MOLECULAR CELL BIOLOGY CONCENTRATION

Director:
Dr. Alexander M. Ishov

Associate Director:
Dr. Eric A. Vitriol

Basic Science Department:
Anatomy & Cell Biology

Department Chair:
Dr. Yehia Daaka
What is Cell Biology?

- **Cell biology studies cells** - their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division and death.

- Knowing the components of cells and how cells work is fundamental to all biological sciences.

- Therefore, research in cell biology is closely related to genetics, biochemistry, molecular biology, immunology, and developmental biology.
MOLECULAR CELL BIOLOGY CONCENTRATION

Variety of research projects:

- Cellular structure, organization and function
- Microbes, insect, yeast, mammals
- Stem cells, somatic cells, tumor cells
- Transgenic animals

Cell Biology of Diseases:

- Cancer biology and therapeutics
- Aging, diabetes, immunity, angiogenesis, viral infection
MOLECULAR CELL BIOLOGY CONCENTRATION

• 12 Graduate students
  ➢ National and International

• Over 60 Faculty members
# Molecular Cell Biology Concentration

<table>
<thead>
<tr>
<th>Department</th>
<th>Faculty</th>
<th>Students</th>
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</thead>
<tbody>
<tr>
<td>1) Anatomy and Cell Biology</td>
<td>Maria Zajac-Kaye</td>
<td>Kelly Maeng</td>
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<td></td>
<td>Maria Zajac-Kaye</td>
<td>Daniel Shabasvilli</td>
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<td>Yehia Daaka</td>
<td>Allyson Shea</td>
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<td>Yehia Daaka</td>
<td>Joseph Black</td>
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<td>Yi Qiu</td>
<td>Johnson, Alta</td>
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<td></td>
<td>Daiqing Liao</td>
<td>Iqbal Mahmud</td>
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<td>2) Medicine</td>
<td>Marck Brantly</td>
<td>George Marek</td>
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<td>3) Mol Gen &amp; Micro</td>
<td>Edward Scott</td>
<td>Anna Rodgers</td>
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<td>4) Pathology</td>
<td>Naohiro Terada</td>
<td>Joonseok Cho</td>
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<td>5) Aging</td>
<td>Shinichi Someya</td>
<td>Mi-Jung Kim</td>
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<td>6) Periodontology</td>
<td>Ozlem Yilmaz</td>
<td>Joann Roberts</td>
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<td>Kevin Mchugh</td>
<td>Ibraheem Bamaga</td>
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MOLECULAR CELL BIOLOGY CONCENTRATION

• Core IDP curriculum

• Advanced MCB curriculum
  ➢ Advanced Cell Biology: 4 credits, required for all MCB students, Spring semester
  ➢ 3 more MCB credits

• Journal club:
  Molecular Cell Biology

• Data Club: semi-monthly, 45' presentation, 15' discussion

• Regular Committee Meetings (2/year)

• At least 1 first authorship paper

• At least 1 poster at national/international conference
Advanced MCB curriculum

Fall Semester:
• Transcriptional Control of Growth & Proliferation
• Organization of Cells and Tissues
• Integrative Aging Physiology
• Mitochondrial Biology in Aging and Disease
• The Nucleus

Spring Semester:
• **Advanced Cell Biology**
• RNA Interference and MicroRNAs
• Protein Trafficking
• Mechanisms of Aging
• Stem Cell Biology
• Advanced Stem Cell Biology - Regenerative Medicine
• Apoptosis
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Former MCB student: 
Serena Giovinazzi 
Mechanisms of Chemotherapy Resistance in Breast Cancer

Started IDP: August 2008; Joined lab: April 2009

Publications:

Conferences:
American Association for Cancer Research, 2012

Awards:
Gold Medal, Medical Guild Research Competition, College of Medicine, 2012

PhD dissertation:
March 2012

Current Position:
Postdoc, Florida State University
MOLECULAR CELL BIOLOGY CONCENTRATION

Faculty and Research
Exosomes: novel regulators of bone remodeling

Communication between osteoclasts (bone resorbing cells) and osteoblasts (bone forming cells) is vital for the maintenance of healthy bone. We have identified exosomes that are released from osteoclasts as novel regulators of bone remodeling.

Efforts are underway to characterize the composition and regulatory activity of osteoclast-derived exosomes. Communication may involve protein signaling, mRNAs or microRNAs. Funded by R21 DE023900
Name:

Shinichi Someya, PhD
Assistant Professor
Department of Aging and Geriatric Research

Area of Research:
Mechanisms of hearing loss and inner ear aging,
Neurodegeneration, Mitochondrial dysfunction
Role of Autophagy in Cancer and Cardiovascular Disease

Project 1: Autophagy is a constitutive degradative pathway necessary for cellular homeostasis, but has been exploited by some cancer cells for survival and chemotherapy resistance. We have identified and characterized a novel anti-autophagy compound that effectively suppresses the growth of osteosarcoma and prostate cancer tumors in mouse models.

Project 2: Chronic periodontitis has been linked to atherosclerotic plaques and cardiovascular disease. We have shown that *P. gingivalis*, a bacterium associated with this oral disease, subverts autophagy causing endothelial dysfunction thereby promoting atherosclerosis. Our goal is to modulate autophagy in order to prevent this progressive disease.

William A Dunn, Jr. PhD
Professor, Anatomy and Cell Biology


The overall research interest in my lab is to study the function and regulation of epigenetic modifiers in hematopoiesis and other normal or abnormal developmental program.

Yi Qiu, Ph.D
Assistant Professor

Ongoing projects:

• Role of histone deacetylase 6 in controlling erythrocyte enucleation processes.
• Understanding the function of histone deacetylase 1 in regulating master regulators of erythroid differentiation.
• The function of histone deacetylase 1 in regulating the assembly and recruitment of basal transcription machinery.
• Identification of epigenetic modifiers which are required for cancer stem cells self-renewal.
• Discovery of new histone deacetylase inhibitors for treatment of human cancer.
High miR-21 = poor prognosis in oral cancer patients

Edward K.L. Chan, PhD, Professor
Department of Oral Biology
Department of Anatomy and Cell Biology
http://edward-chan.dental.ufl.edu/
Motor neurons

Actin polymerization

Actin structures

Actin dynamics

The Vitriol Lab

Lamellipodia

Neuromuscular junctions

ALS

Motor neurons

Neuromuscular junctions

ALS

Amyotrophic Lateral Sclerosis (ALS)
Research Interests:

- Nuclear Structure and Function in normal and stress conditions
- Mechanisms of Chemotherapy Resistance in Breast Cancer
- Epigenetic Regulation of Gene Expression

USP7 controls mitotic spindle assembly and chemotherapy resistance
Questions?

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Or

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