytotoxicity, MTT, cell-cycle analysis, cell proliferation BrdU CCK8 and apoptosis by Nexin and Tunnel assays) by flow cytometry and calorimetrically utilizing different pharmacological MAPK inhibitors and siRNA transfection.
- Performed immunofluorescence staining of various normal and cancer cells for LDL receptor, erythropoietin receptor (EPOR), and MAPK (ERK1/2, JNK1/2 and p38 total and phosphospecific) with and without treatment of erythropoietin and nicotine.
- Successfully identified and characterized erythroid-stimulating factor (ESF) from mouse serum by purification, cloning, and expression in mammalian cells.
- Generated hybridoma cell line, purified protein and used for antibody generation. Developed and established ELISA methods. Developed and established immunological assays (ELISA) and ELISPOT methods for in vitro cell fusion screening, evaluated the protein and antibody secreting cells (ASC), purified from hybridoma cell line.
- Successfully purified, identified and characterized erythroid-stimulating factor (ESF) from mouse serum, cloning, and expression in E.coli and mammalian cells.
- Successfully cloned mouse SOX gene.
- Successfully studied the gene expression of *mGstp1* after treatment of diallyldisulfide and various synthetic analogous compounds in mouse tissues.
- Screened skate fish liver lambda Zap express cDNA library for glutathione-S- tranferase (GST) gene by using mGSTA4-4 polyclonal antibody and mGSTA4-4 full-length cDNA as a probe.

1996-1998
National Institute of Immunology, New Delhi, India
Pool Scientist

(Immunopharmacology, Ultra structure & Histochemistry lab)

- Successfully developed mouse tumor model by subcutaneous tumor cells injections. Examined and screened the antitumor, antifungal and antimycobacterial effect of potential immunomodulatory compound from plants for preclinical trials (on T & B cell mitogenesis by LPS and ConA and receptor response, CD3, CD4, CD8 and CD25, cytokines, IL-1, IL-4, IL-10 TNF-alpha, IFN-gamma and oxidative stress markers, NO and free radicals).
- Developed collagen/CFA induced arthritis in Lewis rats and DBA/1-J mice. Tested the therapeutic efficacy of plant derived Immunomodulators for anti-inflammatory activities by observing the paw swelling and measurements by calipers, T-cell response and anti-collagen antibody analysis for preclinical trials.
- Successfully tested and evaluated the susceptibility and immune response towards opportunistic infection of *Candia albicans*, and *Mycobacterium* in immunocompromised mouse model (BDF1/6J).
- Investigated therapeutic efficacy of immuno-modulatory compounds against microbial infections and evaluation of histological and ultra-structural changes in treated/infected animal's vital organs.

1991-1996
Central Drug Research Institute, Lucknow, India
Post-doctoral fellow, Division of Biochemistry

- Successfully identified a panel of four biochemical parameter targets of drug designing for the in vitro screening of anti-filarial drugs (Glycolytic enzymes, energy metabolism, protein synthesis, and DNA replication and transcription process). Established the rat model for filarial infection (parasite burden).
- Maintained various filarial infections in rodent host and studied the role of various cytokines and oxygen-derived free radicals in establishment and rejection of filarial infection, and carried out various biochemical/immunological assays during course of infection.
- Studied effect of various antifilarial compounds on glycolytic enzymes, energy metabolism, protein synthesis, DNA transcription and replication process and tubulin binding in *D.viteae* and *L.carinii* (filarial parasites).
- Purified phosphofructokinase from filarial parasites and observed its differences from host's enzyme for drug targeting and designing.

Technical Expertise:
Animal research:
Extensive research experience working with mice, rats. Excellent animal handling and surgical techniques (5/6 nephrectomy, UUO, ischemia reperfusion, liver perfusion in mice). In vivo tumor implant in rodents (cell based xenograft, Orthotopic, intracardial), osmotic pumps implantation, In Vivo imaging (IVIS). Experienced with most forms of anesthesia, euthanasia, blood and tissue collections, injections, dosing (IP, IV, SC, and oral), *in vivo* drug testing, Irradiation and engraftment of mice with bone marrow / stem cell populations. Maintained transgenic colonies and genotyping. Hands on experience analyzing mice blood and urine samples to determine the hematological and biochemical parameters, for kidney and liver functions. Expertise in biochemical pharmacology, in vivo drug testing, Mode of action. Metabolic disposition.

Biochemistry/ Protein chemistry:
Recombinant protein expression in E .coli and Yeast, protein purification using various types of liquid chromatography including ion-exchange, affinity and gel filtration column chromatography, SDS-PAGE, Native PAGE, 2D gels, Silver staining, , Enzyme kinetics and various enzyme assays, and purification of enzymes and proteins.

Cell/Tissue Culture:
Extensive knowledge and working experience with different cell lines (human and murine, primary and transformed, neuronal) culture, co-cultures and cell differentiation. Stem cell cultures from mouse bone marrow. Cell isolations from kidneys, spleen, skin of mice and rats, PBMC, monocyte isolation from human and mice blood. Culture and differentiation of blood cells in various other cell types.

Immunology: Multiplexed Bead-Based Immunoassays, ELISA assays for functional Th1, Th2, and inflammatory cytokines in human and mouse serum/or plasma, urine, saliva, nasal and buccal swabs and tissue culture supernatants. Dot blotting, Immuno-precipitation, co-immunoprecipitation (Co-IP) and Pull-Down assays, proximity ligation assay (in situ PLA).

Flow cytometry: Extensive working experience with multi-channel flow cytometry panel (BD FACS Caliber, Flow Jo, and Guava EasyCyte mini) for the analysis of intracellular cytokines, T and B cell activation including staining of fresh and cultured human PBMCs from clinical samples, mouse splenocytes, lymph nodes. Lyse no-wash staining of human and mouse whole blood. Antibodies titration and other critical reagents, optimized fluorochrome selection in antibody panels, for intra and extra cellular FC staining. Optimized mouse mixed lymphocyte reactions and binding assays and performed cell separations with MACS columns. Cell sorting with FACS ARIA cell sorter.

Immunochemistry and pathology: Immunohistochemistry, immunofluorescence and fluorescence in-situ hybridization(ISH), Tunnel assay, H&E, PAS, Prussian blue staining, for many biomarkers in human and mice tissues and cells. Routine fixing, staining and quantification, fluorescence and microscopy.

Molecular Biology:
Gene cloning and expression studies.
Isolation of genomic and plasmid DNA, PCR, quantitative PCR, Southern blotting.
Isolation, quantification of RNA from animal organs and from various human and non-human cell lines.
Northern blotting.
CDNA Library screening, using antibody and radioactive probes.
DNA and RNA probe labeling.
Transfection: plasmid and siRNA techniques.

Tracer technique: Autoradiography, handling of various isotopes and phosphor imager.
Microbiology: Maintained various microbial and parasitic infections in rodents (i.e. filarial, *Mycobacterium* and *candida albicans*).

Mentorship and trainees.

Co-mentor**-** Murali Vijayan, PhD. - Postdoctoral fellow Department of internal medicine, Texas Tech University, Health Science Center, Lubbock, TX.
Co-mentor- Subodh Kumar Ph.D., Postdoctoral Research Associate, Garrison Institute on Aging, Tech University, Health Science Center, Lubbock, TX.

Trainees

2019- Present-Shabnam Rehman, MD, Assistant professor, Department of internal medicine, Texas Tech University, Health Science Center, Lubbock, TX

9-2019- Somedeb Bal, MD, Resident Physician PGY3, Department of internal medicine, Texas Tech
10-2019 University, Health Science Center, Lubbock, TX

03/2019- Anita Sultan, MD, Resident, Texas Tech University Health Sciences Center Lubbock, TX
04/2019- Present -Sahil Tonk, graduate student, Texas Tech University, Health Science Center, Lubbock, TX

2017- Meenakshisundaram Balasubramaniam- Postdoctoral fellow, Department of Geriatrics,
2019 University of Arkansas for Medical Sciences, Little Rock, AR.

2018- Sue Woodward Tech. II, Department of Geriatrics, University of Arkansas for Medical Sciences, Little Rock, AR.

2016- Rohit Seth, Post-doctoral fellow, (College of Medicine, University of Arkansas for Medical Sciences, Nephrology Division, Little Rock, AR).

2016- Alena V Savenka, Research Assistant, (College of Medicine, Pharmacology &Toxicology University Of Arkansas for Medical Sciences, Little Rock, AR).

2010-2012 Robert Stafford Justus, Tech. II, (Veteran Health Science Center, Little Rock, AR), and, Nephrology Division, UAMS, Little Rock, AR).

2014-2015 Oleg Karaduta, Research Assistant, (College of Medicine, University of Arkansas for Medical Sciences, Nephrology Division, Little Rock, AR).

2010-2011 Merrick Christopher, Medical student (College of Medicine, University of Arkansas for Medical Sciences, Little Rock, AR).

2009 Alla Ramani, Research Associate, (University of Arkansas for Medical Sciences, Little Rock, AR, Donald W. Reynolds Institute on Aging)

2008 Debarti Ray, M.D., Research Assistant (Department of Physiology and Biophysics, University of Arkansas for Medical Sciences, Little Rock, AR).

2007 Maheswari Rajasekaran- Graduate (Ph.D) student (University of Arkansas for Medical Sciences, LR, AR, Donald W. Reynolds Institute on Aging)

2007 Azida Walker, Ph.D., Post-doctoral fellow (Department of Physiology and Biophysics, University of Arkansas for Medical Sciences, Little Rock, AR).

2006 Nick Greenwood, -Medical student (College of Medicine, University of Arkansas for Medical Sciences, Little Rock, AR).

2004-2006 Hailing Jhang, M.D., Research Assistant (Department of Physiology and Biophysics University of Arkansas for Medical Sciences, Little Rock, AR).

2004 Shewta Shetty, M.D., Medical Fellow (Department of Physiology and Biophysics, University of Arkansas for Medical Sciences, Little Rock, AR).

2003 Priya Gupta, M.D., Medical Fellow (Department of Physiology and Biophysics, University of Arkansas for Medical Sciences, Little Rock, AR)

2002 Arvind P. Jamakhandi, Graduate (Ph.D) student, (Department of Biochemistry and Molecular Biology, University of Arkansas for Medical Sciences, Little Rock, AR).

1997-1998 Abhilasha Sharma, Graduate (Ph.D) student, (National Institutes of Immunology, India).

1996-1997 Bharti Dewangan, Graduate (Ph.D) student, (National Institutes of Immunology, India).

1996-1997 Meenakshi Saini, Graduate (Ph.D) student, (National Institutes of Immunology, India).

1994-1995 Alima Zaidi, Graduate (Ph.D) student, (Central Drug Research Institute, Lucknow, India).

1996 Manisha Kakkar, Graduate (Ph.D) student, (Central Drug Research Institute, Lucknow, India).