Hsiang-Ying (Sherry) Lee

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SUMMARY

Accomplished biologist with expertise in molecular cell biology and biological engineering. Proven success in discovering small molecules to treat anemia including erythropoietin (EPO) unresponsive anemia and several types of anemia from congenital bone marrow failures. Skilled in small molecule screening, genome editing in mammalian cell lines, primary cells and animals, RNAi, chromatin immunoprecipitation (ChIP), Next-Generation Sequencing and data analysis, single-cell sequencing, fluorescence imaging, qPCR, molecular cloning including engineering lentiviral vectors, protein expression and purification, ELISA, cell culture including mammalian cell lines and hematopoietic stem/progenitor cells such as mobilized CD34+ cells, erythroid progenitors including BFU-Es and CFU-Es, FACS, cell cycle analysis, mouse handling techniques including dosing drugs through multiple routes.

EDUCATION

Ph.D. in Biomolecular Chemistry, 2005-2011
University of Wisconsin-Madison, Madison, WI.
Dissertation title: GATA Factor Mechanisms in Hematopoiesis

M.A. in Medical Sciences, 2003-2005
Boston University, Boston, MA.

B.Sc. in Medical Technology, 1999-2003
National Cheng Kung University, Tainan, Taiwan.

PROFESSIONAL EXPERIENCES

Postdoctoral Associate, (cell biology), Dr. Harvey F. Lodish's laboratory,
Whitehead Institute for Biomedical Research and *Massachusetts Institute of Technology*, 2011-present.

Project 1: Develop therapeutic strategies using small molecules to treat anemias.
- Screened a small molecule library of ligands targeting nuclear receptors using primary mouse and human erythroid cell culture.
- Tested the small compounds in anemic mouse models.
- Addressed underlying mechanisms of the therapeutic effects.

Project 2: Establish a platform technology to generate genetically engineered red blood cells for diagnostic and therapeutic purposes.
- Developed an *ex vivo* culture system to produce a large number of human red blood cells which are suitable for transfusion.
- Genetically engineered red blood cells to express target proteins for clinical applications.

Graduate Research Assistant, (biomolecular chemistry), Dr. Emery H. Bresnick's laboratory, *University of Wisconsin-Madison*, Madison, WI, 2005-2011.

Project: Molecular mechanisms governing master regulator GATA-1 during hematopoiesis
- Elucidated how sumoylation of GATA-1 differentially modulates transcription of its target genes.
- Investigated molecular determinants controlling subnuclear localization of GATA-1 target genes.

OTHER PROFESSIONAL EXPERIENCE

Consultant, (biotechnology), *VL26, Rubius Therapeutics*, Cambridge, MA, 2014-2015.

HONORS AND AWARDS

- Whitehead Institute Postdoctoral Association Educational Award, 2014.
- American Heart Association Predoctoral Fellowship, 2009-2010.
- Biomolecular Chemistry Department Travel Awards, UW-Madison, WI, 2010.
- Biomolecular Chemistry Department Travel Awards, UW-Madison, WI, 2008.
- Award for 2003 Medical Technology Graduates with Outstanding Academic Achievement, The Association of Laboratory Medicine, Taiwan, R.O.C., 2003.
- Award for Outstanding Academic Performance on the Clinical Serology and Immunology, Becton Dickinson and Company, Taiwan Branch, 2003.

CERTIFICATES

- American Society for Cell Biology "Managing Science in Biotech Industry" course (class of 40 people selected from 532 applicants worldwide), 2014.
- Certificate of Medical Technologist (NO. 013128), issued by the Department of Health, the Executive Yuan, Taiwan, R.O.C., 2003.

PUBLICATIONS

Research Papers

1. Gao, X.*, **Lee, H.Y.***, Barrasa, M.I., and Lodish, H.F. Targeting thyroid hormone receptor β to treat anemia. (In Preparation) (* These authors contributed equally.)
2. **Lee, H.Y.***, Gao, X.*, Barrasa, M.I., Li, H., Elmes, R.R., Peters, L.L. and Lodish, H.F. (2015) PPARα and glucocorticoid receptor synergize to promote erythroid progenitor self-renewal. *Nature* (Accepted)
3. **Lee, H.Y.**, Johnson, K.D., Boyer, M. E. and Bresnick, E. H. (2011) Relocalizing genetic loci into specific subnuclear neighborhoods. *Journal of Biological Chemistry*. 286, 18834-18844.
4. Fujiwara, T.*, **Lee, H.Y.***, Sanalkumar, R.* and Bresnick, E. H. (2010) Building multifunctionality into a complex containing master regulators of hematopoiesis. *Proceedings of the National Academy of Sciences USA*. 107, 20429-34.
5. **Lee, H.Y.**, Johnson, K. D., Fujiwara, T., Boyer, M. E., Kim, S.-I. and Bresnick, E. H. (2009) Controlling hematopoiesis through sumoylation-dependent regulation of a GATA factor. *Molecular Cell*. 36, 984-995.

6. Di Bacco, A., Ouyang, J., **Lee, H.Y.**, Catic, A., Ploegh, H. and Gill, G. (2006) The SUMO-specific protease SENP5 is required for cell division. *Molecular and Cellular Biology.* 26, 4489-4498.

Review Papers

1. Bresnick, E.H., **Lee, H.Y.**, Fujuwara, T., Johnson, K.D. and Keles, S. (2010) GATA switches as developmental drivers. *Journal of Biological Chemistry*. 285, 31087-93.

2. Bresnick, E.H., Katsumura, K.R., **Lee, H.Y.**, Johnson, K.D. and Perkins, A.S. (2012) Master regulatory GATA transcription factors: Mechanistic principles and emerging links to hematologic malignancies. *Nucleic Acids Research*. 13, 5819-31.

PATENT

IN VITRO PRODUCTION OF RED BLOOD CELLS WITH SORTAGGABLE PROTEINS (No. PCT/US2014/037554, Attorney Docket No. W0571.70039WO00)

Inventors: Harvey F. Lodish, Hidde L. Ploegh, **Hsiang-Ying Lee**, Jiahai Shi, Lenka Kundrat.

PROFESSIONAL COMMUNITY SERVICE

- Project manager, Emerging Information and Technology Association (EITA)- Young Investigator Conference, Cambridge, MA, 2015.
- Co-chair, Boston Taiwanese Biotechnology Association (BTBA) Symposium, Cambridge, MA, 2015.
- Panelist, American Society for Cell Biology "Managing Science in the Biotech Industry" mini-course, Philadelphia, PA, 2014.
- Workshop Co-chair, EITA- Young Investigator Conference, Cambridge, MA, 2014.
- Organizing committee, MIT Independent Activities Period (IAP) events, 2013.
- Board of Director, Monte Jade New England Science and Technology Association, 2013-present.