

Curriculum Vitae

Name: Zhihui Liu

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Education:

Sep 1991-July 1995: Nanjing University, Nanjing, Jiangsu Province, China
Degree: Bachelor (obtained in July 1995)
Major: Biochemistry

April 1999-Aug 2004: Institute of Biochemistry and Cell Biology, Shanghai Institute for Biological Sciences, Chinese Academy of Sciences, Shanghai, P.R. China
Degree: Ph.D. (obtained in Aug 2004)
Major: Biochemistry and Molecular Biology

Brief Chronology of Employment:

July 1995-April 1999: Research associate, Shenyang No.1 Pharmaceutical Factory, Shenyang, Liaoning Province, P.R. China
Oct 2004-March 2009: Postdoctoral Fellow, National Cancer Institute, National Institutes of Health. Bethesda, Maryland, USA
March 2009-February 2012: Research Fellow, National Cancer Institute, National Institutes of Health. Bethesda, Maryland, USA
March 2012-Present: Staff scientist, National Cancer Institute, National Institutes of Health. Bethesda, Maryland, USA

Societies:

- Member of *American Association for Cancer Research (AACR)*.

Editorial Boards:

Editor, *American Journal of Cancer Biology*, Nov 2012 - Present
Editor, *Journal of Oncobiomarkers*, Feb 2014 - Present

Editorial Review:

- 1 Served as a reviewer for manuscript submitted to *PNAS*, *NAR*, *Cell Death & Differentiation*, *Cancer Research*, *Military Medicine*, *BMC Cancer*, *Cancer*, *Journal*

of Cellular and Molecular Medicine, American Journal of Cancer Biology, Cancer letter and International Journal of Biological Sciences.

- 2 Served as a judge at the 6th Annual NIH Graduate Student Research Symposium, 2009, 2010
- 3 Served as a judge at the NIH Postbac Poster Day/Spring Research Festival, 2011
- 4 Served as a judge at Pediatric Oncology Branch Round-Up, 2012
- 5 Served as a lead judge at Pediatric Oncology Branch Round-Up, 2013
- 6 Served as a judge for the Fellows Award for Research Excellence (FARE) 2014 competition in NIH, 2013
- 7 Served as a judge at Pediatric Oncology Branch Round-Up, 2014
- 8 Served as a judge for the NIH Fellows Award for Research Excellence (FARE) 2015 competition in NIH, 2014

Honors and Other Special Scientific Recognition:

- 1 Outstanding graduate award, Nanjing University, 1995
- 2 Ten outstanding young intellectuals award in Shenyang No.1 Pharmaceutical Factory, 1997
- 3 Third-class award of Liaoning Province Medicine Quality, Science and Technology Achievement Award, Medical Administrative Bureau of Liaoning Province, and Medicine Quality Control Association of Liaoning Province, 1998
- 4 First-class award of 8th Science and Technology Conference, Shenyang No.1 Pharmaceutical Factory, 1999
- 5 Scholarship of excellent graduate, Institute of Biochemistry and Cell Biology, Shanghai Institute for Biological Sciences, CAS 2002-2003, 2003-2004
- 6 Fellows Award for Research Excellence (FARE) 2007 in NIH, 2006
- 7 Fellows Award for Research Excellence (FARE) 2008 in NIH, 2007
- 8 NCI Director's Intramural Innovation Awards, National Cancer Institute, 2010
- 9 Merit Awards for the Pediatric Oncology Branch RoundUp in National Cancer Institute, 2011

Published material about my work:

1. My receipt of the NCI Director's Intramural Innovation Award (Genetic Screen of Candidate Tumor Suppressor Genes for Neural Crest Derived Tumors) was introduced in *NCI Cancer Bulletin* on line Jan 26, 2010, 7(2) and *NCI Fellows & Young Investigators Newsletter* 2010, 9(1): 9.
2. My work of hunting tumor suppressor genes in neuroblastoma was introduced and highlighted in *CCR connections* 2010, 4(2): 16.

Research Interests:

My research interest is in the field of cancer biology, particularly to understand the molecular mechanism in pediatric cancer such as neuroblastoma (NB) tumorigenesis and progression, where I focused on the genetic and epigenetic alterations in pediatric cancers. I study the genetic or epigenetic altered gene function by using different types of

cancer cells, gene knockout mouse embryonic stem cells, and gene knockout mouse model. Moreover, I am using the cutting edge technique to screen genetic or epigenetic alterations that contribute to NB tumorigenesis to develop novel therapies, which could prove beneficial for neuroblastoma patients whose disease is unresponsive to current treatments

Patents Issued:

1. **Liu Z**, Chen T, Cui D et al. The synthetic effect between Osteogenic Growth Peptide and Granulocyte Colony Stimulating Factor at hematopoiesis. Patent number in P.R. China: ZL 02 1 36688.8.
2. Gao X, **Liu Z**, Zhou G et al. Combination of C-peptide and insulin for the treatment of diabetes complication and the preparation of specific antibody to C-peptide. Patent number in P.R. China: ZL 01 1 12929.8.

Mentorship:

Angela Radulescu: High School Student
Mariam Awad: High School Student
Jennifer Ku: High School Student
Steven Qiu: High School Student
Wilson Chan: High School Student, returned as college student
Tuyen Phung: High School Student, returned as college student
Vani Mathur: Graduate Student
JulieAnn Rader: College Student
Caroline Sizer: Postbaccalaureate CRTA
Christine McMahon: Postbaccalaureate CRTA
Ryan Virden: Postbaccalaureate CRTA
Stanley He: Postbaccalaureate CRTA
Guodong Fu: College student
Nancy Ding: High School Student
Norris Lam: Postbaccalaureate CRTA
Nisha Pawar: College student
Ganesh Arvapalli: High School Student

Abstracts:

1. Yang X, **Liu Z**, Barenboim-Stapleton L, Bliskovsky V, Mock B, Ried T, London W, Maris J and Thiele CJ. Novel tumor suppressor gene, hCas, inhibits neuroblastoma tumorigenicity. *Advances in Neuroblastoma Research*, 12th Annual Conference Los Angeles, Abstract # 5, California, May 2006.
2. **Liu Z**, Yang X, Tan F, Cullion K and Thiele CJ. Molecular cloning and characterization of human castor (CASZ1), a novel human gene upregulated during cell differentiation. *Advances in Neuroblastoma Research*, 12th Annual Conference Los Angeles, Abstract # 90 California, May 2006.

3. Yang X, **Liu Z**, Barenloim-Stapleton L, Ried T, London W, Maris J and Thiele CJ. Novel tumor suppressor gene, hCas, inhibits neuroblastoma tumorigenicity. *AACR Meeting Abstracts*, Abstract # 3309, Washington, DC, Apr 2006.
4. **Liu Z**, Yang X, Tan F, Cullion K and Thiele CJ. Molecular cloning and characterization of human castor (CASZ1), a novel human gene encoding zinc finger protein. *AACR Meeting Abstracts*, Abstract # 3267, Washington, DC, Apr 2006.
5. **Liu Z**, Yang X, Tan F and Thiele CJ. Potential Neuroblastoma tumor suppressor gene, CASZ1 is a transcriptional regulator of the EGR1 promoter. NIH Research Festival, Maryland, Sep 2006.
6. **Liu Z**, Sizer C and Thiele CJ. CASZ1 – a novel good prognosis marker of Neuroblastoma, regulates cell growth, adhesion and migration. NIH Research Festival, Maryland, Sep 2007.
7. **Liu Z**, McMahon C and Thiele CJ. Developmental genes on chromosomes frequently lost in tumors are tumor suppressor gene candidates – lessons learned from CASZ1 gene. *Keystone Symposia Abstracts* # 215, Colorado, March 2008.
8. Onishi H, **Liu Z**, Li Z, Tan F, McKee A, McMahon C and Thiele CJ. Retinoids Decrease Expression of BDNF in Neuroblastoma (NB) Cells. *Advances in Neuroblastoma Research*, 13th Annual Conference Chiba, Abstract #00282, Japan, May 2008.
9. **Liu Z** and Thiele C. CASZ1 suppresses neuroblastoma tumor growth via transcription regulation and loss of CASZ1 blocks Embryonic Stem cell neurogenesis. *Keystone Symposia Abstracts* # 210, Montana, Apr 2010.
10. **Liu Z**, London W, Maris J and Thiele C. Hcasz5, CASZ1 gene transcript variant 2 with 5 zinc fingers functions as a tumor suppressor in Neuroblastoma. *AACR Meeting Abstracts*, Abstract # 5015, Washington, DC, Apr 2010.
11. Virden R, **Liu Z** and Thiele C. Identification and analysis of critical domains within the neuroblastoma tumor suppressor gene CASZ1. *AACR Meeting Abstracts*, Abstract # 5014, Washington, DC, Apr 2010.
12. Wang C, Woo C, **Liu Z**, Wei J, Song Y, Wang L, Khan J, Ge K and Thiele C. CASZ1, a neuroblastoma tumor suppressor gene, is epigenetically silenced by EZH2. *AACR Meeting Abstracts*, Abstract # 4880, Washington, DC, Apr 2010.
13. **Liu Z**, Chan W and Thiele C. Tumor suppressor CASZ1 inhibits normal myoblast and rhabdomyosarcoma migration. *AACR Meeting Abstracts*, Washington, DC, Apr 2013.
14. **Liu Z** and Thiele C. CASZ1b interacts with chromatin to suppress tumor cell proliferation. *Advances in Neuroblastoma Research*, 16th Annual Conference Cologne, Germany, May 2014.
15. Pawar N, **Liu Z** and Thiele C. Identification of critical amino acids involved in regulation of CASZ1 subcellular localization and transcriptional activity. *Annual Biomedical Research Conference for Minority Students*, Nov 2014 (Best poster award) (I'm the co-mentor).

Talks:

1. **Liu Z.** CASZ1 is a candidate chromosome 1p36 tumor suppressor gene that controls neuroblastoma developmental programs. *Joint Seminars of National Cancer Institute and John Hopkins University*, Bethesda, Maryland, April 2009.
2. **Liu Z.** CASZ1 induces neuroblastoma cell differentiation and loss of CASZ1 blocks embryonic stem cell neurogenesis. *Seminars of Neurobiology Interest Group*, Bethesda, Maryland, February 2011.

Oral presentation in the international conferences:

1. **Liu Z,** McMahon C, McKee A and Thiele CJ. CASZ1, a developmental gene that is frequently lost on chromosome 1p36 induces cell differentiation, inhibits growth and neuroblastoma tumor initiating capability. *Advances in Neuroblastoma Research*, 13th Annual Conference Chiba, Abstract ID#: 75, Japan, May 2008.
2. **Liu Z** and Thiele CJ. CASZ1 suppresses neuroblastoma growth by recruiting epigenetic modifier NuRD and restoring Rb activity. *Advances in Neuroblastoma Research*, 15th Annual Conference Toronto, Abstract ID#: 33, Canada, June 2012.

Manuscript in submission:

1. **Liu Z,** Lam N and Thiele C. CASZ1 recruits NuRD complex and interacts with chromatin to regulate gene transcription. Manuscript in preparation to submit.
2. **Liu Z,** Virden R, Maris J and Thiele C. The N-terminal Region of CASZ1 Contains a Novel Nuclear Export Signal (NES) and Transcriptional Repression Domain. Manuscript in preparation to submit.

Publications:

1. Li M, **Liu Z,** Shao X et al. Synthesis of human C-peptide and preparation of specific antibody to it. *ACTA BIOCHIMICA et BIOPHYSICA SINICA*, 2000, 32(6): 665.
2. **Liu Z.** Snake venom metalloendopeptidases. *Journal of Snake*, 2001, 13(2): 59.
3. **Liu Z** and Cui D. Mechanism of Proinsulin C-peptide Action. *CHEMISTRY OF LIFE*, 2001, 21(2): 99.
4. Zhao X, Gao X, **Liu Z** et al. Intervention of C-peptide combined insulin on diabetic nephropathy in initial stages rats. *Chin J Endocrinol Metab*, 2002, 18(4): 272.
5. Sun W, Gao X, **Liu Z** et al. Intervention of C-peptide on diabetic nephropathy in streptozotocin induced rats. *Chin J Endocrinol Metab*, 2003, 19(2): 143.
6. Shao Y, Chen H, **Liu Z** et al. Mobilizing of synthetic Osteogenic Growth Peptide on hematopoiesis in cyclophosphamide-induced leucopenic mice. *Journal of Fudan University Medical Science*, 2003, 30(2): 132.
7. **Liu Z,** Shao Y, Chen H et al. Synthesis of Osteogenic Growth Peptide and Its Synergetic Effect with Granulocyte Colony Stimulating Factor. *ACTA BIOCHIMICA et BIOPHYSICA SINICA*, 2003, 35(2): 177.
8. **Liu Z,** Li M and Cui D. A novel method for poly-peptide design to prepare specific antibody of the peptide and applied to immunoassay. *Journal of Immunological Methods* 2003, 281(1-2): 17.

9. Chen H, Shi D, Li H, **Liu Z** et al. Influence of Synthetic Osteogenic Growth Peptide on Hematopoiesis in Irradiated Mice. *Journal of Fudan University Medical Science*, 2003, 30(5): 439.
10. Shao Y, **Liu Z**, Chen H et al. Synthetic Osteogenic Growth Peptide promotes the proliferation of precursor of erythrocyte *in vitro*. *Clinical Medical Journal of China*, 2003, 10(4): 448.
11. Wang X, **Liu Z** et al. The Mechanism of the Osteogenic Growth Peptide on NIH3T3 Cells. *Chinese Journal of Clinical Medicine* 2005, 12 (3): 480.
12. **Liu Z**, Li M, Cui D and Fei J. Macro-branched cell-penetrating peptide design for gene delivery. *Journal of Controlled Release* 2005, 102(3): 699. This paper was highlighted in *Controlled Release Society News Letter* 2005, 22(2): 12.
13. **Liu Z**, Yang X, Tan F, Cullion K and Thiele CJ. Molecular cloning and characterization of human Castor, a novel human gene upregulated during cell differentiation. *Biochemical and Biophysical Research Communications* 2006, 344(3): 834.
14. Li Z, Zhang J, **Liu Z**, Woo CW and Thiele CJ. Downregulation of Bim by brain-derived neurotrophic factor activation of TrkB protects neuroblastoma cells from paclitaxel but not etoposide or cisplatin-induced cell death. *Cell Death and Differentiation* 2007, 14(2): 318.
15. Li L, Fei Z, Ren J, Sun R, **Liu Z**, Shen Z, Wang L, Sun X, Yu J, Wang Z, Fei J. Functional imaging of interleukin 1 beta expression in inflammatory process using bioluminescence imaging in transgenic mice. *BMC Immunol* 2008, 9:49.
16. **Liu Z**, Liu M, Niu G, Cheng Y and Fei J. Genome-wide identification of target genes repressed by the zinc finger transcription factor REST/NRSF in the HEK293 cell line. *Acta Biochim Biophys Sin* 2009, 41 (12): 1008.
17. **Liu Z**, Yang X, Li Z, McMahan C, Sizer C, Barenboim-Stapleton, Bliskovsky V, Mock B, Ried T, London W, Maris J and Thiele CJ. CASZ1, a candidate tumor suppressor suppresses neuroblastoma tumor growth through reprogramming gene expression. *Cell Death & Differentiation* 2011, 18(7): 1174.
18. **Liu Z**, Naranjo A and Thiele CJ. CASZ1b, the short isoform of CASZ1 gene, Coexpresses with CASZ1a during neurogenesis and suppresses neuroblastoma cell growth. *PLoS ONE* 2011, 6(4): e18557.
19. Wang C, **Liu Z**, Woo CW, Li Z, Wang L, Wei JS, Marquez VE, Bates SE, Jin Q, Khan J, Ge K, Thiele CJ. EZH2 mediates epigenetic silencing of neuroblastoma suppressor gene CASZ1, CLU, RUNX3, and NGFR. *Cancer Res* 2012, 72(1): 315.
20. Virden R, Thiele CJ* and **Liu Z***. Characterization of critical domains within the tumor suppressor CASZ1 required for transcription regulation and growth suppression. *Mol Cell Bio*. 2012, 32(8): 1518 (*: Senior author).
21. **Liu Z**, Thiele CJ. ALK and MYCN: when two oncogenes are better than one. *Cancer Cell* 2012, 21(3): 325 (Invited preview).
22. He S, **Liu Z**, Oh DY and Thiele CJ. MYCN and the epigenome. *Front Oncol*. 2013, doi: 10.3389 (Review).
23. **Liu Z**, Rader J, He S, Phung T, Thiele CJ. CASZ1 inhibits cell cycle progression in neuroblastoma by restoring pRb activity. *Cell Cycle* 2013, 12 (14): 2210.
24. **Liu Z***, Li W, Ma X, Ding N, Spallotta F, Southon E, Tessarollo L, Gaetano C, Mukoyama YS, Thiele CJ*. *J Biol Chem*. 2014, 289 (43): 29801 (*: Senior author).