

CURRICULUM VITAE

NAME: Guillermo A. Altenberg

DATE: October 2008

PRESENT POSITION AND ADDRESS

Associate Professor
Department of Cell Physiology and
Molecular Biophysics
Texas Tech University Health Sciences Center
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EDUCATION

December 1976	Biology	B.A.	National School, San Martin, Buenos Aires, Argentina
December 1983	Medicine	M.D.	University of Buenos Aires, Buenos Aires, Argentina
December 1987	Doctor in Medicine and Physiology	Ph.D.	University of Buenos Aires, Buenos Aires, Argentina

PROFESSIONAL AND TEACHING EXPERIENCE

October 2008-
present Director, Membrane Protein Laboratory Core, Center for Membrane Protein Research, Texas Tech University Health Sciences Center, Lubbock, Texas.

April 2008-
present Member, Center for Membrane Protein Research, Texas Tech University Health Sciences Center, Lubbock, Texas.

April 2007-
present Associate Professor, Department of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center, Lubbock, Texas.

April 2007-
present Member of the Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, Lubbock, Texas.

March 2007-
present Adjunct Assistant Professor, Department of Internal Medicine, The University of Texas Medical Branch, Galveston, Texas.

August 2006- Assistant Professor, Department of Internal Medicine, The
 March 2007 University of Texas Medical Branch, Galveston, Texas.

September 2002- Senior Scientist, Sealy Center for Structural Biology and Molecular
 March 2007 Biophysics, The University of Texas Medical Branch, Galveston,
 Texas.

September 1997- Member of the Graduate School of Biomedical Sciences, The
 present University of Texas Medical Branch, Galveston, Texas.

September 1997- Assistant Professor, Department of Physiology and Biophysics
 August 2006 (name changed to Neuroscience and Cell Biology in 2004), The
 University of Texas Medical Branch, Galveston, Texas.

September 1999- Associate Director, Membrane Protein Laboratory, Department of
 August 2000 Physiology and Biophysics, The University of Texas Medical Branch,
 Galveston, Texas.

September 1992- Research Assistant Professor, Department of Physiology and
 August 1997 Biophysics, The University of Texas Medical Branch, Galveston,
 Texas.

September 1990- Instructor, Department of Physiology and Biophysics, The
 August 1992 University of Texas Medical Branch, Galveston, Texas.

January 1988- Postdoctoral Fellow, Department of Physiology and Biophysics,
 August 1990 The University of Texas Medical Branch, Galveston, Texas.

March 1986- Chief Instructor, Department of Physiology, University of Buenos
 January 1988Aires, Argentina.

March 1984- Instructor, Department of Physiology, University of Buenos Aires,
 February 1986 Argentina.

March 1984- Fellow of the National Research Council of Argentina (CONICET),
 February 1986 Institute of Cardiological Research, University of Buenos Aires,
 Argentina.

March 1978- Teaching Assistant, Department of Physiology, University of
 February 1984 Buenos Aires, Argentina.

RESEARCH ACTIVITIES

Research Training

March 1984- Renal pathophysiology and hypertension, Institute of Cardiological
 February 1986 Research, Hypertension Section, under the direction of Dr. Alberto
 C. Taquini, University of Buenos Aires, Argentina.

March 1986- January 1988 Renal pathophysiology and epithelial transport, Institute of Cardiological Research, Renal Section, under the direction of Dr. Carlos E. Amorena, University of Buenos Aires, Argentina.

January 1988- August 1992 Epithelial transport, epithelial electrophysiology, and fluorescence techniques applied to epithelia, under the direction of Dr. Luis Reuss, The University of Texas Medical Branch.

September 1994- August 1996 Molecular biology, in the laboratory of Dr. J-T. Zhang, The University of Texas Medical Branch.

September 1999- August 2000 Crystallization of membrane proteins in lipidic cubic phases, with Dr. E. M. Landau, Membrane Protein Laboratory, The University of Texas Medical Branch.

Area of Research

Structure/function relationships of membrane transport proteins. My major interest is on connexins, the membrane proteins that form the gap junctions.

Research support

Current

R01 GM79629. National Institutes of Health. National Institute of General Medical Sciences, "Architecture of the transmembrane pore formed by connexin 43" (PI: Guillermo Altenberg, 8/1/2007-5/31/2012).

Texas Advanced Research Program 010674-0046-2007, Texas Higher Education Coordinating Board, "Molecular mechanisms of regulation by calcium of gap-junctional hemichannels formed by connexin 43" (PI: Guillermo Altenberg, 8/15/2008-8/14/2010).

R01 GM068586, National Institutes of Health. National Institute of General Medical Sciences, "Mechanisms of regulation of connexin 43" (PI: Luis Reuss, Co-I: Guillermo Altenberg, 8/1/2004-7/31/2009).

Past

National Research Council of Argentina. Fellowship (1984-1988).

National Research Council of Argentina. External postdoctoral fellowship (1988-1989).

UTMB Small Grant. "Mechanisms of Reduced Drug Uptake by Multidrug Resistant Cells" (4/1991-3/1992; role in project: Principal Investigator).

John Sealy Memorial Endowment Fund. "Ion-channel function of P-glycoprotein and its role in multidrug resistance" (8/1992-7/1994; role in project: Co-Investigator).

Searle Research and Development. "A novel blocker of P-Glycoprotein-mediated transport" (1993-1996; role in project: Co-Investigator).

UTMB Small Grant. "Identification of an extracellular domain of P-glycoprotein that regulates transport of chemotherapeutic agents" (5/1996-4/1997; role in project: Principal Investigator).

American Heart Association, Texas Affiliate Inc. Grant-in-Aid award. "Regulation of drug transport by P-glycoprotein via protein kinase C-mediated phosphorylation" (7/1996-6/1997; role in project: Principal Investigator).

Collaborative Grant from the Sealy Center for Structural Biology. "Structure of a carrier protein from E. coli" (4/1997-3/1998; role in project: Principal Investigator).

National Institutes of Health. National Cancer Institute grant R29 CA72783. "Phosphorylation and drug transport by P-glycoprotein" (7/1997-6/2002; role in project: Principal Investigator).

National Institutes of Health. National Institute of Diabetes and Digestive and Kidney Diseases, R21 DK63322. "Development of genetically-encoded glucose sensors" (1/2003-12/2004; role in project: Principal Investigator).

John Sealy Memorial Endowment Fund for Biomedical Research. "Mutant cochlear connexins associated with deafness" (6/1/2005-8/31/2005); role in project: Principal Investigator.

American Heart Association, Texas Affiliate Inc., Grant-in-Aid 0755002Y, "Identification of the pore-lining helices of connexin 43 gap-junctional hemichannels" (7/1/2007-8/31/2009; role in project: Principal Investigator). Relinquished on 7/31/2007 because of funding of the overlapping award R01 GM79629.

National Institutes of Health. National Institute of Deafness and Communication Disorders, R21 DC007150. "Mutant cochlear connexins associated with deafness" (9/1/2005-8/31/2008); role in project: Principal Investigator.

COMMITTEE RESPONSIBILITIES

Renal Physiology Committee of the Argentine Society of Nephrology (1986-2000).

Mason Guest Distinguished Lectureship Committee, Department of Physiology and Biophysics, The University of Texas Medical Branch (1993-2003).

Confocal Facility co-director, Department of Physiology and Biophysics, The University of Texas Medical Branch (1996-1999).

Graduate School of Biomedical Sciences, Cellular Physiology and Molecular Biophysics Curriculum Committee, The University of Texas Medical Branch (1997-2005).

Renal/Fluid/Electrolytes Course Curriculum Committee Member, School of Medicine, The University of Texas Medical Branch (1999-2004).

Basic Biomedical Science Curriculum Committee, Graduate School of Biomedical Sciences, The University of Texas Medical Branch (2000-2002).

Graduate School of Biomedical Sciences Curriculum Committee, The University of Texas Medical Branch (2000-2002).

Gap-junction Session, Biophysical Society Meeting 2005, co-chair.

Structural Biology Symposia, Sealy Center for Structural Biology and Molecular Biophysics, Organizing Committee, 2005-2007.

Seminars Program, chair, Department of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center (2007-present).

Space Committee, Department of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center (2007-present).

Common Equipment, chair, Department of Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center (2007-present).

Conflict of Interest Committee, member, Texas Tech University Health Sciences Center, 2008-present.

Bridge Support Review Committee, Bridge Funding Program for the Texas Tech University Health Sciences Center School of Medicine, 2008-present.

Texas Tech University Health Sciences Center Core Facilities Planning and Oversight Committee, member, 2008-present.

Preliminary Data Grant Program, Texas Tech University Health Sciences Center, Committee, member, 2008-present.

TEACHING RESPONSIBILITIES

A. TEACHING RESPONSIBILITIES

Teaching

School of Medicine

Lecturer, Renal Physiology and Electrolytes course, University of Buenos Aires, 1983-1987.

Facilitator, Renal Physiology and Electrolytes course, University of Buenos Aires, 1983-1987.

Facilitator Assistant, Renal Physiology and Electrolytes course, University of Buenos Aires, 1978-1983.

Lecturer, Human Physiology, Renal Physiology and Electrolytes course, The University of Texas Medical Branch, 1992-1998.

Small group problem discussions, Human Physiology, Renal Physiology and Electrolytes course, The University of Texas Medical Branch, 1990-1998.

Lecturer, Renal/Fluids/Electrolytes, The University of Texas Medical Branch, 2000-2002.

Facilitator, Renal/Fluids/Electrolytes, The University of Texas Medical Branch, 1999-2007.

Facilitator, Great Syndromes, The University of Texas Medical Branch, 2005-2007.

Structure and Function of the Organ Systems, Texas Tech University Health Sciences Center, 2007-present.

Graduate School

Laboratory techniques, Cell Biology Program, lectures and discussions on fluorescent techniques. The University of Texas Medical Branch, 1998-2000.

Electrophysiological techniques, Cellular Physiology and Molecular Biophysics Program, lectures and discussion on epithelial electrophysiology. The University of Texas Medical Branch, 2000-2002.

Membrane protein structure and function, Cellular Physiology and Molecular Biophysics Program, lectures and discussion on structure-function relationship of ATP-binding cassette proteins. The University of Texas Medical Branch, 2002-2007.

Ion channel structure and function, Cellular Physiology and Molecular Biophysics Program, lectures and discussion on ion channel structure. The University of Texas Medical Branch, 2004-2007.

Laboratory Methods in Physiology, Physiology Program, lecture and laboratory training on electrophysiology of ion channels. Texas Tech University Health Sciences Center, 2007-present.

Physiology Special Topics: Membrane Proteins, Physiology Program, discussions on membrane protein structure and function. Texas Tech University Health Sciences Center, 2007.

Human Physiology, Renal Section leader, organization, lectures and group discussions. Texas Tech University Health Sciences Center, 2007-present.

Topics in Biochemistry and Laboratory Methods, Biochemistry and Molecular Genetics Program. Course Director, Texas Tech University Health Sciences Center, 2008.

Students/Mentees/Advisees/Trainees

Post-doctoral fellows

Ariel Castro, currently an Adjunct Assistant Professor of Surgery, University of California, San Francisco.

Xiaoyong Bao, currently an Instructor in the Pediatrics Child Health Research Center, The University of Texas Medical Branch at Galveston.

Mauricio Retamal, postdoctoral fellow, currently an Assistant Professor at University for Development, Santiago, Chile.

Maria Elena Zoghbi, current postdoctoral fellow.

Mariana Fiori, current postdoctoral fellow.

Sung Chang Lee, current postdoctoral fellow.

Ph.D. and M.D./Ph.D. students

Alejandro Sarries, undergraduate student, 1985-1986.

Brian Button, currently Research Associate in the Cystic Fibrosis Center, University of North Carolina School of Medicine at Chapel Hill.

Denise M. Wilkes, currently Assistant Professor in the Department of Anesthesiology, The University of Texas Medical Branch at Galveston.

Yongyue Chen, currently postdoctoral fellow in the Department of Neuroscience at Albert Einstein School of Medicine, New York.

Sung Haeng Lee, currently an Assistant Professor at Chosun University College of Medicine, South Korea.

Sung Chang Lee, currently a postdoctoral fellow in my laboratory.

Rebecca Sisson Cooper, current graduate student.

Christopher Tomingas, current M.D., Ph.D. student.

Chair/Member of Ph.D. Supervisory Committee for:

Brian Button, Committee Member, Dissertation completed in 2000.

Denise Wilkes, Committee Chair, M.D., Ph.D. student, Dissertation completed in 2000.

Ernest S. Han, Committee Member, Dissertation completed in 2000.

Xiaoyong Bao, Committee Member, Dissertation completed in 2003.

Yongyue Chen, Committee Member, Dissertation completed in 2004.

Sung Haeng Lee, Committee Chair, M.D., Ph.D. student, Dissertation completed in 2004.

Naomi Oshiro, Committee Member, Dissertation completed in 2006.

Zhifang Zhao, Committee Member, Dissertation completed in 2006.

Sung Chang Lee, Committee Chair, Dissertation completed in 2008.

Liang Ma, External Committee Member, The University of Texas Medical Branch at Galveston, in progress.

Rebecca Sisson Cooper, Committee Chair, Dissertation work to start next year.

Christopher Tomingas, Committee Chair, Dissertation work to start next year.

Arup Ratan Chakraborty, Committee Member, Biological Sciences Program, Texas Tech University, Dissertation in progress.

Chair/Member of Masters Supervisory Committee for:

Greg Young, Honors in Research Committee Member, Dissertation in 1993.

Andrei Bednov, Committee Member, 2004.

MEMBERSHIP IN ELECTED SCIENTIFIC SOCIETIES

American Association for Biochemistry and Molecular Biology.
American Society for Cell Biology.
Biophysical Society.
Society of General Physiologists.

HONORS

Honor Diploma, Medical School, University of Buenos Aires, 1983.

Competitive Fellowships:

Fellowship of the National Research Council of Argentina (1984-1988).

External postdoctoral fellowship of the National Research Council of Argentina (1988-1989).

ADDITIONAL INFORMATION

Journal reviewer for:

Acta Physiologica et Pharmacologica Latinoamericana.
Aging Cell.
American Journal of Physiology.
Biochimica and Biophysica Acta.
Biology of the Cell
Biophysical Journal.
Cancer Research.
Chemico-Biological Interactions.
Current Molecular Medicine.
European Journal of Biochemistry.
European Journal of Neuroscience.
FEBS letters.
International Journal of Cancer.
Journal of General Physiology.
Journal of Membrane Biology.
Leukemia Research.
Medicina (Bs.Aires).
Pflügers Archives-European Journal of Physiology
The Journal of Physiology (London).

Grant reviewer for:

Agencia Nacional de Promoción Científica y Tecnológica, Fondo para la Investigación Científica y Tecnológica (FONCyT), Argentina (2007-present).
American Cancer Society Institutional Research Grant Program. Intramural Research Grants and Fellowships (1996-1997).

American Cancer Society Institutional Research Grant Program Committee (1999).
Cancer Research Campaign Grants, United Kingdom (1999-2004).
German-Israeli Foundation (2007-present).
James W. McLaughlin Fellowship Fund Committee (2003).
John Sealy Memorial Endowment Fund for Biomedical Research (1999).
Pilot Project Applications. Centennial Center for Environmental Toxicology (1998).
Medical Research Council, Great Britain (2004-present).
Health Research Council of New Zealand (2006)
American Heart Association, Region III Review Consortium, Committee 5A (since 2008).
Bridge Funding Program for the Texas Tech University Health Sciences Center School of Medicine (since 2008).

PUBLICATIONS

A. Articles in peer-reviewed journals

Altenberg, G.A., Negri, A.L., Rainoldi, F.A., Prigollini, D. and Yeyati, N.L. Acute effect of amiloride on urinary magnesium excretion in dogs. *Acta Physiol. Pharmacol. Latinoam.*, 36:89-92, 1986.

Yeyati, N.L., **Altenberg, G.A.**, Rainoldi, F.A. and Greco, J. Reversal by indomethacin of the renal effects of dopamine in subjects with normal renal function. *Acta Physiol. Pharmacol. Latinoam.*, 36:127-133, 1986.

Altenberg, G.A., Aristimuno, P.C., Amorena, C.E. and Taquini, A.C. Amiloride prevents the metabolic acidosis of a KCl load in nephrectomized rats. *Clinical Science*, 76:649-652, 1989.

Altenberg, G.A. and Reuss, L. Apical membrane Na^+/H^+ exchange in *Necturus* gallbladder epithelium. Its dependence on extracellular and intracellular pH and on external Na^+ concentration. *J. Gen. Physiol.*, 95:369-392, 1990.

Stoddard, J.S., **Altenberg, G.A.**, Ferguson, M.L. and Reuss, L. Furosemide blocks basolateral membrane Cl^- permeability in gallbladder epithelium. *Am. J. Physiol. Cell Physiol.*, 258:C1150-C1158, 1990.

Altenberg, G.A. Intracellular alkalosis induced by increasing extracellular potassium. Ionic dependence and effects of amiloride and DIDS. *Miner. Electrolyte Metab.*, 16:197-201, 1990.

Mac Laughlin, M., **Altenberg, G.**, Gioioso, E., Amorena, C.E. and Taquini, A.C. Natriuretic response to saline load in one-kidney/one-clip hypertensive rats. *Renal Physiol. Biochem.*, 13:200-205, 1990.

Altenberg, G.A., Stoddard, J.S. and Reuss, L. Electrophysiological effects of basolateral $[\text{Na}^+]$ in *Necturus* gallbladder epithelium. *J. Gen. Physiol.*, 99:241-262, 1992.

Yeyati, N.L., **Altenberg, G.A.** and Adroque, H. Mechanism of the acetazolamide-induced

rise in renal resistance assessed in the dog whole kidney. *Renal Physiol. Biochem.*, 15:99-105, 1992.

Altenberg, G.A., Young, G., Horton, J.K., Glass, D., Belli, J.A. and Reuss, L. Changes in intra- or extracellular pH do not mediate P-glycoprotein-dependent multidrug resistance. *Proc. Natl. Acad. Sci. USA*, 90:9735-9738, 1993.

Altenberg, G.A., Subramanyam, M., Bergmann, J.S., Johnson, K.M. and Reuss, L. Muscarinic stimulation of gallbladder epithelium. I. Electrophysiology and signalling mechanisms. *Am. J. Physiol. Cell Physiol.*, 265:C1604-C1612, 1993.

Altenberg, G.A., Subramanyam, M. and Reuss, L. Muscarinic stimulation of gallbladder epithelium. II. Fluid transport, cell volume, and ion permeabilities. *Am. J. Physiol. Cell Physiol.*, 265:C1613-C1619, 1993.

Altenberg, G.A., Deitmer, J.W., Glass, D.C. and Reuss, L. P-glycoprotein-associated Cl⁻ currents are activated by cell swelling but do not contribute to cell volume regulation. *Cancer Res.*, 54:618-622, 1994.

Altenberg, G.A., Vanoye, C.G., Han, E. S., Deitmer, J. W. and Reuss, L. Relationship between P-glycoprotein-mediated rhodamine 123 transport, cell volume, and Cl⁻ currents. *J. Biol. Chem.*, 269:7145-7149, 1994.

Altenberg, G.A., Vanoye, C. G., Horton, J. K. and Reuss, L. Unidirectional fluxes of rhodamine 123 in multidrug-resistant cells: evidence against direct drug extrusion from the plasma membrane. *Proc. Natl. Acad. Sci. USA*, 91:4654-4657, 1994.

Sognier, M.A., Zhang, Y., Eberle, R.L., Sweet, K.M., **Altenberg, G.A.** and Belli, J.A. Sequestration of doxorubicin in vesicles in a multidrug-resistant cell line (LZ-100). *Biochem. Pharmacol.*, 48:391-394, 1994.

Altenberg, G.A., Subramanyam, M. and Reuss, L. Muscarinic stimulation of gallbladder epithelium. III. Antagonism of adenosine 3', 5'-cyclic monophosphate-mediated effects. *Am. J. Physiol. Cell Physiol.*, 267:C1196-C1202, 1994.

Subramanyam, M., **Altenberg, G.A.** and Reuss, L. Dopamine activates apical membrane Cl⁻ conductance and inhibits fluid absorption in amphibian gallbladder by elevating intracellular cAMP. *Cell. Physiol. Biochem.*, 5:118-126, 1995.

Han, E.S., Vanoye, C.G., **Altenberg, G.A.** and Reuss, L. P-glycoprotein-associated chloride currents revealed by specific block by an anti-P-glycoprotein antibody. *Am. J. Physiol. Cell Physiol.*, 270:C1370-C1378, 1996.

Torres, R.J., **Altenberg, G.A.**, Copello, J.A., Zampighi, G. and Reuss, L. Preservation of structural and functional polarity in isolated epithelial cells. *Am. J. Physiol. Cell Physiol.*, 270:C1864-C1874, 1996.

Torres, R.J., **Altenberg, G.A.**, Cohn, J.A. and Reuss, L. Polarized expression of cyclic AMP-activated chloride channels in isolated epithelial cells. *Am. J. Physiol. Cell Physiol.*, 271:C1574-C1582, 1996.

Torres, R.J., Subramanyam, M., **Altenberg, G.A.** and Reuss, L. Cell swelling activates K^+ and inhibits Cl^- conductance of the basolateral membrane of cells from a leaky epithelium. *J. Gen. Physiol.*, 109:1-12, 1997.

Castro, A.F. and **Altenberg, G.A.** Inhibition of drug transport by genistein in multidrug-resistant cells expressing P-glycoprotein. *Biochem. Pharmacol.*, 53:89-93, 1997.

Vanoye, C.G., **Altenberg, G.A.** and Reuss, L. P-glycoprotein is not a swelling-activated Cl^- channel; possible role as a Cl^- channel regulator. *J. Physiol. (Lond.)*, 502:249-258, 1997.

Lee, J. S., Scala, S., Matsumoto, Y., Dickstein, B., Robey, R., Zhang, Z., **Altenberg, G.** and Bates, S. E. Reduced drug accumulation and multidrug resistance in human breast cancer cells without associated P-glycoprotein or MRP overexpression. *J. Cell. Biochem.*, 65:513-526, 1997.

Horton, J.K., Thimmaiah, K.N., **Altenberg, G.A.**, Castro, A.F., Germain, G.S., Gowda, G.K. and Houghton, P.J. Characterization of a novel bis-acridone and comparison with PSC-833 as a potent and poorly reversible modulator of P-glycoprotein. *Mol. Pharmacol.*, 52:948-957, 1997.

Wang, C., Castro, A.F., Wilkes, D.M. and **Altenberg, G.A.** Expression and purification of the first nucleotide-binding domain and linker region of MDR1. Comparison of fusions to glutathione-S-transferase, thioredoxin and maltose-binding protein. *Biochem. J.*, 338:77-81, 1999.

Vanoye, C.G., Castro, A.F., Pourcher, T., Reuss, L. and **Altenberg, G.A.** Phosphorylation of P-glycoprotein by PKA and PKC modulates swelling-activated Cl^- currents. *Am. J. Physiol. Cell Physiol.*, 276:C370-C378, 1999.

Vanoye, C.G., **Altenberg, G.A.** and Reuss, L. Inhibition of P-glycoprotein-mediated transport by a hydrophobic contaminant in commercial gluconate salts. *Am. J. Physiol. Cell Physiol.*, 276:C1439-C1442, 1999.

Castro, A.F., Horton, J.K., Vanoye, C.G. and **Altenberg, G.A.** Mechanism of inhibition of P-glycoprotein-mediated drug transport by protein kinase C blockers. *Biochem. Pharmacol.*, 58:1723-1733, 1999.

Reuss, L., Vanoye, C.A., **Altenberg, G.A.**, Vergara, L., Subramanyam, M. and Torres, R. Cell-volume and ion conductances in amphibian gallbladder epithelium. *Cell. Physiol. Biochem.*, 10:385-392, 2000.

Button, B., Reuss, L. and **Altenberg, G.A.** PKC-mediated stimulation of amphibian CFTR depends on a single phosphorylation consensus site. Insertion of this site confers PKC

sensitivity to human CFTR. *J. Gen. Physiol.*, 117:457-467, 2001.

Wilkes, D.M., Wang, C., Aristimuño, P., Castro, A.F. and **Altenberg, G.A.** Nucleotide triphosphatase activity of the N-terminal nucleotide-binding domains of the multidrug resistance proteins P-glycoprotein and MRP1. *Biochem. Biophys. Res. Commun.*, 296:388-394, 2002.

Lee, S.H. and **Altenberg, G.A.** Transport of leukotriene C₄ by a cysteine-less multidrug resistance protein 1 (MRP1). *Biochem. J.*, 370:357-360, 2003.

Lee, S.H. and **Altenberg, G.A.** Expression of functional multidrug-resistance protein 1 (MRP1) in *Saccharomyces cerevisiae*. Effects of N- and C-terminal affinity tags. *Biochem Biophys. Res. Commun.*, 306:644-649, 2003.

Bao, X., **Altenberg, G.A.** and Reuss, L. Mechanism of regulation of the gap-junction protein connexin 43 by protein kinase C-mediated phosphorylation. *Am. J. Physiol. Cell Physiol.*, 286:C647-654, 2004.

Bao, X., Cheng, Y., Reuss, L. and **Altenberg, G.A.** Functional expression in *Xenopus* oocytes of gap-junctional hemichannels formed by a cysteine-less connexin 43. *J. Biol. Chem.*, 279:9689-9692, 2004.

Bao, X., Reuss, L. and **Altenberg, G.A.** Regulation of purified and reconstituted connexin 43 hemichannels by protein kinase C-mediated phosphorylation of serine 368. *J. Biol. Chem.*, 279:20058-20066, 2004.

Chen, Y., **Altenberg, G.A.** and Reuss, L. Mechanism of the activation of *Xenopus* CFTR by stimulation of PKC. *Am. J. Physiol. Cell Physiol.*, 287:C1256-C1263, 2004.

Chen, Y., Button, B., **Altenberg, G.A.** and Reuss, L. Potentiation of the effect of PKA stimulation of *Xenopus* CFTR by activation of PKC. Role of NBD2. *Am. J. Physiol. Cell Physiol.*, 287:C1436-1444, 2004.

Bao, X., Chen, Y., Lee, S.H., Lee, S.C., Reuss, L. and **Altenberg, G.A.** Membrane transport proteins with complete replacement of transmembrane helices with poly-alanine sequences remain functional. *J. Biol. Chem.*, 280:8647-8650, 2005.

Chen, Y., Deng, Y., Bao, X., Reuss, L. and **Altenberg, G.A.** Mechanism of the defect in gap-junctional communication by expression of a mutant connexin 26 associated with dominant deafness. *FASEB J.*, 19: 1516-1518, 2005. <http://www.fasebj.org/cgi/reprint/04-3491fjev1?ijkey=UsWbAvF4WTuEc&keytype=ref&siteid=fasebj>.

Deng, Y., Chen, Y., Reuss, L. and **Altenberg, G.A.** Mutations of connexin 26 at position 75 and dominant deafness: Essential role of arginine for the generation of functional gap-junctional channels. *Hearing Res.*, 220:87-94, 2006.

Bao, X., Lee, S.C., Reuss, L. and **Altenberg, G.A.** Change in permeant size-selectivity by phosphorylation of connexin 43 gap-junctional hemichannels by PKC. *Proc. Natl.*

Acad. Sci. USA, 104:4919-4924, 2007.

Kelly, B., Lozano, A., **Altenberg, G.** and Makishima, T. Connexin 26 mutation in Keratitis-Ichthyosis-Deafness (KID) syndrome in mother and daughter with combined conductive and sensorineural hearing loss. *Int. J. Dermatol.*, 47:443-447, 2008.

B. Other

Thesis/Dissertation

Mechanism of the metabolic acidosis produced by hyperkalemia. Doctor in Medicine Dissertation, University of Buenos Aires, Argentina, 1987.

Reviews and book chapters

Reuss, L., Segal, Y. and **Altenberg, G.** Regulation of ion transport across gallbladder epithelium. *Ann. Rev. Physiol.*, 192:650-683, 1990.

Altenberg, G., Copello, J., Cotton, C., Dawson, K., Segal, Y., Wehner, F. and Reuss, L. Electrophysiological methods for studying ion and water transport in *Necturus* gallbladder epithelium. *Methods Enzymol.*, 53:361-373, 1991.

Reuss, L. and **Altenberg, G.A.** cAMP-activated Cl⁻ channels: Regulatory role in gallbladder and other absorptive epithelia. *News Physiol. Sci.*, 10:32-37, 1995.

Altenberg, G.A. and Reuss, L. Measurements and interpretation of intracellular ionic activities. In: *Epithelial transport: A guide to methods and experimental analysis*. Chapter 7. N. K. Wills, L. Reuss and S.A. Lewis, editors. Chapman and Hall, London, 1996.

Reuss, L., Cotton, C.U. and **Altenberg, G.A.** Measurements of epithelial cell volume. In: *Epithelial transport: A guide to methods and experimental analysis*. Chapter 8. N. K. Wills, L. Reuss and S.A. Lewis, editors. Chapman and Hall, London, 1996.

Altenberg, G.A. The engine of ABC proteins. *News Physiol. Sci.*, 18:191-195, 2003.

Altenberg, G.A., Chen, Y., Button, B. and Reuss, L. The role of protein kinase C in the regulation of the activity of the cystic fibrosis chloride channel. *Nova Acta Leopoldina*, 89:165-169, 2004.

Altenberg, G.A. Structure of multidrug-resistance proteins of the ATP-binding cassette (ABC) superfamily. *Curr. Med. Chem. Anti-Canc. Agents*, 4:53-62, 2004.

Altenberg, G.A. The multidrug resistance protein P-glycoprotein and the regulation of chloride channels. *Leukemia Res.*, 29:983-984, 2005.

Kovacs, J.A., Baker, K.A., **Altenberg, G.A.**, Abagyan, R. and Yeager, M. Molecular modeling and mutagenesis of gap junction channels. *Prog. Biophys. Mol. Biol.*, 94:15-28, 2007.

Altenberg, G.A., Bao, X., Lee, S.C. and Reuss, L. Regulation of connexin 43 channels by

PKC-mediated phosphorylation, *Physiological Mini-Reviews* 3:35-40, 2008.

C. Abstracts (Since 2006)

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Retamal, M.A., Schalper, K., Shoji, K., Reuss, L., **Altenberg, G.**, Bennett, M.V.L., and Saez, J.C. How Metabolic Inhibition Increases Membrane Permeation Through Connexin Hemichannels. American Society for Cell Biology, San Diego, 2006.

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