

Curriculum Vitae

Baeck-Seung Lee, Ph.D.

CTO and VP at CancerROP and MJCELLBIO

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Education

- Post-doc., Immunology/Pathology, Washington University in St Louis, 2008 - 2014.
- Ph.D., Molecular Biology, University of Texas at Austin, 2007
Dissertation: *Functional Characterization of the B-cell Lymphoma/Leukemia 11A (BCL11A) Transcription Factor*
- M.S., Genetic Engineering, Korea University, Seoul, Korea, 1997
Dissertation: *Cloning and Sequencing of cDNA Encoding Antibacterial peptides from a Korean Frog*
- B.S., Genetic Engineering, Korea University, Seoul, Korea, 1995

Experience

- CTO, 2019-present
CancerROP and MJCELLBIO
Tasks
; Chimeric antigen receptor (CAR)-T cell development against a pancreatic cancer using Lentivirus, AAV, and genome editing.
; Precision medicine for cancer and microbiome using molecular analysis
Role: develop overall technologies, make collaboration with other parties and establish business plans
- Research Scientist, 2014-2019
Bluebirdbio.com (Seattle, and Boston)
Project: Genome editing with ZFN, CRISPR and megaTAL and CAR-T cell engineering with AAV and LV
Role: Test refined megaTAL nucleases for cleavage activity and homology directed repair (HDR) in collaboration with protein engineering teams. Design new AAV donors and develop strategies for higher HDR. Collaborate with virus and RNA production teams to enhance mRNA quality and viral titers. Develop the inducible gene expression system in CAR-T cells and transfer it to another team.
- Post-doc and Staff Scientist, 2008 – 2014
Washington University in St Louis

Project: DNA repair during V(D)J recombination, Genome editing to make an inducible double strand DNA cleavage/repair system, Double strand DNA damage response, and Immunology for B cell development

Role: Develop research ideals and carry out experiments. Supervise and guide graduate students and lab technicians.

- Teaching Assistant, 2007, 2004
University of Texas at Austin (Course: General Microbiology Lab)
- Teaching Assistant, 2003
University of Texas at Austin (Course: Molecules to Organisms)
- Research Scientist, 1999
Clinical Research Center at Seoul National University in Korea
Project: Development of Bio-Artificial Liver Using Pig Hepatocytes
Role: Construct in-house the Bio-Artificial Liver based on previous publications.
Coordinate the whole processes from cell isolation, construction and running of the unit, operation, and lab assays.
- Research Scientist, 1998
Cell Death Research Center at Korea University in Korea
Project: Study kinase and caspase activation during apoptosis

Publication

1. Lim J, Jeon S, Shin HY, Kim MJ, Seong YM, Lee WJ, Choe KW, Kang YM, **Lee B**, Park SJ.
Case of the Index Patient Who Caused Tertiary Transmission of Coronavirus Disease 2019 in Korea: the Application of Lopinavir/Ritonavir for the Treatment of COVID 19 Pneumonia Monitored by Quantitative RT-PCR. J Korean Med Sci. 2020 Feb 17;35(6):e79
2. Malika Hale, **Baeckseung Lee**, Yuchi Honaker, Wai-Hang Leung, Alexandra E. Grier, Holly M. Jacobs, Karen Sommer, Jaya Sahni, Shaun W. Jackson, Andrew M. Scharenberg, Alexander Astrakhan, and David J. Rawlings. **Homology-Directed Recombination for Enhanced Engineering of Chimeric Antigen Receptor T Cells.** Molecular Therapy. 2017 Mar. Vol. 4
3. Dorsett Y, Zhou Y, Tubbs AT, Chen BR, Purman C, **Lee BS**, George R, Bredemeyer AL, Zhao JY, Sodergeren E, Weinstock GM, Han ND, Reyes A, Oltz EM, Dorsett D, Misulovin Z, Payton JE, Sleckman BP. **HCoDES reveals chromosomal DNA end structures with single-nucleotide resolution.** Mol Cell. 2014 Dec 18;56(6):808-18.
4. Tubbs AT, Dorsett Y, Chan E, Helmink B, **Lee BS**, Hung P, George R, Bredemeyer AL, Mittal A, Pappu RV, Chowdhury D, Mosammaparast N, Krangel MS, Sleckman BP. **KAP-1 promotes resection of broken DNA ends not protected by γ -H2AX and 53BP1 in G₁-phase lymphocytes.** Mol Cell Biol. 2014 Aug;34(15):2811-21.
5. Ippolito GC, Dekker JD, Wang YH, Lee BK, Shaffer AL 3rd, Lin J, Wall JK, **Lee BS**, Staudt LM, Liu YJ, Iyer VR, Tucker HO. **Dendritic cell fate is determined by BCL11A.** Proc Natl Acad Sci U S A. 2014 Mar 18;111(11).
6. Um JH, Brown AL, Singh SK, Chen Y, Gucek M, **Lee BS**, Luckey MA, Kim MK, Park JH, Sleckman BP, Gellert M, Chung JH. **Metabolic sensor AMPK directly phosphorylates RAG1 protein and regulates V(D)J recombination.** Proc Natl Acad Sci U S A. 2013 Jun 11;110(24):9873-8.
7. **Baeck-Seung Lee**, Eric J. Gapud, Shichuan Zhang, Yair Dorsett, Andrea Bredemeyer, Rosmy George, Elsa Callen, Jeremy A. Daniel, Oleg Osipovich, Eugene M. Oltz, Craig H. Bassing, Andere Nussenzweig, Susan Lees-Miller, Michal Hammel, Benjamin P.C. Chen and Barry P. Sleckman. **Functional Intersection of ATM and DNA-PKcs Kinase Activities During V(D)J Recombination.** Mol Cell Biol. 2013 Sep;33(18):3568-79.
8. **Baeck-Seung Lee**, Joseph Dekker, Bum-Kyu Lee, Vishwanath Iyer, Barry Sleckman, Arthur Shaffer, Gregory Ippolito, and Philip Tucker. **BCL11A Is a Critical Component of a Transcriptional Network That Activates RAG Expression and V(D)J Recombination.** Mol Cell Biol. 2017 Dec 13;38(1). pii: e00362-17.
9. Natalie C. Steinel*, **Baeck-Seung Lee***, Anthony T. Tubbs, Jeffrey J. Bednarski, Emily Schulte, Katherine S. Yang-Iott, David G. Schatz, Barry P. Sleckman, and Craig H. Bassing (* equally contributed). **The Ataxia Telangiectasia Mutated Kinase Controls Ig κ Allelic Exclusion by Inhibiting Secondary V κ -to-J κ Rearrangement.** J Exp Med. Jan 2013.

10. Gapud EJ*, **Lee BS***, Mahowald GK, Bassing CH, Sleckman BP (* equally contributed). **Repair of chromosomal RAG-mediated DNA breaks by mutant RAG proteins lacking phosphatidylinositol 3-like kinase consensus phosphorylation sites.** *J Immunol.* 2011 Aug 15;187:1826.
11. Jeremy A. Daniel, Manuela Pellegrini, **Baeck-Seung Lee**, Zhi Guo, Darius Filsuf, Natalya V. Belkina, Zhongsheng You, Tanya T. Paull, Barry P. Sleckman, Lionel Feigenbaum and André Nussenzweig. **Loss of ATM kinase activity leads to embryonic lethality in mice.** *J Cell Biol.* 2012 Aug6;198:295.
12. Yin B, **Lee BS**, Yang-Iott KS, Sleckman BP, Bassing CH. **Redundant and nonredundant functions of ATM and H2AX in $\alpha\beta$ T-lineage lymphocytes.** *J Immunol.* 2012 Aug 1:189:1372.
13. Helmink BA, Bredemeyer AL, **Lee BS**, Huang CY, Sharma GG, Walker LM, Bednarski JJ, Lee WL, Pandita TK, Bassing CH, Sleckman BP. **MRN complex function in the repair of chromosomal Rag-mediated DNA double-strand breaks.** *J Exp. Med.* 2009 Mar 16;206:669.
14. Liu H, Ippolito GC, Wall JK, Niu T, Probst L, **Lee BS**, Pulford K, Banham AH, Stockwin L, Shaffer AL, Staudt LM, Das C, Dyer MJ, Tucker PW. **Functional studies of BCL11A: characterization of the conserved BCL11A-XL splice variant and its interaction with BCL6 in nuclear paraspeckles of germinal center B cells.** *Mol Cancer.* 2006 May 16;5:18.

Patent

1. Main inventor of novel AAV designs for homology directed repair
2. Co-inventor of several megaTAL nucleases used for genome editing
3. Main main inventor of human anti-ANTXR chimeric antigen receptor and use