Tzu-Hsing Kuo (郭姿杏), PhD

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EDUCATION

Ph.D., Rutgers University, NJ *2005-2010*
Biomedical Sciences, Advisor: Julie A. Williams, Ph.D.
M.S., National Yang-Ming University, Taiwan *2001-2003*
Microbiology and Immunology, Advisor: Ling-Pai Ting, Ph.D.
B.S., National Taiwan University, Taiwan *1997-2001*
Public Health

RESEARCH EXPERIENCE

Postdoctoral Researcher, Brigham Regenerative Medicine Center and Harvard Medical School *9/2013-present*
Advisor: Jessica L. Whited, Ph.D.

- Project: Conduct in vitro and in vivo experimental approaches to investigate the role of vasculature during limb regeneration in salamander axolotls to identify potential treatments for limb loss in humans.
- Collaborated with a zebrafish laboratory to establish TALEN in axolotls to knockdown genes of interest.
- Developed CRISPR in axolotls to effectively generate transgenic animals and to edit genes in specific tissues.
- Set up the retrovirus production protocol for the start-up lab to facilitate ongoing research.

Postdoctoral Researcher, Center for Sleep and Circadian Neurobiology, University of Pennsylvania *10/2010-03/2013*
Ph.D. Student Research Assistant, Rutgers, The State University of New Jersey *09/2005-09/2010*
Advisor: Julie A. Williams, Ph.D.

- Project: Investigated the reciprocal interaction between central nervous system and peripheral immune system.
- Demonstrated that during bacterial infection or injury, flies increase sleep through NFκB activation from the immune system.
- Identified a beneficial role of sleep during infection in *Drosophila* through NFκB activation using genetic tools.

Research Assistant, National Taiwan University Hospital, Taiwan *2004-2005*
Advisors: Ang Yuan, M.D., Ph.D. & Pan-Chyr Yang, M.D., Ph.D.

- Investigated the role of cytokines during the interaction between human lung cancer cells and primary endothelial cells.

Master Student Research Assistant, National Yang-Ming University, Taiwan *2001-2003*
Advisor: Ling-Pai Ting, Ph.D.

- Identified the biological effect of Hepatitis B virus e antigen (HBeAg) through IL-1/NFκB signaling pathway.

Undergraduate Researcher, Microarray Core Laboratory at National Taiwan University Hospital, Taiwan *2000-2001*
Advisors: Jeremy J.W. Chen, Ph.D. & Dr. Pan-Chyr Yang, M.D., Ph.D.

Undergraduate Researcher, Center for Disease Control (CDC), Department of Health, Taiwan *2000*
Advisor: Yu-Yuan Wo, Ph.D.

TECHINICAL SKILLS

Molecular Biology: Genome editing (TALEN and CRISPR-Cas9), Molecular cloning, PCR, RT-PCR, real-time PCR, DNA and RNA isolation, in vitro transcription, in-situ hybridization and DNA microarray.

Microbiology: Retrovirus production, titration and infection, grow/maintain bacteria, competent cell preparation and transformation.

Protein Chemistry: Protein expression from prokaryotic and eukaryotic system, protein purification, column chromatography, HPLC, immunoprecipitation, ELISA, gel electrophoresis and Western Blotting.

Cell Biology: Isolation of human primary endothelial cells, cell culture (human/insect cell lines, human primary endothelial cells), transfection, cell migration assay, immunocytochemical staining and fluorescence microscopy.

Histology: Whole brain dissection (*Drosophila*), tissue fixation (formaldehyde and fresh frozen), dehydration, embedding (paraffin and OCT), sectioning (including cryosectioning), and staining (H&E staining, immunohistochemical staining and in-situ hybridization)

Animal handling: Surgery (mice and salamander axolotls), *Drosophila*/salamander husbandry, *Drosophila* genetics, embryo injection (salamander axolotls).

COMMUNITY SERVICE, MENTORING EXPERIENCE & AWARDS

Committee, Boston Taiwanese Biotechnology Association *2013 - present*
Judge of the North Jersey Regional Science Fair 2009
Mentored lab members such as postdoctoral researcher, undergraduate and technician *2011 - present*
Young investigator award, Department of Pharmacology, Robert wood Johnson Medical School, UMDNJ *2006*
Scholarship of Dr. Yen, Chih-Chung, the Chinese Society of Microbiology *2002*

PRESENTATION IN SCIENTIFIC CONFERENCES (SELECTED)

1. **TH Kuo**, JA Williams. " Sleep Enhances Survival during Bacterial Infection in *Drosophila*. " SLEEP 2012 26th APSS Annual, Boston, Massachusetts. June 9-13, 2012. (Poster)
2. **TH Kuo**, JA Williams. " Recovery Sleep Promotes Survival during Bacterial Infection in *Drosophila*. " New York Area Clock Group 10th Meeting, Rockefeller University, April 5, 2011. (Oral presentation)
3. **TH Kuo**, JA Williams. " Recovery Sleep Enhances Survival during Bacterial Infection in *Drosophila*. " 52nd Annual *Drosophila* Research Conference, San Diego, CA. March 30-April 3, 2011. (Poster)
4. **TH Kuo**, DH Pike, JA Williams. "A reciprocal interaction between sleep and the immune response in *Drosophila*." Cold Spring Harbor Laboratory Meetings on Neurobiology of *Drosophila*. Sep. 29- Oct. 3, 2009. (Oral presentation)
5. **TH Kuo**, A Handa and JA Williams. "Sleep Deprivation Modulates the Immune Response through NFκB in *Drosophila melanogaster*." SLEEP 2008 22nd APSS Annual Meeting, Baltimore, Maryland. June 7-12, 2008. (Oral presentation)

PUBLICATIONS

1. **TH Kuo**, JE Kowalko, T DiTommaso, M Nyambi, DT Montoro, JJ Essner and JL Whited. (*in press*) " TALEN-mediated gene editing of the thrombospondin-1 locus in axolotl."
2. **TH Kuo** and JL Whited. (2015) " Pseudotyped retroviruses for infecting axolotl." Methods Mol Biol.; 1290:127-40.
3. TH Kuo and JA Williams. (2014) " Increased sleep promotes survival during a bacterial infection in *Drosophila*." Sleep. 37(6):1077-86.
4. **TH Kuo** and JA Williams. (2014) " Acute sleep deprivation enhances post-infection sleep and promotes survival during bacterial infection in *Drosophila*." Sleep. 37(5):859-69.
5. **TH Kuo**, A Handa and JA Williams. (2012) " Quantitative measurement of the immune response and sleep in *Drosophila*. " J Vis Exp. (70):e4355.
6. **TH Kuo**, DH Pike, Z Beizaepour and JA Williams. (2010) "Sleep triggered by an immune response in *Drosophila* is regulated by the circadian clock and requires the NFkappaB Relish." BMC Neuroscience, 11:17.
7. CY Yang, **TH Kuo**, and LP Ting. (2006) "Human Hepatitis B Viral e Antigen Interacts with Cellular Interleukin-1 Receptor Accessory Protein and Triggers Interleukin-1 Response." J. Biol. Chem. 281(45): 34525-34536.