CURRICULUM VITAE

Sangwon Lee, PhD

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Contact Information:

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School: Yale School of Medicine

Education:

03/1990 - 06/1996	BS, Konkuk University, Chemistry, Seoul, Seoul
06/1996 - 06/1998	MS, Konkuk University, Chemistry, Seoul, Seoul
09/2000 - 06/2007	PhD, University of California, San Diego, Chemistry and Biochemistry, San Diego, CA

Career/Academic Appointments:

09/2007 - 08/2012	Postdoctoral Associate, Pharmacology, Yale School of Medicine, New Haven, CT
09/2012 - 07/2018	Associate Research Scientist, Pharmacology, Yale School of Medicine, New Haven, CT
07/2018 - 06/2026	Assistant Professor, Pharmacology, Yale School of Medicine, New Haven, CT

Grants/Clinical Trials History:

Current Grants

Agency:	NIH/NCI
I.D.#:	R01CA258867
Title:	Therapeutic targeting of FGF19-driven cancers with FGF21 variants
P.I.:	Sangwon Lee
Role:	PI
Percent effort:	50%
Total costs:	$1,915,780.00
Project period:	07/15/2022 - 06/30/2027

Invited Speaking Engagements, Presentations & Workshops Not Affiliated With Yale:

International/National

1. "Structures of ligand occupied β-klotho complexes reveal molecular mechanism underlying endocrine FGF specificity and activity". The 19th KIAS Conference on Protein Structure and Function, Seoul, Seoul, South Korea, September 2019. (Oral Presentation)

Peer-Reviewed Presentations Given at Meetings Not Affiliated With Yale:

International/National

1. **Lee S**. Molecular Mechanism of Endocrine FGF Activation and Cell Signaling. EMBO Metabolic disorders and liver cancer, PM, IB, Spain, April 2017. (Poster Presentation)
2. **Lee S**. Structural Basis of Endocrine FGF Recognition by β-Klotho. 3rd Fibroblast Growth Factors in Development and Repair Conference, Nassau, New Providence, Bahamas, February 2019. (Oral Presentation)
3. **Lee S**. Structural Basis of Endocrine FGF Recognition by β-Klotho. 63rd Annual Meeting of the Biophysical Society, Baltimore, MD, March 2019. (Poster Presentation)
4. **Lee S**. A de novo-designed mini-protein can inhibit FGFR signaling in an isoform-specific manner. 67th Annual Meeting of the Biophysical Society, San Diego, CA, February 2023. (Poster Presentation)
5. **Lee S**. Isoform-specific Inhibition of FGFR Signaling by a de novo-designed Mini-protein. FASEB SRC The Protein Phosphorylation Conference, Steamboat Springs, CO, June 2023. (Oral Presentation)

Patents:

Issued

1. **Lee Sangwon**, Schlessinger Joseph. 2022. Mutant FGF21 polypeptide compositions. United States US11365228B2, filed July 05, 2018, and issued June 21, 2022.
2. **Lee Sangwon**, Schlessinger Joseph, Diego Alvarado. 2020. Anti-ErbB antibodies and methods of use thereof . United States US10745490B2, filed April 10, 2015, and issued August 18, 2020.

Bibliography:

Peer-Reviewed Original Research

1. Jhon G, Park S, Han S, **Lee S**, Kim Y, Chang Y. Studies of the Chemical Structure of Gangliosides in Deer Antler, Cervus nippon Chemical And Pharmaceutical Bulletin 1999, 47: 123. PMID: 9987834, DOI: 10.1248/cpb.47.123.
2. **Lee S**, Suh Y, Kim S, Kim Y. Comparison of the Structures of β Amyloid Peptide (25–35) and Substance P in Trifluoroethanol/Water Solution Journal Of Biomolecular Structure And Dynamics 1999, 17: 381-391. PMID: 10563586, DOI: 10.1080/07391102.1999.10508369.
3. **Lee S**, Kim Y. Solution structure of neuromedin B by 1H nuclear magnetic resonance spectroscopy FEBS Letters 1999, 460: 263-269. PMID: 10544247, DOI: 10.1016/s0014-5793(99)01346-0.
4. Kim HS, Park CH, Cha SH, Lee JH, **Lee S**, Kim Y, Rah JC, Jeong SJ, Suh YH. Carboxyl-terminal fragment of Alzheimer's APP destabilizes calcium homeostasis and renders neuronal cells vulnerable to

excitotoxicity. FASEB Journal : Official Publication Of The Federation Of American Societies For Experimental Biology 2000, 14: 1508-17. PMID: 10928985, DOI: 10.1096/fj.14.11.1508.

5. Kim H, Park C, Cha S, Lee J, **Lee S**, Kim Y, Rah J, Jeong S, Suh Y. Carboxyl-terminal fragment of Alzheimer's APP destabilizes calcium homeostasis and renders neuronal cells vulnerable to excitotoxicity The FASEB Journal 2000, 14: 1508-1517. DOI: 10.1096/fj.99-0809com.
6. Oh D, Shin S, **Lee S**, Kang J, Kim S, Ryu P, Hahm K, Kim Y. Role of the Hinge Region and the Tryptophan Residue in the Synthetic Antimicrobial Peptides, Cecropin A(1−8)−Magainin 2(1−12) and Its Analogues, on Their Antibiotic Activities and Structures † , ‡ Biochemistry 2000, 39: 11855-11864. PMID: 11009597, DOI: 10.1021/bi000453g.
7. Lee K, **Lee S**, Kim Y, Park NG. Structures of neuropeptide γ from goldfish and mammalian neuropeptide γ, as determined by 1H NMR spectroscopy Chemical Biology Drug Design 2003, 61: 274-285. PMID: 12662361, DOI: 10.1034/j.1399-3011.2003.00058.x.
8. Mesleh MF, **Lee S**, Veglia G, Thiriot DS, Marassi FM, Opella SJ. Dipolar Waves Map the Structure and Topology of Helices in Membrane Proteins Journal Of The American Chemical Society 2003, 125: 8928-8935. PMID: 12862490, PMCID: PMC3272074, DOI: 10.1021/ja034211q.
9. **Lee S**, Mesleh MF, Opella SJ. Structure and dynamics of a membrane protein in micelles from three solution NMR experiments Journal Of Biomolecular NMR 2003, 26: 327-334. PMID: 12815259, DOI: 10.1023/a:1024047805043.
10. Kochendoerfer G, Jones D, **Lee S**, Oblatt-Montal M, Opella S, Montal M. Functional Characterization and NMR Spectroscopy on Full-Length Vpu from HIV-1 Prepared by Total Chemical Synthesis Journal Of The American Chemical Society 2004, 126: 2439-2446. PMID: 14982452, DOI: 10.1021/ja038985i.
11. Page RC, Moore JD, Nguyen HB, Sharma M, Chase R, Gao FP, Mobley CK, Sanders CR, Ma L, Sönnichsen FD, **Lee S**, Howell SC, Opella SJ, Cross TA. Comprehensive evaluation of solution nuclear magnetic resonance spectroscopy sample preparation for helical integral membrane proteins Journal Of Structural And Functional Genomics 2006, 7: 51-64. PMID: 16850177, DOI: 10.1007/s10969-006-9009-9.
12. **Lee S**, Howell SB, Opella SJ. NMR and mutagenesis of human copper transporter 1 (hCtr1) show that Cys-189 is required for correct folding and dimerization Biochimica Et Biophysica Acta 2007, 1768: 3127-3134. PMID: 17959139, PMCID: PMC2275670, DOI: 10.1016/j.bbamem.2007.08.037.
13. Page RC, **Lee S**, Moore JD, Opella SJ, Cross TA. Backbone structure of a small helical integral membrane protein: A unique structural characterization Protein Science 2008, 18: 134-146. PMID: 19177358, PMCID: PMC2708045, DOI: 10.1002/pro.24.
14. **Lee S**, Xue Y, Hu J, Wang Y, Liu X, Demeler B, Ha Y. The E2 Domains of APP and APLP1 Share a Conserved Mode of Dimerization Biochemistry 2011, 50: 5453-5464. PMID: 21574595, PMCID: PMC3120129, DOI: 10.1021/bi101846x.
15. Xue Y, **Lee S**, Wang Y, Ha Y. Crystal Structure of the E2 Domain of Amyloid Precursor Protein-like Protein 1 in Complex with Sucrose Octasulfate* Journal Of Biological Chemistry 2011, 286: 29748-29757. PMID: 21715329, PMCID: PMC3191016, DOI: 10.1074/jbc.m111.219659.
16. Hu J, Xue Y, **Lee S**, Ha Y. The crystal structure of GXGD membrane protease FlaK Nature 2011, 475: 528-531. PMID: 21765428, PMCID: PMC3894692, DOI: 10.1038/nature10218.
17. Xue Y, **Lee S**, Ha Y. Crystal structure of amyloid precursor-like protein 1 and heparin complex suggests a dual role of heparin in E2 dimerization Proceedings Of The National Academy Of

Sciences Of The United States Of America 2011, 108: 16229-16234. PMID: 21930949, PMCID: PMC3182750, DOI: 10.1073/pnas.1103407108.

18. Perry RJ, **Lee S**, Ma L, Zhang D, Schlessinger J, Shulman GI. FGF1 and FGF19 reverse diabetes by suppression of the hypothalamic–pituitary–adrenal axis Nature Communications 2015, 6: 6980. PMID: 25916467, PMCID: PMC4413509, DOI: 10.1038/ncomms7980.
19. **Lee S**, Greenlee EB, Amick JR, Ligon GF, Lillquist JS, Natoli EJ, Hadari Y, Alvarado D, Schlessinger J. Inhibition of ErbB3 by a monoclonal antibody that locks the extracellular domain in an inactive configuration Proceedings Of The National Academy Of Sciences Of The United States Of America 2015, 112: 13225-13230. PMID: 26460020, PMCID: PMC4629334, DOI: 10.1073/pnas.1518361112.
20. Wang Y, **Lee S**, Ha Y, Lam W, Chen SR, Dutschman GE, Gullen EA, Grill SP, Cheng Y, Fürstner A, Francis S, Baker DC, Yang X, Lee KH, Cheng YC. Tylophorine Analogs Allosterically Regulates Heat Shock Cognate Protein 70 And Inhibits Hepatitis C Virus Replication Scientific Reports 2017, 7: 10037. PMID: 28855547, PMCID: PMC5577180, DOI: 10.1038/s41598-017-08815-z.
21. **Lee S**, Choi J, Mohanty J, Sousa LP, Tome F, Pardon E, Steyaert J, Lemmon MA, Lax I, Schlessinger J. Structures of β-klotho reveal a 'zip code'-like mechanism for endocrine FGF signalling Nature 2018, 553: 501-505. PMID: 29342135, PMCID: PMC6594174, DOI: 10.1038/nature25010.
22. Kuzina ES, Ung PM, Mohanty J, Tome F, Choi J, Pardon E, Steyaert J, Lax I, Schlessinger A, Schlessinger J, **Lee S**. Structures of ligand-occupied β-Klotho complexes reveal a molecular mechanism underlying endocrine FGF specificity and activity Proceedings Of The National Academy Of Sciences Of The United States Of America 2019, 116: 7819-7824. PMID: 30944224, PMCID: PMC6475419, DOI: 10.1073/pnas.1822055116.
23. Suzuki Y, Kuzina E, An SJ, Tome F, Mohanty J, Li W, **Lee S**, Liu Y, Lax I, Schlessinger J. FGF23 contains two distinct high-affinity binding sites enabling bivalent interactions with α-Klotho Proceedings Of The National Academy Of Sciences Of The United States Of America 2020, 117: 31800-31807. PMID: 33257569, PMCID: PMC7749347, DOI: 10.1073/pnas.2018554117.
24. Cao L, Coventry B, Goreshnik I, Huang B, Sheffler W, Park JS, Jude KM, Marković I, Kadam RU, Verschueren KHG, Verstraete K, Walsh STR, Bennett N, Phal A, Yang A, Kozodoy L, DeWitt M, Picton L, Miller L, Strauch EM, DeBouver ND, Pires A, Bera AK, Halabiya S, Hammerson B, Yang W, Bernard S, Stewart L, Wilson IA, Ruohola-Baker H, Schlessinger J, Lee S, Savvides SN, Garcia KC, Baker D. Design of protein-binding proteins from the target structure alone Nature 2022, 605: 551-560. PMID: 35332283, PMCID: PMC9117152, DOI: 10.1038/s41586-022-04654-9.
25. Park JS, Choi J, Cao L, Mohanty J, Suzuki Y, Park A, Baker D, Schlessinger J, **Lee S**. Isoform-specific inhibition of FGFR signaling achieved by a de-novo-designed mini-protein Cell Reports 2022, 41: 111545. PMID: 36288716, PMCID: PMC9636537, DOI: 10.1016/j.celrep.2022.111545.
26. Krimmer S, Bertoletti N, Suzuki Y, Katic L, Mohanty J, Shu S, **Lee S**, Lax I, Mi W, Schlessinger J. Cryo-EM analyses of KIT and oncogenic mutants reveal structural oncogenic plasticity and a target for therapeutic intervention Proceedings Of The National Academy Of Sciences Of The United States Of America 2023, 120: e2300054120. PMID: 36943885, PMCID: PMC10068818, DOI: 10.1073/pnas.2300054120.

Chapters

1. Opella S, Park S, **Lee S**, Jones D, Nevzorov A, Mesleh M, Mrse A, Marassi F, Oblatt-Montal M, Montal M, Strebel K, Bour S. Structure and Function of Vpu from HIV-1 2005, 1: 147-163. DOI: 10.1007/0-387-28146-0_11.