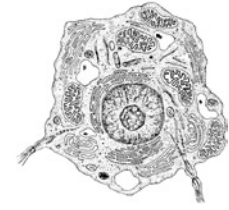


Cellutations



Newsletter for the Department of Cell Biology, UMass Medical School

Special Student Edition, December 2005



Cell Biology Welcomes The First Year Graduate Students!

Having accomplished the challenges of the first semester of the Core curriculum, you can now think about the exciting opportunities for you in research at UMass Medical School. This newsletter highlights the activities of our current and recent graduates in Cell Biology. Many of our current grad students have presented their work at national meetings. As one can see from our recent graduates, the Cell Biology students are prepared for a broad spectrum of career options. The scope of cell biology research includes *in vivo* genetics, intracellular trafficking mechanisms, gene regulation within the context of chromatin and nuclear architecture, cell motility and cell cycle control and signaling pathways that affect growth and differentiation of specialized cell phenotypes. These experimental approaches are being applied to resolve fundamental regulatory mechanisms and clinically related problems that are associated with embryonic development, cancer, kidney and musculoskeletal diseases, and neurological disorders. *Please feel free to contact any of the student mentors for insight into the laboratories and life as a graduate student in Cell Biology. We wish you all the best in your future endeavors.*

Current Rotation Students



Yulian Ramirez

Advisor: Jane Lian

Project: *In vivo* characterization of metastatic bone disease by modified breast cancer cell lines.



Dena Wingate

Advisor: Beth Luna

Project: Invadopodia composition and function.



Charusheila Ramkumar

Advisor: Mary Lee

Project: MIS regulation of male reproductive structures.



Maria Hondele - Fulbright student visiting from University of Regensburg, Germany

Advisor: George Witman

Project: Function of novel ciliary and flagellar proteins.



Ceren Tezer

Advisor: Steve Jones

Project: Exploring the role of Ing1 tumor suppressor in development and apoptosis.



Iva Tatarkova - Visiting medical student from Prague, Checkoslovakia

Advisor: Jeffrey Nickerson

Project: Studying the role of chromatin remodeling in human mammary tissue morphogenesis using 3D tissue culture. Exploring the changes induced by malignant progression.

Students in The Cell Biology Department



Akhter Ali Syed, Exchange Student from Pakistan - Institute for Center of Excellence In Molecular Biology, P.U. Lahore
Mentor: Jane Lian, Janet Stein, Gary Stein
Project: Runx2 and ribosomal gene interaction; their role in normal and cancer cells.



Eric Johnson
Mentor: George Witman
Project: Investigating the function of human disease genes using *Chlamydomonas reinhardtii*.
Presented at International Conference on the Cell and Molecular Biology of *Chlamydomonas*, Kobe, Japan, 2004 and American Society for Cell Biology Meeting, 2004.



Krystin Bedard
Mentors: Jane Lian and Janet Stein
Project: Role of Runx2 in breast cancer metastasis to bone.
Presenting at the American Association for Cancer Research, Washington, DC, 2006.



Concetta Marfella
Mentor: Anthony Imbalzano
Project: Role of the Chd2 chromatin remodeling protein in mouse development.
Presenting at at Annual West Coast Chromatin and Chromosomes Conference in 2005.



Andrew Coles
Mentor: Stephen Jones
Project: The role of Ini1 proteins in tumorigenesis and p53 function.
Presented work in Cancer Cell, 2003. Presenting at the American Association for Cancer Research, Washington, DC, 2006.



Angela Miele
Mentors: Janet Stein, Gary Stein, Andre van Wijnen
Project: Cell cycle dependent regulation of histone H4 genes at the G1/S.
Presented work in Molecular Cell Biology, 2005 and at the American Society of Cell Biology, 2003, San Francisco.



Jessica Crowley
Mentor: Elizabeth Luna
Project: Lipid raft-associated membrane skeletons and nongenomic signaling through steroid receptors.
Presented work in J Biol Chem, 2003 and Journal of Cell Science, 2003.



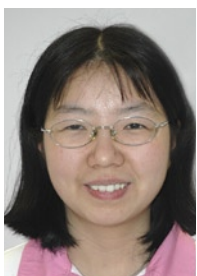
Josh Norberg
Mentor: Kip Sluder
Project: Studying the effects of p53 on the control of centrosome duplication. Using cells expressing fluorescent proteins linked to centrioles, he plans to take an in-depth look at the process of centrosome duplication in living cells using high resolution video microscopy.



Caroline Dacwag
Mentor: Anthony Imbalzano
Project: Role of the Prmt5 methyltransferase in muscle differentiation.
Presented work in Mol Cell Bio, 2005 and at Annual West Coast Chromatin and Chromosomes Conference in 2005.



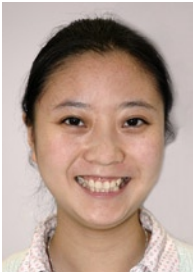
Gayle Pageau MD/PhD student
Mentor: Jeanne Lawrence
Project: Studying the relationship of BRCA1 to XIST RNA and to chromatin structure in the nucleus to better understand the role of BRCA1 in the development of breast cancer.



Yuqing Hou
Mentor: George Witman
Project: To characterize components of the intraflagellar transport machinery, which is necessary for ciliary and flagellar assembly. Presented work in Molecular Biology of the Cell, 2004, and at the 2005 meeting of the American Society for Cell Biology.



Nunciada Salma
Mentor: Anthony Imbalzano
Project: Transcriptional regulation of adipogenic gene expression.
Presented work in Molecular Cell Biology, 2004 and Journal of Molecular Endocrinology (in press); FASEB Meeting, VT, 2002 and at Molecular Control of Adipogenesis and Obesity, Keystone, CO., 2002.

**Qi Yan****Mentor:** George Witman**Project:** Investigating the function of the polycystic kidney disease protein fibrocystin in cilia.**Daniel Young****Mentors:** Jane Lian, Gary Stein**Project:** Spatial organization and cellular compartmentalization of Runx2 regulatory complexes during cell growth and differentiation**Future:** Awarded Novartis Fellowship T. Mitchison Lab at Harvard.

Presented work in Young, D. et al., Proceedings of the National Academy of Science, 2003; Young, D. et al., Journal of Cell Science, 2004. at the Plenary Oral Session at ASBMR, 2005; American Society of Cell Biology, 2004.

Recent Graduates**Diane M. Casey****Mentor:** George Witman**Thesis project:** DC3, a calcium-binding protein important for assembly of the *Chlamydomonas* outer dynein arm.**Current position:** Postdoctoral Fellow, Division of Viral Pathogenesis, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA.**Publications:** Casey, D. M., et al., Mol. Biol. Cell 2003; Casey, D. M., et al., J. Biol. Chem. 2003.**Yu Chen**, UMMS Master's student**Mentor:** Elizabeth Luna**Current position:** Master's in Public Health program at Columbia University, New York, NY.**Publications:** Chen Y, et al., J Biol Chem, 2003.**Gloried Ebsworth**, UMMS Master's student**Mentor:** Elizabeth Luna**Current position:** Podiatric Medicine and Surgery Program at Barry University, Miami Shores, FL.**Cynthia Guidi****Mentor:** Anthony Imbalzano**Thesis project:** Chromatin remodeling and cancer.**Current position:** Post-doctoral fellow with Mitch Smith at UVa**Publications:** Guidi et al, Mol. Cell. Biol., 2001; Guidi, CJ, et al, Cell Cycle and Growth Control: Biological Regulation and Cancer, 2nd Edition, 2004; Guidi, CJ, et al., J Biol Chem, 2004.**Kimberly Harrington****Mentor:** Janet Stein**Thesis project:** Intranuclear trafficking of transcription factors and living cells.**Current Position:** Forensic Scientist**Publication:** Harrington KS, et al., Journal of Cell Science, 2002**Christopher Lengner****Mentors:** Gary Stein and Jane Lian**Thesis project:** Role of the bone-specific Runx2 transcription factor in skeletal development.**Current Position:** Postdoctoral fellow, Whitehead Institute for Biomedical Research, MIT, Rudolf Jaenisch laboratory**Publications:** Lengner et al, Mech Dev. 2002; Lengner et al, J Cell Physiol. 2004; Lengner et al, J Biol Chem, 2005.**Mai Luong****Mentors:** Gary Stein, Janet Stein, Andre van Wijen**Thesis project:** Transcriptional regulation of the histone gene in vitro and in vivo.**Current Position:** Postdoctoral fellow in Rakesh Jain laboratory, Department of Radiation Oncology, Massachusetts General Hospital, Harvard University.**Publication:** Luong MX et al, Molecular Cell Biology, 2002.**Heather A Steinman****Mentor:** Stephen Jones**Thesis project:** Role of Mdm2 during development and in tumorigenesis.**Current position:** Office of Technology Management, UMASS Medical School**Publications:** Steinman, H et al., Genesis, 2003; Steinman, H., et al., Oncogene, 2004; Steinman, H., et al., J Biol Chem, 2004; Steinman, H.A, et al., Oncogene, 2005.**Caroline van der Meijden****Mentors:** Gary Stein, Andre van Wijnen.**Thesis project:** Discovery of cell cycle regulated genes by microarray profiling.**Current Position:** Postdoctoral fellow, Cold Spring Harbor Laboratory, Michael Myers laboratory.**Publication:** van der Meijden CM, et al., Cancer Research, 2002.**Maureen Blomberg Wirschell****Mentor:** George Witman**Thesis project:** *Chlamydomonas reinhardtii* ODA5 encodes an axonemal protein required for assembly of the outer dynein arm and an associated flagellar adenylate kinase.**Current position:** NIH NRSA Postdoctoral Fellow, Department of Cell Biology, Emory University School of Medicine, Atlanta, GA.**Publications:** Wirschell, M. et al., Mol. Biol. Cell 2004.

Faculty Rotation Projects

Roger Craig

Lipid-Layer Protein Crystallization for Electron Microscopy. While individual protein molecules can be readily visualized by EM, structural information is greatly enhanced if the molecules can be crystallized into 2-dimensional ordered arrays. Methods for achieving this are well established, making use of lipid monolayers at an air-water interface. Techniques to be learned: lipid layer crystallization methods; grid preparation; use of electron microscope; image processing

Harvey Florman

1. The characterization of trp2-interacting proteins.
2. Studies of trp2 channel gating mechanisms.
3. The examination of downstream effectors of trp2 channel function

Anthony Imbalzano

1. Identify and characterize factors involved in repression and activation of myogenic gene expression
2. Examine functional roles of the Ini1 tumor suppressor in cell differentiation and chromatin remodeling

Stephen Jones

1. Analysis of Wnt5a signaling pathways in B cell lymphoma and chronic myeloid leukemia.,
2. Mdm2 regulation of p53 activity in skin
3. Dicer in bone development and in tumor suppression.

Jeanne Lawrence

1. Examine the relationship of a novel intranuclear body structure in cancer cells to growth control, and its dynamic interactions with other known nuclear bodies and regulation of specific genes.
2. Investigates the impact of triplet repeat mutations on expression, processing and transport of specific RNAs in human genetic diseases, such as myotonic dystrophy.
3. The role of XIST RNA in X-inactivation is being examined using transgenes in ES cells.

Mary M. Lee

1. Interaction of MIS and androgens with VEG-F in reproductive tissues
2. Elucidation of the MIS signal transduction pathway
3. Smad function and expression in Leydig cells
4. Effects of dioxins on the male reproductive system

Jane Lian

1. Transcriptional control of skeletal development by BMP inducible proteins (Runx, Hox, Homeodomain).
 2. Stem cells for tissue engineering of cartilage and bone.
 3. Mechanisms of cancer cell metastasis to the skeleton.
- Our approaches include gene regulation, in vitro models of cell growth and differentiation and morphologic phenotype characterization of mutant mice.

Elizabeth Luna

Molecular dissection of focal adhesion dis/assembly mechanisms, using mutational analyses, cell transformation, RNAi protein down-regulation, and/or live cell imaging and adhesion assays.

Jeffrey Nickerson

1. Explore the role of SRm160 in the coupling of RNA splicing to RNA export from the nucleus. The multidisciplinary experimental approach will combine in vitro assays with live cell microscopy imaging complex assembly in live cells by confocal microscopy, FRAP, and FRET.
2. Explore the role of SRm300 in RNA splicing. In vitro splicing assays show SRm300 to be in spliceosomal complexes. We will examine the effects of its depletion from human cells using in vivo splicing reporter assays.

Paul Odgren

1. Expression/function studies of factors that affect bone cell differentiation in vivo and in vitro.
2. Mouse and rat models of metabolic bone diseases.
3. Histological analysis of bone cell differentiation and structure and bone development.

Kip Sluder

We address regulation of mitosis, centrosome duplication, and the cell cycle. Projects include: Centrosomes in the control of G1 cell cycle progression; Cleavage failure and cell cycle progression; Analysis of the basis for centrosome amplification using live cells; The relationship between mitosis duration and G1 cell cycle progression. Our methods emphasize time lapse microscopy of live cells under normal and experimental conditions, immunofluorescence microscopy, and micromanipulation of live cells.

Gary Stein

1. Molecular characterization of intranuclear targeting signals in cell cycle and tissue-specific gene regulatory factors; implications for biological control and cancer.
2. Utilization of intranuclear targeting signals for development of gene therapy approaches aimed at directing gene regulatory factors to specific nuclear domains.

Janet Stein

1. HiNF-P in regulation of H4 histone gene transcription. HiNF-P is a critical factor for cell cycle regulation of H4 histone genes. To determine its biological activity, we will use molecular and cellular approaches, including transfection and RNAi analyses coupled with immunofluorescence microscopy.
2. Chromatin structure of an osteoblast-specific gene. Chromatin immunoprecipitation assays will be used to examine the dynamics of regulatory protein interactions with the promoter of the bone-related osteocalcin gene during osteoblast differentiation.

Andre van Wijnen

1. Analysis of the function of RUNX2 proteins in regulating osteoblast cell growth and differentiation.
2. Transcriptional and post-transcriptional regulation of RUNX2 activity during the cell cycle in response to osteogenic signals.

George Witman

1. Proteomic analysis of flagellar proteins.
2. Function of primary cilia.
3. Structure and assembly of dynein.
4. Intracellular transport by microtubule-based molecular motors.
5. Role of intraflagellar transport (IFT) in sperm tail formation.
6. Regulation of dynein motor activity