

KangAe Lee, Ph.D

Princeton University

Departments of Chemical & Biological Engineering and Molecular Biology

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EDUCATION

- 2002 – 2007 Ph.D Cell and Molecular Biology, Michigan State University
Mentor: John J. LaPres, Ph.D
Dissertation: The role of hypoxia signaling in tumorigenesis
- 1998 – 2000 M.Sc Life Science and Biotechnology, Korea University, Seoul, Korea
Mentor: Zin-Soo Kim, Ph.D
Dissertation: RAPD variation of natural population in *Pinus koreanasis*
- 1994 – 1997 B.Sc Life Science and Biotechnology, Korea University, Seoul, Korea

RESEARCH EXPERIENCE

- 2009 – present **Postdoctoral Research Associate**, Laboratory of Celeste M. Nelson, Ph.D
Departments of Molecular Biology and Chemical & Biological Engineering
Princeton University, NJ
- Epithelial-mesenchymal transition during epithelial tissue morphogenesis and invasion
 - Regulation of epithelial-mesenchymal transition by mechanical signals from the microenvironment
 - The effects of interstitial pressure on tumor invasion and metastatic progression
- 2007 – 2009 **Postdoctoral Fellow**, Laboratory of Gregg L. Semenza, MD/Ph.D
Vascular Program in Institute for Cell Engineering and McKusick–Nathans
Institute of Genetic Medicine, Johns Hopkins University, Baltimore, MD
- Evaluate inhibitors of hypoxia-inducible factor (HIF) as anticancer agents
 - The effect of HIF1-activated bone marrow angoigenic cells on limb ischemia
- 2003 – 2007 **Graduate Research Assistant**, Laboratory of John J. LaPres, Ph.D
Cell & Molecular Biology Program and Department of Biochemistry and
Molecular Biology, Michigan State University, MI
- The hypoxia signaling pathways and tumorigenesis
 - Proteomic anaysis of aryl hydrocarbon receptor (AhR) interacting proteins
- 2000 – 2002 **Research Scientist**, Laboratory of Sang-Chul Park, Ph.D
Cancer Research Institute, Seoul National University Hospital, Seoul, Korea
- Aging-related apoptotic response and MAPKs signaling to genotoxic stress
- 1998 – 2000 **Graduate Research Assistant**, Laboratory of Zin-Soo Kim, Ph.D
Division of Life Science and Biotechnology, Korea University, Seoul, Korea
- The genomic variation of natural population in *Pinus koreanasis*
- 1997 –1998 **Research Scientist**, Laboratory of Yong-pyo Hong, Ph.D
Division of Molecular Genetics Agriculture Research Institute Suwon, Korea
- The genomic variation of *Gingko biloba*

TEACHING EXPERIENCE

- 09/2004 – 12/2004 Graduate Teaching Assistant, Experiment in Molecular Biology
Michigan State University
- 08/1999 – 12/1999 Instructor, Statistics in Biology, Korea University
- 08/1999 – 12/1999 Graduate Teaching Assistant, Molecular Population Genetics, Korea University
- 08/1998 – 12/1998 Graduate Teaching Assistant, Molecular Population Genetics, Korea University

AWARDS AND HONORS

- 2008 – 2009 Foundations for Advanced Research in the Medical Sciences Research Fellowship Award
- 2007 Dissertation Completion Fellowship, Michigan State University, MI
- 2002 – 2003 Research Fellowship, Van Andel Research Institute, MI
- 1994 – 1997 Academic Scholarships, Korea University, Seoul, Korea

INVENTIONS AND PATENTS

1. Report of Invention (JHU Ref # C10515): Identification of a class of drugs that blocks tumor growth by blocking the binding of HIF-1 to DNA and method of use. 2008
2. Report of Invention (JHU Ref # 10600): Screen for inhibitors of HIF-1 dimerization. 2009

PUBLICATIONS

18. **KangAe Lee**, Qike K. Chen, Cecillia Lui, Esther W. Gomez, Derek C. Radisky and Celeste M. Nelson. (2011) Matrix compliance regulates epithelial-mesenchymal transition. (in preparation)
17. **KangAe Lee** and Celeste M. Nelson. (2011) New insight into the regulation of epithelial-mesenchymal transition and fibrogenesis. *Int. Rev. Cell Mol. Bio.* (in preparation)
16. **KangAe Lee**, Nikolce Gjorevski, Eline Boghaert, Derek C. Radisky, and Celeste M. Nelson. (2011) Snail, Slug, and E47 mammary epithelial branching morphogenesis. *Embo J.* (in revision)
15. Dorothy M. Tappenden, Scott G. Lynn, Robert B. Crawford, **KangAe Lee**, Ajith Vengellur, Norbert E. Kaminski, Russell S. Thomas, John J. LaPres. (2011) The Aryl Hydrocarbon Receptor interacts with ATP5 α 1, a subunit of the ATP synthase complex, and modulates mitochondrial function. *Toxicol. Appl. Pharm.* (in press)
14. Yongli Guan, Kavitha Ramasamy Reddy, Qiqing Zhu, Yifei Li, **KangAe Lee**, Priya Weerasinghe, Josef Prchal, Gregg L. Semenza, and Naijie Jing. (2010) G-rich oligonucleotides inhibit HIF-1 α and HIF-2 α and block tumor growth. *Mol. Ther.* 18(1):188-197
13. Sergio Rey, **KangAe Lee**, Joanne C. Wang, Kshitiz Gupta, Shaoping Chen, Alexandra McMillan, Nupura Bhise, Andre Levchenko, and Gregg L. Semenza. (2009) Synergistic effect of HIF-1 α gene therapy and HIF-1-activated bone marrow angiogenic cells in a mouse model of limb ischemia. *Proc. Natl. Acad. Sci. U.S.A.* 106 (48); 20399-20404
12. **KangAe Lee**, Huafeng Zhang, David Z. Qian, Sergio Rey, Jun O. Lui, and Gregg L. Semenza.

- (2009) Acriflavine inhibits HIF-1 dimerization, tumor growth, and vascularization. *Proc. Natl. Acad. Sci. U.S.A.* 106 (42); 17910-17915
11. **KangAe Lee**, David Z. Qian, Sergio Rey, Hong Wei, Jun O. Liu, and Gregg L. Semenza. (2009) Anthracycline chemotherapy inhibits HIF-1 transcriptional activity and tumor-induced mobilization of bone marrow-derived cells. *Proc. Natl. Acad. Sci. U.S.A.* 106(7);2353-2358
 10. **KangAe Lee**, Jeremy D. Lynd, Sandra O'Reilly, Matti Kiupel, J. Justin McCormick, and John J. LaPres. (2008) The biphasic role of the Hypoxia-Inducible Factor Prolyl-4-Hydroxylase, PHD2, in modulating tumor-forming potential. *Mol. Cancer Res.* 6(5);829-842
 9. Huafeng Zhang, David Z. Qian, Yee Sun Tan, **KangAe Lee**, Ping Gao, Yunzhao R. Ren, Sergio Rey, Hans Hammers, Daniel Chang, Roberto Pili, Chi V. Dang, Jun O. Liu, and Gregg L. Semenza. (2008) Digoxin and other cardiac glycosides inhibit HIF-1 α synthesis and block tumor growth. *Proc. Natl. Acad. Sci. U.S.A.* 105(50);19579-19586.
 8. **KangAe Lee**, Robert A. Roth and John J. LaPres. (2007) Hypoxia, drug therapy and toxicity. *Pharm & Ther.* 113; 229-246
 7. **KangAe Lee**, Lyle D. Burgoon, Laura Lamb, Edward Dere, Timothy R. Zacharewski, John B. Hogenesch, and John J. LaPres. (2006) Identification and characterization of genes susceptible to transcriptional cross-talk between the hypoxia and dioxin signaling cascades. *Chem. Res. Toxicol.* 19; 1248-1293.
 6. Heather A. Hirsch, Gauri W. Jawdekar, **Kang-Ae Lee**, Liping Gu, and R. William Henry. (2004) Distinct mechanisms for repression of RNA polymerase III transcription by the retinoblastoma tumor suppressor protein. *Mol. Cell. Biol.* 21; 5989-5999.
 5. Suh, Y., **Kang-Ae Lee**, Woo-Ho Kim, Jan Vijg, and Sang Chul Park. (2002) Absence of apoptotic response to genotoxic stress in the liver of aged rats. *Nat. Med.* 8; 3-4.
 4. Suh Yousin, **Kang-Ae Lee**, and Sang Chul Park. (2001) Differential activation of mitogen-activated protein kinases by methylmethanesulfonate (MMS) in the kidney of young and old rats. *Exp. Mol. Med.* 33; 7-9.
 3. Suh Yousin, **Kang-Ae Lee**, Woo-Ho Kim, Bok-Ghee Han, Jan Vijg, and Sang Chul Park. (2001) Aging alters the apoptotic response to genotoxic Stress. *Exp. Mol. Med.* 33; 9-10.
 2. Suh Yousin, **Kang-Ae Lee**, and Sang Chul Park. (2001) Age-specific changes in expression, activity, and activation of the c-jun NH2-terminal kinase and p38 mitogen-activated protein kinases by methylmethanesulfonate (MMS) in Rats. *Exp. Mol. Med.* 34; 11-13.
 1. **Kang-Ae Lee** and Yousin Suh. (2000) Aging-related expression profiling using tissue array. In : The 1st Tissue array workshop. Lee, W (ed) Vol 1. pp 151-168. Academy Press.

CONFERENCE PROCEEDINGS AND PRESENTATIONS

16. **KangAe Lee** and Celeste M. Nelson. E-box-binding Transcription factors promote branching morphogenesis of mammary epithelial tissues. December 2010. American Society for Cell Biology. Philadelphia, PA. (poster)

15. **KangAe Lee** and Celeste M. Nelson. Defining the gene expression changes required for morphogenesis of engineered tissues. October 2010. Biomedical Engineering Society. Austin, TX (oral)
14. **KangAe Lee** and Celeste M. Nelson. EMT-related transcription factors promote spatially patterned invasion of mammary epithelial tissues. September 2010. AACR Metastasis and Tumor microenvironment. Philadelphia, PA. (poster)
13. **KangAe Lee**, Sandra O'Reilly, J. Justin McCormick, and John J. LaPres. The biphasic role of prolyl hydroxylase domain protein 2 (PHD2/EGLN1) in modulating tumor-forming potential. April 2007. America Association for Cancer Research. Los Angeles, CA. (poster)
12. **KangAe Lee** and John J. LaPres. The effect of altered PHD expression levels on the tumorigenicity of various cell lines. Michigan State University, Cell and Molecular Biology Research Forum. November 2005. (oral)
11. **KangAe Lee** and John J. LaPres. Identification of proteins capable of interacting with the Aryl Hydrocarbon Receptor (AhR) using Tandem Affinity Purification. August 2005. Biochemistry and Molecular Biology Poster Session. Michigan State University. (poster)
10. **KangAe Lee** and John J. LaPres. The role of the HIF1 signaling pathway in tumorigenesis. Michigan State University Carcinogenesis Forum. February 2005. (oral)
9. **KangAe Lee** and John J. LaPres. The role of hypoxia signaling pathway in tumorigenesis. Michigan State University Cell and Molecular Biology Research Forum. September 2004. (oral)
8. **KangAe Lee**, SangChul Park and Yousin Suh. Differential activation of mitogen-activated protein kinases by methylmethanesulfonate in the kidney of young and old rats. October 2001. The 13th Annual Meeting of the Korea Society for Molecular and Cellular Biology. Seoul, Korea. (invited)
7. **KangAe Lee**, Woo-Ho Kim, Bok-Ghee Han, Jan Vijg, SangChul Park, and Yousin Suh. Aging alters the apoptotic response to genotoxic stress. October 2000. The 12th Annual Meeting of the Korea Society for Molecular and Cellular Biology. Seoul, Korea. (invited)
6. **KangAe Lee**, SangChul Park and Yousin Suh. Age-specific changes in expression, activity, and activation of the c-jun NH2-terminal kinase and p38 mitogen-activated protein kinases by methyl-methanesulfonate (MMS) in rats. August 2000. The 1st Asian Society of Toxicology. Cheju, Korea. (poster)
5. Suh Yousin, **Kang-Ae Lee**, Sang Chul Park. Cell signaling pathways of genotoxic stress in cancer and aging. In: The 17th Congress of the International Association of Gerontology in the Symposium "Carcinogenesis and aging", Vancouver, Canada, July 2001. (invited)
4. Suh Yousin, **Kang-Ae Lee**, Sang Chul Park. Cellular responses to alkylating agents: implications for cancer and aging. In: Japan-Korea Cancer Research Symposium; Investigation on the balanced cooperation of cancer cells with the human body, Omiya, Japan, February 2001. (invited)
3. **Kang-Ae Lee** and Yousin Suh. Aging-related expression profiling using tissue array. In: The

1st Tissue Array Workshop 2000, Seoul National University College of Medicine, Seoul, Korea. July 2000. (invited)

2. Suh Yousin, **Kang-Ae Lee**, Sang Chul Park. Tissue arrays in aging research: cellular responses to genotoxic stress. In: The 2000 Annual Meeting of Gerontology Society of America in the Symposium of "The Blue Sky Technology Revolution and Aging Research", Washington DC, USA, November 2000. (invited)
1. Suh Yousin, **Kang-Ae Lee**, Sang Chul Park. Cellular responses to alkylating agents: implications for cancer and aging. In: Symposium of The Korean Society for Gerontology - Stress Response and Aging. Bukyung University, Pusan, Korea, August 2000. (invited)