

# Center on Aging

UNIVERSITY OF MIAMI

## BIOMEDICAL RESEARCH AGING ACTIVITIES UNIVERSITY OF MIAMI

### **Rebecca Adkins – Microbiology and Immunology**

I am actually interested in the flip side of or very early “aging”. In my laboratory, we study the development of the immune system during ontogeny – i.e., during fetal and neonatal life. We have largely focused on the capacity of neonates and fetal-origin cells to produce systemic T helper cell responses to model vaccine antigens. An additional new focus is on the dynamic interaction between bacteria and the intestinal immune system in early life.

### **John Barrett – Physiology and Biophysics**

#### **John Bethea – Miami Project**

The focus of my laboratory is neuroimmunology. We are investigating the consequence of immune responses in the brain and spinal cord of naïve animals or animals suffering from neurodegenerative disorders such as spinal cord injury, MS, AD and prion disease. To this end we use a variety of molecular biological approaches and animal models.

#### **Sanjoy Bhattacharya – Ophthalmology**

Our group focuses on age associated eye diseases, namely, Glaucoma and age-related macular degeneration. We have observed modification of protein arginines into citrulline by peptidyl arginine deiminase 2 in glaucomatous but not control optic nerve. We are interested in determining whether such posttranslational modifications (or their irreversible removal) are age related.

#### **Nanette Bishopric – Pharmacology**

I have a novel mouse model of aging, induced by heterozygous loss of the coactivator p300, a regulator of cell survival and differentiation. This model replicates all of the features of aging we have examined to date, including osteoporosis, weight (fat) loss, dermal thinning and accumulation of p16INK in a variety of tissues.

#### **Bonnie Blomberg – Microbiology and Immunology**

The main interest of our lab is B lymphocytes in aging where we have shown decreases in Ig class switch, the enzyme AID and the transcription factor E47 both in mice and humans. This will affect ability to respond well to vaccines, etc. The molecular mechanism (for E47) is decreased mRNA stability (likely through increased TTP) and we are currently following this up in various cell

types. So molecular and cellular models of immune deviation in aging would be a short summary. Very interested in relating what we are doing to other aging systems.

### **Mary Bunge – Miami Project**

My work concentrates on enhancing growth of nerve fibers across the injury site inflicted by dropping a weight onto the exposed spinal cord, which paralyzes the hindlimbs of the adult rat. One intervention, such as the implantation of Schwann cells into the injury site, is not enough and so we are examining a number of combination strategies to improve the regenerative response. The combination of Schwann cells and elevation of cAMP has led to excellent results, including an improvement in walking after paralysis. Another new project, not yet far enough along to say how much improvement there will be, is the introduction of transcription factors by means of viral vectors into the brain stem, to ask those infected neurons to revert to their program expressed during the initial period of growth during development. Our goal is to achieve beneficial treatments at both the neuronal cell body and the area of injury where the damaged axons are to maximize repair of the injured spinal cord.

### **Herman Cheung – Medicine**

There are two areas of research interests in our laboratory: The first is on stem cell-based tissue engineering in particular the effect of aging of the differentiation of adult stem cells. The second area is on the role of calcification in cartilage degeneration in Osteoarthritis, which is an age-related disease.

### **Sara Czaja – Psychiatry and Behavioral Sciences (COA)**

Co –Director Center on Aging and Director of the Center on Research and Education for Aging and Technology Enhancement (CREATE). Research interests include: aging and cognition, caregiving, human-computer interaction, training, and functional assessment.

### **Gennaro D'Urso – Pharmacology**

My main research interest in DNA replication control in fission yeast. However, we are also studying programmed cell death in yeast in response to chronological ageing.

### **Carl Eisdorfer – Psychiatry and Behavioral Sciences (COA)**

Knight Professor and Director University of Miami Center on Aging Special Assistant for Aging to the President of the University of Miami. Research has been principally in aging, stress, learning and memory, dementia, as well as depression in later life, psychoneuroimmunology health policy and problems associated with Caregiving for chronically ill elderly.

### **Sharon Elliot – Vascular Biology**

The differential effects of sex hormones on organ function in aging.

**Robert K Fujimora – Molecular Biology**

I am studying the changes in gene expression associated with Abeta peptides in the hippocampus of Alzheimer Disease cases.

**Marilyn Glassberg – Pulmonary and Critical Care**

Aging and the lung, use of mouse models. The differential effects of sex hormones on organ function in aging.

**Abigail Hackam – Ophthalmology**

Age related eye disease

**Guy Howard – Biochemistry and Molecular Biology (GRECC)**

Research Director for the VA GRECC (Geriatrics Research, Education, and Clinical Center) Research interests are in the molecular and cellular biology of aging of the skeleton, with an emphasis on osteoblasts. We are using marrow-derived mesenchymal stem cells, and a subpopulation (MIAMI cells, see interests of Dr. Paul Schiller) with the ultimate goal of tissue engineering for regeneration/repair of bone defects and osteoporosis.

**Roland Jurecic – Microbiology and Immunology**

Our lab is studying genes that regulate self-renewal of stem cells by inducing their proliferation and inhibiting differentiation. In addition, we are interested in studying the function of these genes in aging HSC and cancer stem cells, and how these self-renewal mechanisms affect myeloid and lymphoid developmental potential of aging stem cells. Comparative study of extrinsic, intrinsic and epigenetic regulation of self-renewal and differentiation of young and aging stem cells will advance our understanding of tissue homeostasis, regeneration, aging, and oncogenesis.

**Michael Karl – Endocrinology**

The differential effects of sex hormones on organ function in aging.

**Roger Leblanc – Chemistry**

Biophysical chemistry; Mechanism of plaque formulation in Alzheimer's disease employing phospholipids that correspond to fragments of beta-amyloid

**Richard Lee – Ophthalmology**

My clinical and research interests focus on glaucoma, an age-related optic neuropathy. Using proteomic approaches, my lab is characterizing proteins from surgical patients with and without glaucoma for differential protein analyses. Using a mouse model of glaucoma that follows a similar age-related chronic, progressive course of retinal ganglion cell death as observed in the human eye, my lab has been using genomic, gene-chip based experiments to identify genes associated with the development and progression of glaucoma. Lastly, my lab

has a broad interest in other age-related disorders of the eye including retinal degenerations and tissue responses to surgery in my mainly elderly practice.

**Maria Marin – Ophthalmology**

Age related eye disease. I am the Database Analyst for the Division of Clinical Research for the Department of Pediatrics. I currently work on clinical trial databases in which I host on the server. I also configure the database to allow for ODBC. I look forward to understanding what your research involves.

**Carlos Moraes – Neurology**

The main focus of my lab is on mitochondrial diseases and biology. We have been studying the role of mitochondrial dysfunction in a mouse model of Alzheimer's disease by crossing a mouse producing amyloid plaques with a mouse produced in our lab with a cytochrome oxidase deficiency in mature neurons.

**Spyridon Papapetropoulos – Neurology**

His research is concentrated on the genetic aspects and non-motor symptoms (dementia, psychiatric complications) of Parkinson's disease and related disorders. He is the PI on a study on the association of toxic aminoacids and neurodegeneration.

**Miguel Perez – Neurology**

My main research focuses on mitochondrial dysfunction following cerebral ischemia and in defining the mechanisms of neuroprotection that develop naturally in the phenomenon of ischemic preconditioning.

**Richard Riley – Microbiology and Immunology**

The Riley Lab conducts NIH-sponsored research concerning the defects in immune function that occur in old age. Our focus is on characterizing defects in B lymphocyte development in senescence at both the cellular and molecular levels and assessing their impacts on the read-out of B cell antibodies and B cell functions important to host defense.

**Eugene Roberts – Neurology**

My research over the years has been concerned with how age-related changes in the metabolic physiology of the brain affect the ability of brain tissue to withstand metabolic challenges such as anoxia, hypoxia, ischemia, high frequency neural activation, and trauma. The animal model used in my studies has been the Fischer-344 rat. Age groupings used in these studies have ranged from young adults (3-9 months of age) to aged adults (26-29 months of age).

**Bernie Roos – Medicine**

Geriatrics Institute

### **Richard Rotundo – Cell Biology and Anatomy**

Our research is on the expression and regulation of acetylcholinesterase at the neuromuscular synapse as a model cholinergic system. We also study the synthesis, folding and assembly of the acetylcholinesterase molecules and the role of post-transcriptional and post-translation regulatory mechanisms in synapse development. We are also currently interested in studying the aging neuromuscular synapse and its role in late stage muscle degeneration.

### **Paul Schiller – Endocrinology**

My lab works on a population of marrow-isolated adult multilineage inducible (MIAMI) cells identified in our lab that maintain a stable molecular profile and a strong differentiation potential during aging. We examine the effect of aging on the self-renewal and differentiation mechanisms of these unique post-natal human cells.

### **Paul Shapshak – Psychiatry and Behavioral Science**

Gene expression and neuron-associated mechanisms in Aging and Alzheimer's disease. We are studying mechanisms of gene expression in Aging and Alzheimer's disease specifically focused on presenilin-1 function and signaling. We utilize neuronal cultures and will also use neurons from post-mortem brain tissue (via Laser Capture Microdissection). Findings will also be applied to our AIDS dementia studies.

### **Valery Shestopalov – Ophthalmology**

I am studying molecular pathways implicated in glaucoma and cataract; both are age-related vision disorders. For this reason aging per se is also my interest.

### **Bruce Troen – Medicine**

I have two major research foci, osteoporosis and frailty, both of which result in great morbidity in the elderly. We study the molecular basis of bone resorption, which leads to decreased bone mineral density and subsequent fractures. We are investigating the factors that govern both the formation and differentiation of osteoclasts and the regulation of expression of cathepsin K, which is one of the major effectors of osteoclastic bone resorption. At the clinical/translational level we are studying the factors that predispose to frailty and are examining the interplay between inflammation, insulin signaling pathways, and vitamin D metabolism

### **Keith Webster – Molecular and Cellular Pharmacology**

### **David Wilson – Biology**

My most recent lab research involved isolating and studying mutants that extend life expectancy in the nematode, *C. elegans*. I also am interested in biodemographic modeling of aging. Right now, I'm working on a book about the possibility of slowing aging in humans in the near future.

**Patrick Wood – Miami Project**

**Julia Zaias – Pathology**

I am the associate director of the Division of Veterinary Resources, a veterinarian, and veterinary pathologist. The DVR oversees all animal care and use here at UM. In addition, I have participated as a veterinary pathologist on several animal projects with UM PI's.

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