



NEUROSCIENCE NEWSLETTER

Neuroscience Welcomes Three New Students

Mark Kane comes from Daleville and Muncie, Indiana. He was home-schooled through the seventh grade, and then began attending regular schools. Mom and Dad must have done reasonably well as Mark graduated valedictorian of his high school class. Mark received a BS in Exercise Physiology from Cedarville University (a private college in Western Ohio) in 1999. After taking a year off and joining the US workforce as a wireless phone service retail associate/EBay entrepreneur, he continued his education at James Madison University and graduated with an MS in Kinesiology with an emphasis in Exercise Physiology earlier this summer. The aim of Mark's masters thesis research was to determine whether a "sports beverage" with specific ratio of carbo

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Please give a warm welcome to (pictured from left to right) Mark Kane, Tida Kumbalasiri and Joseph O'Sullivan

Tida Kumbalasiri is a true "hometown girl." She was born, raised, and educated in Maryland. In fact, Tida has resided fifteen minutes away from USUHS her entire life! Medical School has been a dream of Tida's since the age of five and she has strongly pursued this dream each step of the way. Tida graduated with a BS in Biology and Psychology from University of Maryland, Baltimore County. While at UM, she was part of the Meyerhoff Program, a scholarship program dedicated to helping college students pursue their PhD and MD/PhD in the Sciences. Tida believes that her presence at USUHS is due to a lot of luck and the hard work, ongoing support and dedication from very many people. Tida is proud and happy to represent the new PhD/MD program.

Joseph O'Sullivan hails from Milwaukee, Wisconsin. He received a BA in Theology from Ripon College, Ripon Wisconsin. After attending McCormick Theological Seminary in Chicago for a year, he decided instead to pursue nursing. Joseph received a scholarship and completed his first Nursing degree at Moraine Park Technical Institute and went on to receive a BSN with honors from the University of Wisconsin. After a short period employed in the Surgical Intensive Care Unit at a large VA Medical Center, he returned to school on scholarship to University of New England, Biddeford, ME where he earned an MS in Nurse Anesthesia. Joseph has taught Pharmacology at Hawaii Pacific University, has been Clinical Adjunct Faculty for

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Three New Faculty Join Neuroscience Program

Dr. Diane E. Borst received her B.A. from Goucher College and her Ph.D. from the University of Pennsylvania. The focus of her dissertation research was the study of eye lens regeneration in newts. Diane performed a post-doctoral fellowship at the National Eye Institute where she isolated the gene for Interphotoreceptor Retinoid-Binding Protein (IRBP). Diane came to USU in 1995 and currently is a Research Assistant Professor in the Department of Anatomy, Physiology & Genetics.

Currently, there are two main projects under study in her laboratory. The first is the study of IRBP gene expression in the eye. IRBP is synthesized by photoreceptor cells and pinealocytes and is critical for proper retinal function. IRBP is the only retinoid-binding protein found in the interphotoreceptor matrix (IPM) where it facilitates the transport of retinoids between the retinal pigment epithelium and the photoreceptor cells. The long term goal of her research is to define the DNA elements required for the control of the spatial and temporal expression of the IRBP gene and to understand their role in normal and diseased retinal homeostasis. Transgenic mice are used to achieve this goal.

Another project under investigation in the laboratory is to elucidate the function, in the retina and the brain, of the protein fovin. Dr. Borst's lab isolated the cDNA for fovin because it is more highly expressed in the fovea than in the mid-peripheral retina. Immunostaining, *in situ* hybridization and *in vitro* expression of the fovin protein will provide information about fovin's function in neural tissues.



Dr. Debra McLaughlin received her BS in Physics from Clark-Atlanta University and her Ph.D. in Neurobiology from the University of North Carolina, Chapel Hill. She is currently a Research Assistant Professor in Anatomy, Physiology & Genetics at USUHS and Adjunct Associate Professor at the University of Maryland. Her overall research addresses momentary processing (as to a sensory stimulus), long-term plasticity, temporal coding, and nonstationarities in somatosensation. Dr. McLaughlin's research interests also include behavioral aspects of tactile processing and involve use of classical and modified psychophysical approaches. Her current research project addresses the role electrical properties of young neurons may have in cell migration and thalamocortical termination. She uses a combination of extracellular multiple array recordings for network analysis, intracellular recordings for determination of intrinsic cell properties, and local manipulation of different developmental compartments. Nonlinear analysis with procedures such as Laplacian, stochastic (or probabilistic), and independent component analyses are used to determine the relative interactivity and interdependency of different developmental compartments.



Dr. T. John Wu received his BS in Zoology from the University of Texas at Austin in 1985 and a PhD in Reproductive Physiology from Texas A&M University in 1991. He held postdoctoral positions in the Department of Anatomy at Columbia University (Neuroendocrine Anatomy) and at the Fishberg Research Center for Neurobiology, Mount Sinai School of Medicine (Molecular Neuroendocrinology). He joined the USUHS faculty in 2001 as an Assistant Professor in the Department of Obstetrics and Gynecology. Dr. Wu also holds a secondary appointment in the USUHS MCB Program and an adjunct appointment in the Reproductive Endocrinology and Infertility Program at NICHD. His laboratory focuses on the cellular and molecular mechanisms through which gonadotropin-releasing hormone (GnRH) neurons and ovarian steroids regulate reproduction and behavior. The importance of these studies is underscored by strong correlations between the hormones that regulate the reproductive neuroendocrine system and mental health.



Student Awards, Fellowships & Publications

Kimberly Byrnes has been awarded the Henry M. Jackson Foundation Fellowship in Medical Sciences for the 2002/2003 year. This fellowship will provide stipend support for her final year of thesis work and will cover travel expenses for attendance at a scientific meeting. Kim also was featured in the Science Next Wave article "ANDP Fellows: Changing graduate education policy in neuroscience programs".

Tammy Crowder has been awarded an individual National Research Service Award from the National Institute on Drug Abuse. The title of Tammy's project is "RGS4 and Mu Opioid Receptor Signaling".

Holly Nash published the paper, "Ensheathing cells and methylprednisolone promote axonal regeneration and functional recovery in the lesioned adult rat spinal cord", in the August 2002 issue of the Journal of Neuroscience.

Tara Romanczyk published a paper in the January 2002 issue of the European Journal of Neuroscience on the research she performed while at the NIH. The reference is: Romanczyk TB, Weickert CS, Webster MJ, Herman MM, Akil M, Kleinman JE. Alterations in trkB mRNA in the human prefrontal cortex throughout the lifespan. Eur J Neurosci. 2002 Jan; 15(2) 269-80.

Alisa Schaefer has been awarded a two year fellowship from The Natural Science and Engineering Research Council of Canada. This fellowship is awarded competitively to students who are Canadian Citizens (Alisa has dual citizenship) and is based on academic excellence, research potential, communication skills, and interpersonal and leadership abilities. Alisa's fellowship will support her proposed thesis project. The focus of this project is to assess the ability of neural progenitor cells to repair damaged cortex of neonatal animals that were exposed to the teratogen, methylazoxy methanol (MAM), during embryonic development.

Adam Vana will be a co-author on a paper in the October 1 issue of the Journal of Neuroscience entitled "Absence of Fibroblast Growth Factor 2 Promotes Oligodendroglial Repopulation of Demyelinated White Matter" by Regina C. Armstrong, Tuan Q. Le, Emma E. Frost, Rosemary C. Borke, and Adam C. Vana.

Neuroscience Program Has a New Director



Dr. Regina Armstrong was appointed the new director of the Neuroscience Program in 2002, following the promotion of the former director, Dr. Cinda Helke, to Associate Dean of Graduate Education. Dr. Armstrong received her B.S. degree in Neuroscience from the University of Rochester followed by a Ph.D. in Neurobiology from the University of North Carolina at Chapel Hill. She then did postdoctoral training at NINDS before coming onto the USUHS faculty in 1991. Dr. Armstrong holds the rank of Professor in the Department of Anatomy, Physiology, and Genetics with secondary appointments in Neuroscience as well as Molecular and Cell Biology.

Student-run Neuroscience Journal Club

An informal student-run Neuroscience Journal Club has been initiated by Tara Romanczyk to allow students to keep up-to-date on current literature, to give students the opportunity to learn about and discuss a wide variety of Neuroscience topics and to help students gain practice presenting research in an informal setting. The first meeting of the journal club occurred on June 27, 2002 and students will continue to meet bi-monthly until Thanksgiving. The Journal club will then resume next summer and run from about May to November. Speakers have included: Cliff Dalgard, Tyler Best, Tom McFate and Dhrit Mukherjee. The general topics presented and discussed have included: the regulation of hypoxia inducible factor (HIF), cold receptors acting as thermostats, responses of the vanilloid receptor-1, and circadian rhythms. Please contact Tara Romanczyk if you have questions, comments or concerns regarding the student-run Neuroscience Journal Club.

Monthly Lunch Group for Graduate Students

The Neuroscience Program sponsors a monthly lunch group for the graduate students. This group was developed in 2000 by Kim Byrnes to bring graduate students in the Neuroscience Program at USUHS together to discuss issues that were important to them and find support among their peers. Meetings, which are informal and open to all Neuroscience students, are currently held the first Tuesday of every month.

The schedule for the 2002/2003 year is below. Topics and dates are subject to change. For more information, to suggest a topic or to volunteer as a guest speaker, please contact Kim Byrnes.

<i>September 3:</i>	Laboratory Rotations and Choosing an Advisor
<i>October 1:</i>	Finances and Insurance Issues
<i>November 12:</i>	Negotiating and Jobs after Graduation
<i>December 3:</i>	Holiday Luncheon
<i>January 7:</i>	Transitioning from Graduate Student to Faculty Member, What You Can Do Now.
<i>February 4:</i>	The Qualifying Exam
<i>March 4:</i>	Applying for Grants and Fellowships
<i>April 1:</i>	TBA
<i>May 6:</i>	TBA

****Your Graduate Student Representative****

Tara Romanczyk, a third year Neuroscience graduate student, is currently serving as the Neuroscience Graduate Student Representative. Graduate Student Program Representatives are a new addition to the Graduate School, initiated and instituted by the previous Graduate Student Representative, Kimberly Byrnes. Each graduate program here at USUHS now has a Student Representative to be the voice of that program's students. The role of the Student Program Representative is to form a liaison between administration/faculty and the graduate students through the dissemination of pertinent information. Additionally, this position allows students to raise concerns and issues that can then be addressed through more formal channels. If you have any questions, comments or concerns, please feel free to contact Tara Romanczyk.

USUHS Neuroscience Student Graduates



Holly H. Nash completed her Ph.D. in Neuroscience in January, 2002, under the direction of Juanita J. Anders. Holly is currently living in Stockton CA, and doing her postdoctoral training at UC Davis under the direction of Dr. Bruce Lyeth. Her current research project is to examine the role of astrocytes in neuronal cell death after traumatic brain injury. Holly is also working for a biotech company investing in systems for delivering drugs to localized regions of the brain and for San Joaquin Delta Community College as an Adjunct Professor teaching biology and human anatomy part time.

REGENERATION OF THE ADULT RAT SPINAL CORD IN RESPONSE TO ENSHEATHING CELLS AND METHYLPREDNISOLONE

Holly H. Nash

Directed by Juanita J. Anders, Ph.D., Associate Professor
Anatomy, Physiology, and Genetics, and Neuroscience

Axons fail to regenerate after spinal cord injury (SCI) in adult mammals, leading to permanent loss of function. Following SCI, ensheathing cells promote recovery in animal models, whereas methylprednisolone promotes neurological recovery in humans. The aim of this research was to explore the effectiveness of ensheathing cells and methylprednisolone after acute SCI in the adult rat. Three studies were conducted to accomplish this goal. In the first study, a new method of purifying ensheathing cells was developed, resulting in a final population of ensheathing cells that were 93% pure. In the second study, the ability of a modified directed forepaw reaching (DFR) apparatus to accurately assess function of the corticospinal tract (CST) was examined. The data demonstrated that the modified apparatus prevented extinguishing of DFR behavior after SCI. In addition, the modified apparatus allowed for the collection of quantitative data to accurately assess CST function after bilateral, cervical spinal cord lesions. In the third study, the effectiveness of combining ensheathing cells and methylprednisolone after SCI was investigated. After lesioning the CST in adult rats, a purified population of ensheathing cells was transplanted into the lesion, and methylprednisolone was administered for 24 hours. At six weeks post injury, functional recovery was assessed by measuring successful DFR performance. Axonal regeneration was analyzed by counting the number of anterogradely labeled CST axons caudal to the lesion. Lesioned control rats, receiving either no treatment or vehicle, had abortive axonal regrowth (1 mm) and poor DFR success (38% and 42%, respectively). Compared to controls, rats treated with methylprednisolone for 24 hours had significantly more axons at 7 mm caudal to the lesion, and DFR performance was significantly improved (57%). Rats that received ensheathing cells with methylprednisolone had significantly more regrowing axons than all other lesioned rats up to 13 mm caudal to the lesion. Successful DFR performance was significantly higher in rats with ensheathing cell transplants, both without (72%) and with (78%) methylprednisolone, compared to other lesioned rats. These data confirm previous reports that ensheathing cells promote axonal regeneration and functional recovery after spinal cord lesions in a rat model. In addition, this research provides new evidence that, when used in combination, methylprednisolone and ensheathing cells improve axonal regrowth up to 13 mm caudal to the lesion.

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the University of Texas- Houston and the University of New England and currently is an ACLS instructor. He has to his credit 4 publications, on topics as varied as Total Intravenous Anesthesia, to Trauma Induced Coagulopathy and Treatment in Kosovo to Utilizing Field Anesthesia Vaporizers in the Operating Room and is a member of the Sigma Theta Tau- Honor Nursing Society. Joseph is currently a Major in the US ARMY, Nurse Corps and has come to USUHS from Wurzburg, Germany. Current research interests include pain modulation and studies with a pharmacological /neurological emphasis. Outside interests include traveling, jogging, stock market, reading, biking, music and movies.

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hydrate to protein would offer more benefits to athletes participating in exhaustive bouts of exercise than a typical carbohydrate-only sports drink. Mark continues to work with his former mentor, Dr. Michael J. Saunders, on a collaborative project with the University of Georgia's Exercise Science department. This project aims to determine the contributions of various muscles during cycling bouts of differing intensities by using internal imaging of the lower body musculature. Mark is relatively new to the field of Neuroscience, and while finding it both interesting and challenging, he has yet to narrow his academic interests at USUHS down to a more focused goal. Mark's outside interests include his faux-fiancé (he can't afford the ring yet) and his four-year-old sister, whom his family adopted three years ago from Transylvania, Romania. Mark also enjoys heavy resistance training, running and building and programming computers.

Mark your Calendars!!!!!!

Neuroscience Open House

Wednesday, November 20, 2002

Poster presentations start at 3:30 pm

2002/2003 Neuroscience Program Executive Committee Members

Regina Armstrong, Ph.D.	Program Director, Anatomy, Physiology & Genetics	301-295-3205
He Li, Ph.D.	Psychiatry	301-295-3295
Aviva Symes, Ph.D.	Pharmacology	301-295-3234
Sharon Juliano, Ph.D.	Anatomy, Physiology & Genetics	301-295-3673
Leslie McKinney, Ph.D.	Anesthesiology	301-295-3021

Newsletter Editor

Suzanne Bausch, Ph.D.	Pharmacology	301-295-3226
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A Special Thanks is extended to **Dr. Linda Porter** for her time and effort in serving two consecutive terms (6 years total) on the Executive Committee. Linda remains the seminar series organizer.