





personal information

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education

Mar 1996 - Feb 2000 **Bachelor of Engineering** in Biological and Food Engineering
Handong University, South Korea
Aug - Dec 1998 Huntington College, Montgomery, AL, USA
Mar 2000 - Feb 2002 **Master in Biochemistry**
Gwangju Institute of Science and Technology, South Korea
Aug 2004 - Dec 2010 **Doctor of Philosophy in Computational and Molecular Biophysics**
Washington University in St. Louis, MO, USA

research experience

Mar 2000 - Jan 2002 **Graduate Research Fellow**
YJ Yoo research group, Gwangju Institute of Science and Technology, South Korea
Comparative proteome analysis of chick mesenchymal cells during chondrogenesis to identify new proteins relevant to the differentiation process
Feb 2002 - Jan 2004 **Research Assistant**
SS Cha research group, Pohang Accelerator, South Korea
Structure determination and functional annotation of hypothetical proteins of DJ-1/Pfpl family members
Jun 2006 - Dec 2010 **Graduate Research Fellow**
NA Baker research group, Washington University in St. Louis, MO, USA
Computational modeling of drug delivery vehicles with cell membranes
Jan 2011 - Jun 2015 **Postdoctoral Research Fellow**
Jul 2015 - Present **Staff Scientist**
CG Nichols research group, Washington University in St. Louis, MO, USA
Understanding of molecular mechanisms of lipid regulation of potassium ion channels

teaching experience

Mar - Jun 1999 **Teaching Assistant**
Department of Biology, Handong University, South Korea
Microbiology laboratory class
Sep - Dec 2005 **Teaching Assistant**
Department of Chemistry, Washington University in St. Louis, MO, USA
Advanced biochemistry class
Jun - Jul 2011 **Advising a high school student**
Sydney Sabino, a STAR Program participant from a local high school
May - Aug 2012, 2013 **Advising a undergraduate summer student**
Feb - Jul 2014 Jacob Goyre, a summer research student from University of Illinois Urbana-Champaign
currently, a graduate student in University of IOWA
Jul 2014 - Jun 2015 **Advising graduate students**
Elisa Murray, a graduate student of Biochemistry program during her rotation
Andrew Meiburg, a graduate student of Biophysics program

research contributions

Research Articles

1. [Lee SJ](#), Kim SJ, Kim, IK, Jeon CS, Kim GH, Park C, Kang SO, Suh PG, Lee HS and Cha SS. Crystal structures of human DJ-1 and *Escherichia coli* Hsp31, which share an evolutionarily conserved domain. *J. Biol. Chem.* (2003) **278** (45), 44552-44559
2. [Lee SJ](#), Kim JY, Jung HI, Suh PG, Lee HS, Lee SH and Cha SS. Crystallization and preliminary X-ray crystallographic analyses of CMY-1 and CMY-10, plasmidic class C beta-lactamases with extended substrate spectrum. *Acta Cryst.* (2004) **D60**, 382-384
3. [Lee SJ](#), Jeon HB, Lee JH, Yoo JS, Chun JS and Yoo YJ. Identification of proteins differentially expressed during chondrogenesis of mesenchymal cells. *FEBS Lett.* (2004) **563** (1), 35-40
4. Cho YR, [Lee SJ](#), Jeon HB, Park ZY, Chun JS and Yoo YJ. Under-sulfation by PAPS synthetase inhibition modulates the expression of ECM molecules during chondrogenesis. *Biochem. Biophys. Res. Co.* (2004) **323** (3), 769-775
5. [Lee SJ](#), Song Y and Baker NA. Molecular dynamics simulations of asymmetric NaCl and KCl solutions separated by phosphatidylcholine bilayers: potential drops and structural changes induced by strong Na⁺-lipid interactions and finite size effects. *Biophys. J.* (2008) **94** (9), 3565-3576
6. [Lee SJ](#), Olsen BN, Schlesinger PH and Baker NA. Characterization of perfluorooctylbromide-based nanoemulsion particles using atomistic molecular dynamics simulations. *J. Phys. Chem. B* (2010) **114** (31), 10086-10096.
7. [Lee SJ](#), Schlesinger PH, Wickline SA, Lanza GM, and Baker NA. Interaction of melittin peptides with perfluorocarbon nanoemulsion particles. *J. Phys. Chem. B* (2011) **115** (51), 15271-15279
8. Wang S, [Lee SJ](#), Heymann S, Enkvetchakul D and Nichols CG. Structural rearrangements underlying ligand-gating in Kir channels. *Nature Communications* (2012) **3**, 617
9. [Lee SJ](#), Schlesinger PH, Wickline SA, Lanza GM, and Baker NA. Simulation of fusion-mediated nanoemulsion interactions with model lipid bilayers. *Soft Matters* (2012) **8**, 7024-7035
10. D'Avanzo N, [Lee SJ](#), Cheng WWL, Nichols CG. Energetics and location of phosphoinositide binding in human Kir2.1. *J. Biol. Chem* (2013) **288**, 16726-16737
11. [Lee SJ](#), Wang S, Borschel W, Heyman S, Goyre J, Nichols CG. Unique anionic phospholipids binding site and gating mechanism in Kir2.1 inward rectifier channels. *Nature Communications* (2013) **4**, 2786
12. Zubcevic L, Wang S, Bavro V, [Lee SJ](#), Nichols CG, and Tucker S. Modular Design of Ion Selectivity in a Novel Family of Prokaryotic 'Inward-Rectifier' (NirBac) Channels". *Scientific Reports* (2015) **5**, 15305
13. Cooper P, Sala-Rabanal M, [Lee SJ](#), and Nichols CG. Differential Mechanisms of Cantu Syndrome-Associated Gain of Function Mutations in the ABCC9 (SUR2) subunit of the KATP channel. *J. Gen. Physiol.* (2015) **146** (6), 527-540
14. Lee SJ, Ren F, Heyman S, Yuan P, and Nichols CG. Structural basis of control of inward rectifier Kir2 channel gating by bulk anionic phospholipids. *J. Gen. Physiol.* (2016) **148**(6), 527-540

Invited Presentations

1. Lee SJ and Cha SS. The Crystal Structure of Hsp31. Macromolecular Crystallography Tutorial, Pohang Accelerator Laboratory, Pohang, South Korea. 2002. Talk
2. Lee SJ, Olsen BN, Schlesinger PH and Baker NA. Multi-scale modeling of nanoscale emulsions for cancer diagnosis and therapy. NBCR Summer Institute. La Jolla, CA, USA. 2009. Talk
3. Lee SJ, Olsen BN and Baker NA. Modeling a “contact-facilitated” delivery mechanism of PFOB-based nanoemulsions by molecular dynamics simulations. Gibbs Conference on Biothermodynamics. Carbondale, IL, USA. 2009. Talk
4. Lee SJ. Elucidating secondary anionic phospholipids binding site to exhibit synergistic effect. Gordon Research Conferences-Ion channels. South Hadley, MA, USA. 2012. Data Blitz
5. Lee SJ. Molecular mechanism of anionic phospholipid regulation of K_{ir} channels. BRIC webinar, South Korea. 2014. Online Talk
6. Lee SJ. Lipids beyond barriers: lipid regulation of potassium channels and target specific drug delivery. Sungkyunkwan University, South Korea. 2015. Talk
7. Lee SJ. Lipids beyond barriers: lipid regulation of potassium channels and target specific drug delivery. GIST, South Korea. 2015. Talk
8. Lee SJ. Lipids beyond barriers: lipid regulation of potassium channels and target specific drug delivery. Handing Global University, South Korea. 2015. Talk
9. Lee SJ. Membrane lipid regulation of potassium ion channels. University of Vienna, Austria. 2016. Talk

Contributed Presentations

1. Lee SJ, Oh CD, Jeon HB, Jeon JS and Yoo YJ. Down-regulation of cellular retinoic acid binding protein II during chondrogenesis of chick mesenchymal cells. The American Society of Biochemistry and Molecular Biology conference. Orlando, FL, USA. 2001. Poster
2. Lee SJ, Kim SJ, Lee HS and Cha SS. Crystal structures of human DJ-1 and Escherichia coli Hsp31 that share an evolutionarily conserved domain. Annual Meeting of the Korean Society for Molecular and Cellular Biology. Seoul, South Korea. 2003. Poster
3. Olsen BN, Lee SJ, Song Y and Baker NA. The effects of small amphipathic molecules on the electrical and mechanical properties of phosphatidylcholine bilayers. Gibbs Conference on Biothermodynamics. Carbondale, IL, USA. 2006. Poster
4. Lee SJ, Song Y and Baker NA. Molecular dynamics simulations of asymmetric monovalent ion solutions around model lipid bilayers. Annual Meeting of Biophysical Society, Baltimore, MA, USA. 2007. Poster
5. Lee SJ, Gitomer A, Schlesinger PH and Baker NA. Modeling of contact-facilitated delivery mechanism of PFOB-based nanoemulsions with melittin cargo. Annual Meeting of Korean Biochemistry and Molecular Cell Biology. Seoul, South Korea. 2009. Poster
6. Lee SJ, Olsen BN, Schlesinger PH and Baker NA. Multi-scale modeling of the “contact-facilitated” delivery mechanism of perfluorocarbon-based nanoemulsions. Annual Meeting of Biophysical Society. San Francisco, CA, USA. 2010. Poster
7. Lee SJ, D’Avanzo N, Nichols CG, and Huettner JE. Deciphering the lipid requirements for GluK2 activation. Annual Meeting of Biophysical Society. San Diego, CA, USA. 2011. Poster
8. Lee SJ, D’Avanzo N, Wang S. and Nichols CG. Elucidating Secondary Anionic Phospholipid Binding Site in Kir2.1 Channels. Gordon Conference. South Hadley, MA, USA. 2012. Poster
9. Lee SJ, D’Avanzo N, Wang S, Borschel W. and Nichols CG. Identification of the Regulatory Anionic Lipid Site in Kir Channels. Annual Meeting of Biophysical Society. Philadelphia, PA, USA. 2013. Poster
10. Lee SJ, Wang S, Borschel W, Gyore J, Heyman S, and Nichols CG. Unique anionic phospholipid binding site and gating mechanism in Kir2.1 inward rectifier channels. Membrane Protein Folding. Seoul, South Korea. 2013. Poster
11. Lee SJ, Wang S, Borschel W, Gyore J, Heyman S, and Nichols CG. Unique anionic phospholipid binding site and gating mechanism in Kir2.1 inward rectifier channels. Membrane Protein Folding. Annual Meeting of Biophysical Society. San Francisco, CA, USA. 2014. Poster
12. Lee SJ, Gyore J, Heyman S and Nichols CG. Tight control of Kir channel activity through the balance between PI(4,5)P₂ and other anionic phospholipids. Lipid MAPS. San Diego, CA, USA. 2014. Poster
13. Lee SJ, Gyore J, Heyman S and Nichols CG. Biphasic influence of bulk anionic phospholipids on PIP₂ gating of Kir2.1 channels. Annual Meeting of Biophysical Society. Baltimore, MA., USA. 2015. Poster

awards and scholarship

- Mar 1996 - Feb 1997 Merit-based full scholarship, Handong University, South Korea
- Mar - Jun 1997 Merit-based partial scholarship, Handong University, South Korea
- Aug - Dec 1998 Merit-based partial scholarship, Handong University, South Korea
- Mar 2001 - Feb 2002 Full scholarship, Gwangju Institute of Science and Technology, South Korea
- Oct 2008 Poster award, Biophysics program retreat, Washington University in St. Louis, MO, USA.
- Jan 2013 - Dec 2014 **Postdoctoral fellowship from American Heart Association**
- Oct 2013 Poster award, Biophysics program retreat, Washington University in St. Louis, MO, USA.
- Jan - Dec 2015 **Postdoctoral fellowship from American Heart Association**

professional activities

- Nov 2009 - Present Member of the Biophysical Society
- Oct 2011 - Present Member of the Korean-American Scientist and Engineering Association
- Jul 2013 - Present Member of the American Heart Association
- May 2013 - Apr 2014 **Organizer of an interdisciplinary seminar series**
Membrane Protein Club, Washington University in St. Louis, MO, USA.