

Tewarit Sarachana, M.S., Ph.D.

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Date of Birth: 2 August 1983 **Citizenship:** Thai

Education

Ph.D. program in Biomedical Sciences **2012**

Institute for Biomedical Sciences, School of Medicine and Health Sciences, The George Washington University, Washington, DC, USA

Master of Sciences program in Genomics, Proteomics, and Bioinformatics **2009**

Department of Biochemistry and Molecular Biology, School of Medicine and Health Sciences, The George Washington University, Washington, DC, USA

Bachelor of Sciences (Medical Technology), First Class Honors, University Gold Medal **2005**

Department of Medical Technology, Faculty of Allied Health Sciences, Chulalongkorn University, Bangkok, Thailand

Dissertation and Theses

Ph.D. Dissertation: "Hormonal Regulation and Transcriptional Targets of *RORA*, a Novel Candidate Gene for Autism Spectrum Disorder"

Location: Professor Valerie Hu's laboratory, Department of Biochemistry and Molecular Biology, School of Medicine and Health Sciences, The George Washington University, Washington, DC, USA

Master's Thesis: "Investigation of Post-Transcriptional Gene Regulatory Networks Associated with Autism Spectrum Disorders by microRNA Expression Profiling of Lymphoblastoid Cell Lines"

Location: Professor Valerie Hu's laboratory, Department of Biochemistry and Molecular Biology, School of Medicine and Health Sciences, The George Washington University, Washington, DC, USA, and the Laboratory of Molecular Pathophysiology, National Institute of Mental Health, National Institutes of Health, Bethesda, MD, USA.

Bachelor's Thesis: "Investigation of *Gnathostoma spinigerum*'s Migration Route and Eosinophilia in Mice"

Location: Associate Professor Wilai Saksirisampant's laboratory, Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Professional Experience and Skills

Postdoctoral Research Fellowship **2012 - 2013**

The Office of Blood Research and Review, Center for Biologics Evaluation and Research, U.S. Food and Drug Administration, Bethesda, Maryland, USA

Conducting research focusing on development of noncoding RNA biomarkers for blood quality during storage in blood bank using bioinformatics, -omics, cellular and molecular biology approaches, including Affymetrix microarray analysis, flow cytometry analysis, density gradient, ultracentrifugation, ATP assays. Performing -omic analysis using computer programs, including GeneSpring, Partek Genomics Suite (gene, exon, and alternative splicing analyses), GeneChip Command Console, Expression Console, Transcriptome Analysis Console.

Research Assistantships

Professor Valerie Hu's Laboratory

2007 – 2012

School of Medicine and Health Sciences, The George Washington University, Washington, DC, USA

Conducting research focusing on identification of biomarkers for autism using bioinformatics, -omics, cellular and molecular biology approaches, including high-throughput microarray analyses (gene expression profiling, miRNA expression profiling, and whole-genome identification of transcription factor binding sites), cloning, luciferase assays (single/dual reporters), MALDI-TOF mass spectrometry for quantitative DNA methylation analysis, bisulfite conversion of genomic DNA for DNA methylation analysis, methylation-specific PCR, TaqMan real-time qPCR, real-time qPCR, reverse-transcription qPCR, T7-promoter in vitro transcription, semi-quantitative PCR for mRNA alternative splicing analysis, conventional PCR, DNA/RNA/protein gel electrophoresis (agarose and SDS-PAGE), western blot, chromatin/protein immunoprecipitation, confocal immunofluorescence microscopy, inverted fluorescence/non-fluorescence microscopy, culture of adherent/non-adherent cells and cell counting, transient/stable transfection (miRNA precursor, miRNA antisense, siRNA, shRNA, and overexpression plasmid), differentiation of neuronal cells, cell proliferation and survival assays (MTS/trypan blue), neurodegeneration assay, determination of protein concentration (BCA assay), spectrophotometry for determination of DNA/RNA/protein concentration, isolation of DNA/total RNA/small RNA/protein/chromatin, preparation of nuclear/whole-cell lysates.

Proficient in computer programs and databases, including microarray data collection and normalization (linear regression, LOWESS, quantile), statistical analyses (SAM, USC, PTM, SVM, ANOVA, and t-test), supervised/unsupervised clustering analysis (HCL, KMC, and PCA), identification of biological networks and pathways associated with genes/proteins of interest, identification of miRNA targets, identification of transcriptional factor binding elements, DNA/RNA hybridization probe and primer design, confocal immunofluorescence analysis, mass spectrometry analysis, and other biomedical science research-related programs. Examples are TIGR Spotfinder, MIDAS, TMeV, IPLab, R, Ingenuity Pathway Analysis, Pathway Studio, miRBase, Targetscan, TESS, JASPAR, ENCODE, PROMO3.0, Primer 3, Shimadzu Biotech Launchpad MALDI-TOF MS, OriginPro, Volocity, Zen. Also proficient in Microsoft Office Word, Excel, PowerPoint, Access, Outlook, OneNote, Publisher, Groove, Adobe Acrobat, Adobe Reader, Adobe PhotoShop Elements, Nikon Capture NX 2, Picasa, EndNote, RefWorks, Write-N-Cite, and iBuy.

The HALAL Science Center

2005

Faculty of Allied Health Sciences, Chulalongkorn University, Bangkok, Thailand

Performing isolation of lipids and lipoproteins from tissues and assisting in high-throughput protein, metabolite, and lipid analyses, including ESI-mass spectrometry, gas chromatography, and high-pressure liquid chromatography. Using animal model (mice), transfecting mice with parasites, dissecting organs, and collecting blood.

Special Research Program

Guest researcher in Professor Hussein Manji's lab

2008

National Institute of Mental Health, National Institutes of Health, Bethesda, MD

Performing techniques focusing on post-transcriptional gene regulatory approach, such as miRNA isolation and purification techniques, miRNA microarray analysis, as well as statistical analyses for miRNA microarray.

Medical Technologist

The Alpha Laboratory Center, Phyathai 2 Hospital, Bangkok, Thailand

2005

Performing diagnostic analytic tests on human tissues and body fluids in clinical laboratory using biochemical assays, immunological assays, immunofluorescence assays, ELISA, blood bank, bacteria culture and identification, as well as laboratory quality controls, quality assessment and assurance.

Honors, Fellowships, and Awards

- The ORISE Postdoctoral Research Fellowship** **2012 - present**
A postdoctoral research fellowship sponsored by the Oak Ridge Institute for Science and Education, USA, during postdoctoral research training at U.S. Food and Drug Administration
- U.S. Diversity Travel Award by the International Society for Autism Research (INSAR)** **2012**
- GWU Financial Support for Traveling to International Annual Meetings for Autism Research** **2009 - 2012**
- Sigma Xi Grants-in-Aid of Research (GIAR) Award (George Washington University Chapter)** **2008**
- Strategic Scholarship for Frontier Research Network** **2005 - 2012**
A full-expense scholarship for M.S. and Ph.D. studies in United States granted by The Royal Thai Government, Thailand
- Chulalongkorn University Gold Medal** **2005**
An academic achievement recognition for a graduating student at the baccalaureate level who receives first-class honors and has highest cumulative GPA in each field.
- Theppisai Scholarship** **2004**
A scholarship from Professor Hathai Theppisai, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, granted to a student in the field of medical technology who receives outstanding scores in a medical technology examination.
- Bhumibol Scholarship (Medical Technology)** **2003 - 2005**
One of the most prestigious scholarships in Thailand granted annually to undergraduate students from low-income families who have outstanding academic and extra-curricular activity profiles by His Majesty King Bhumibol Adulyadej through Chulalongkorn University. On behalf of the King, Her Royal Highness Princess Maha Chakri Sirindhorn gives the scholarship to the students in the annual scholarship ceremony at Chulalongkorn University.
- Highest GPA** **2002 - 2005**
Faculty of Allied Health Sciences, Chulalongkorn University, Bangkok, Thailand

Certificates

- BD Biosciences Company: FACSCalibur User Training **2012**
- U.S. National Institutes of Health: Biological Materials Shipper Training **2012**
- U.S. National Institutes of Health: Laboratory Safety Training **2012**
- U.S. National Institutes of Health: Introduction to Laboratory Safety Training (Online) **2012**
- U.S. National Institutes of Health: Working Safely with HIV and Other Bloodborne Pathogens Training **2012**
- U.S. Food and Drug Administration: Computer Security Awareness Training **2012**

Publications

Scientific Journals

1. **Sarachana T.**, Zhou X., Ramirez S.M., Shah M., Hu V.W. Propionic acid induces autistic-like gene expression profiles, inhibits neurite outgrowth, and promotes neurodegeneration in cells from non-autistic individuals. *Autism Res.* (under revision).
2. **Sarachana T.**, Hu V.W. Differential recruitment of coregulators to the RORA promoter adds another layer of complexity to gene (dys)regulation by sex hormones in autism. *Mol Autism.* (in press)
3. **Sarachana T.**, Hu V.W. Genome-wide identification of transcriptional targets of RORA reveals direct regulation of multiple genes associated with autism spectrum disorder. *Mol Autism.* 2013 May 22;4(1):14. PMID: 23697635.
4. **Sarachana T.**, Xu M., Wu R.C., Hu V.W. Sex hormones in autism: androgens and estrogens differentially and reciprocally regulate RORA, a novel candidate gene for autism. *PLoS One.* 2011 Feb 16;6(2):e17116. PMID: 21359227.
5. **Sarachana T.**, Zhou R., Chen G., Manji H.K., Hu V.W. Investigation of post-transcriptional gene regulatory networks associated with autism spectrum disorders by microRNA expression profiling of lymphoblastoid cell lines. *Genome Med.* 2010 Apr 7;2(4):23. PMID: 20374639.
6. Hu V.W., Nguyen A., Kim K.S., Steinberg M.E., **Sarachana T.**, Scully M.A., Soldin S.J., Luu T., Lee N.H. Gene expression profiling of lymphoblasts from autistic and nonaffected sib pairs: altered pathways in neuronal development and steroid biosynthesis. *PLoS One.* 2009 Jun 3;4(6):e5775. PMID: 19492049.
7. Hu V.W., **Sarachana T.**, Kim K.S., Nguyen A., Kulkarni S., Steinberg M.E., Luu T., Lai Y., Lee N.H. Gene expression profiling differentiates autism case-controls and phenotypic variants of autism spectrum disorders: evidence for circadian rhythm dysfunction in severe autism. *Autism Res.* 2009 Apr;2(2):78-97. PMID: 19418574.

Books

1. **Sarachana T.**, Hu V.W. Role of microRNAs in autism spectrum disorder. In S. Sahu (Ed.), *microRNA in Toxicology and Medicine.* Johns Wiley and Sons Ltd. (in press)
2. **Sarachana T.**, Hu V.W. Shedding light on the dark side: noncoding RNAs as a new avenue of autism research. In V. W. Hu (Ed.), *Frontiers in autism research, diagnosis, and treatment.* World Scientific Publishing Co. (manuscript in preparation)
3. **Sarachana T.**, Hu V.W. Role of *RORA* in Autism Spectrum Disorder. In V. W. Hu (Ed.), *Frontiers in autism research, diagnosis, and treatment.* World Scientific Publishing Co. (manuscript in preparation)

Memberships

Sigma-Xi	2012 - present
Sigma-Aldrich Global Advisor	2011 - present
American Association for the Advancement of Science	2010 - present
International Society for Autism Research	2008 - present

Presentations

1. Oral presentation on "**Applications of Omics and Bioinformatics in Biomarker Discovery Research**" at the Lunchtime Seminar by the Faculty of Allied Health Sciences, Chulalongkorn University, Oct 2013, Bangkok, Thailand.
2. Oral presentation on "**Hormonal Regulation and Function of RORA, a Novel Candidate Gene for Autism Spectrum Disorder**" at the 2nd Annual Neuroscience Symposium by the George Washington University Institute for Neuroscience, May 2012, Washington, DC, USA.
3. Poster presentation on "**Identification of Transcriptional Targets of RORA, a Novel Candidate Gene for Autism Spectrum Disorder**" at the 11th Annual International Meeting for Autism Research (IMFAR), May 2012, Toronto, Ontario, Canada.
4. Poster presentation on "**Identification of Transcriptional Targets of RORA, a Novel Candidate Gene for Autism Spectrum Disorder**" at the 17th Annual George Washington University Medical Center Research Day, March 2012, Washington, DC, USA.
5. Poster presentation on "**Sex hormones in autism: androgens and estrogens differentially and reciprocally regulate RORA, a novel candidate gene for autism**" at the 10th Annual International Meeting for Autism Research (IMFAR), May 2011, San Diego, CA, USA.
6. Poster presentation on "**Sex hormones in autism: androgens and estrogens differentially and reciprocally regulate RORA, a novel candidate gene for autism**" at the 16th Annual George Washington University Medical Center Research Day, March 2011, Washington, DC, USA.
7. Poster presentation on "**Exposure to propionic acid induces autistic-like gene expression profiles in lymphoblastoid cell lines from non-autistic individuals**" at the 9th Annual International Meeting for Autism Research (IMFAR), May 2010, Philadelphia, PA, USA.
8. Poster presentation on "**Exposure to propionic acid induces autistic-like gene expression profiles in lymphoblastoid cell lines from non-autistic individuals**" at the 15th Annual George Washington University Medical Center Research Day, March 2010, Washington, DC, USA.
9. Poster presentation on "**Investigation of post-transcriptional gene regulatory networks associated with autism spectrum disorders by microRNA expression profiling using lymphoblastoid cell lines**" at the 8th Annual International Meeting for Autism Research (IMFAR), May 2009, Chicago, Illinois, USA.
10. Poster presentation on "**Investigation of post-transcriptional gene regulatory networks associated with autism spectrum disorders by microRNA expression profiling using lymphoblastoid cell lines**" at the 14th Annual George Washington University Medical Center Research Day, April 2009, Washington, DC, USA.
11. Poster presentation on "**Gene expression profiling of lymphoblastoid cell lines distinguishes autism case-controls as well as autistic phenotypes**" at the 7th Annual International Meeting for Autism Research (IMFAR), May 2008, London, UK.
12. Poster presentation on "**Gene expression profiling of lymphoblastoid cell lines distinguishes autism case-controls as well as autistic phenotypes**" at the 13th Annual George Washington University Medical Center Research Day, April 2008, Washington, DC, USA.