



Robert Wood Johnson Medical School MD/PhD Program Symposium

Thursday, July 31, 2008
Department of Molecular Biology
Carl Icahn Laboratory
Princeton University
Princeton, New Jersey

Program

Continental Breakfast 8:30 to 9:00 a.m.

Introductory Remarks 9:00 to 9:30 a.m.

Terri Goss Kinzy, PhD

Assistant Dean for Medical Scientist Training
Director, UMDNJ-RWJMS/Rutgers/Princeton MD/PhD
Program

Professor, Department of Molecular Genetics,
Microbiology, and Immunology, UMDNJ-RWJMS

James Broach, PhD

Associate Director, Lewis-Sigler Institute for Integrative
Genomics, Princeton University

Professor and Associate Chair, Department of
Molecular Biology, Princeton University

Student Presentations (Session 1) 9:30 to 10:30 a.m.

Break 10:30 to 10:45 a.m.

Student Presentations (Session 2) 10:45 to 11:45 a.m.

Break 11:45 to 12:00 p.m.

Dean's Welcome Remarks 12:00 to 12:15 p.m.

Peter Amenta, MD, PhD

Interim Dean, UMDNJ-RWJMS
Professor and Chair, Department of Pathology and
Laboratory Medicine, UMDNJ-RWJMS

Luncheon	12:15 to 2:00 p.m.
Student Presentations (Session 3)	2:00 to 3:00 p.m.
Break	3:00 to 3:15 p.m.
Keynote Address	3:15 to 4:15 p.m.

Leon Rosenberg, MD

Professor, Department of Molecular Biology, Princeton University and Woodrow Wilson School of Public and International Affairs

“Questions a Physician-Scientist Asks About Life”

Concluding Remarks	4:15 to 4:30 p.m.
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Elizabeth Gavis, MD, PhD

Princeton Liason, UMDNJ-RWJMS/Rutgers/Princeton MD/PhD Program

Professor, Department of Molecular Biology, Princeton University

Reception	4:30 p.m.
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Acknowledgments:

The MD/PhD Symposium was made possible by the support of Dr. Arnold Rabson, Senior Associate Dean for Research and Dr. Peter Amenta, Interim Dean of UMDNJ-Robert Wood Johnson Medical School.

We also would like to acknowledge Dr. Terri Goss Kinzy, Director of the MD/PhD program, and Perry Dominguez, the Program Administrator at RWJMS.

We want to thank Dr. Elizabeth Gavis, Princeton Liason for our program, and Elena Chiarchiaro, Manager of Student Services, and Dawn Tindall, Academic Assistant, for Princeton Molecular Biology. Additionally, we appreciate the support of Dr. Jean Schwarzbauer, the Director of Graduate Studies for the Department of Molecular Biology.

Thank you,

Erin Haley
Sean Liu
Jean McGee
Nilay Sethi
Richard Sun

Order of Presentations

Session 1: Neuroscience

Session Chair: Erin M. Haley

Issa P. Bagayogo, “Regulated release of neurotrophins by cortical oligodendrocytes”

Jean-Paul Abboud, “An *in silico* model of retinal neurogenesis that accounts for both cell number and cell class in normal and knockout mice”

Christopher Langhammer, “A neuromuscular junction-based neural interface for neural signal acquisition”

Richard Sun, “*In vivo* calcium imaging with genetically encoded calcium indicators in the rodent cerebellum”

Session 2: Cell Biology

Session Chair: Nilay Sethi

Matthew D. Treiser, “Early prediction of long-term material-mediated stem cell fates”

Jean S. McGee, “The role of Rif1p in preferential elongation of short telomeres”

Sean T. Liu, “Proteomic and metabolomic approaches to characterize the role of pUL37x1 in the human cytomegalovirus life cycle”

Erin M. Haley, “A role for autophagy in cellular quiescence”

Session 3: Cancer Biology

Session Chair: Sean T. Liu

Nilay Sethi, “The role of Notch signaling in breast cancer metastasis”

Shannon C. Agner, “Using kinetic textural features for improved classification of breast lesions on dynamic contrast enhanced (DCE)-MRI”

Peter Mazari, “Receptor isolation and characterization of a novel feline leukemia virus envelope with high titers on human osteosarcoma cell lines”

Kevin Anton, “Intercellular signaling in the tumor microenvironment: Roles for the tumor-associated macrophage”

About the MD/PhD program at RWJMS...

The University of Medicine and Dentistry of New Jersey- Robert Wood Johnson Medical School was established as a part of Rutgers, The State University of New Jersey in 1966 and is located on the Busch Campus of Rutgers University in Piscataway, New Jersey and adjacent to Robert Wood Johnson University Hospital (RWJUH) and several campuses of Rutgers University in New Brunswick, New Jersey. In 1986, the name of Rutgers Medical School was changed to Robert Wood Johnson Medical School, in honor of Robert Wood Johnson, a former member of the Board of Trustees of RWJUH. Rutgers, The State University of New Jersey was chartered in 1766. It has a unique history as a colonial college, a land-grant institution, and a state university. The MD/PhD program has historically been joint with Rutgers University, owing to the joint nature of all RWJMS-based graduate programs and the historic and physical links of the schools and campuses. Princeton University was chartered in 1746 as the College of New Jersey and renamed Princeton University in 1896 when university status was achieved. Princeton University joined RWJMS and Rutgers University in the MD/PhD program in the fall of 2005 through the Department of Molecular Biology.

The MD/PhD program has existed at RWJMS since its inception, and the MD/PhD program of RWJMS/Rutgers University/Princeton University is based on the strengths of the three universities to create a unique opportunity for trainees to select from among a wide variety of programs and mentors for the PhD portion of the dual degree. The missions of the RWJMS/Rutgers University/Princeton University MD/PhD Program are:

- To train the next generation of physician scientists to advance biomedical research and medical therapy and to provide service to our communities;
- To promote the interdisciplinary research training necessary to capitalize on growing scientific opportunities;
- To support the unique career paths and address the challenges of students in the MD/PhD program;
- To foster a community of researchers, educators, and clinical scientists conducive to the training of program students.

To this end, a core of faculty from the three institutions has been recruited to administrative, support and mentorship roles in the MD/PhD program. These individuals represent a diverse array of scientific disciplines. While each student chooses his or her own laboratory and mentor, all benefit from the support and expertise of the program faculty and the diversity of student interests. Most importantly, the program is designed to maintain integrated training in science and medicine through the first two years of medical school (M1 and M2), the PhD phase (P1-P3), and the final clinical years of medical school (M3 and M4).

The immediate proximity of faculty laboratories at RWJMS and Rutgers University and the close scientific ties to Princeton University build the essential relationships for the MD/PhD program:

- An intensive research experience where the student works closely with a faculty member who serves as a research advisor

- Formal course offerings from both the medical and graduate school curricula
- Seminars, journal clubs, research conferences, and symposia which are held on the campuses
- Attendance and presentations at local and national meetings
- Free and informal access to all training faculty as well as to other members of the academic community on this campus
- An annual symposium where trainees present their research results to the entire program
- Clinical exposure and individualized tutorials in clinical medicine during the PhD years

C²alc “Clinical Continuity a la carte”

Once a student enters the PhD phase of the MD/PhD program, the question arises as to how to maintain the “clinical contact” and assure a smooth transition back to the M3 year. As such, the MD/PhD program offers an “a la carte” selection of opportunities to fit the unique interests, needs, and locations of our students. Students do not exercise ALL of these options, but select the best ones for their specific stage of the PhD. The C²alc options are below and we welcome student suggestions.

Cognitive Skills Tutoring

- Contact Dr. Norma Saks at: saks@umdnj.edu

Physical Diagnosis Tutoring

- Contact Dr. Carol Terregino at: terregca@umdnj.edu

M1 Integrated Cases Facilitator:

- Contact Dr. Will Zerhing at: zehrinwa@umdnj.edu

PCM Mentor Shadowing

- Contact your M1/M2 mentors

Promise Clinic or Other Service Learning

- Go to <http://rwjms.umdnj.edu/hiphop/>

Interim OSCEs

- Contact Dr. Carol Terregino at: terregca@umdnj.edu

Local Physician Shadowing

- Contact our clinical program faculty or Perry

Abstracts

Regulated release of neurotrophins by cortical oligodendrocytes

Issa Papiss Bagayogo, Ying Jean, Lauren Lercher, and Cheryl F. Dreyfus

Neuroscience and Cell Biology, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

Abstract:

Recent literature suggests that oligodendrocytes (OLGs) not only myelinate axons, but also release trophic factors. For instance, brain-derived neurotrophic factor (BDNF) is expressed in OLGs and has been shown to enhance the survival and function of basal forebrain cholinergic neurons (Dai et al, J. Neuro 2003). To determine whether the release of OLG-derived BDNF can be regulated, differentiated OLG populations isolated from the frontal, cingulate and parietal cortices were stimulated with the neurotransmitter glutamate or glutamate receptor agonists. Levels of released BDNF were evaluated by ELISA and western blot analysis. Results indicated that 10 minutes application of glutamate increased the amount of BDNF released by OLGs.

Immunocytochemical and western blot analysis revealed that OLG lineage cells exhibit metabotropic glutamate receptors as well as ionotropic AMPA/Kainate and NMDA receptors. However, while ACPD, a metabotropic agonist, mimicked the effects of glutamate on BDNF release, the ionotropic agonists kainate and NMDA did not, suggesting that AMPA/Kainate and NMDA receptors do not play a role in the release of BDNF from OLGs. The PLC-pathway appears to be a key mediator of BDNF release. Short-term treatment of OLGs with the PLC activator m-3M3FBS induced robust release of BDNF. Furthermore, in the presence of the PLC antagonist U73122, ACPD-induced release was completely blocked. Similar results were obtained using the IP3 inhibitor 2-APB and the intracellular calcium chelator BAPTA-AM. Taken together, these results suggest that OLG lineage cells can secrete BDNF in a regulated manner, through the activation of metabotropic glutamate receptors and the PLC pathway.

An *in silico* model of retinal neurogenesis that accounts for both cell number and cell class in normal and knockout mice.

Jean-Paul Abboud^{1,2}, Oliver Camand², Nancy L. Hayes², and Richard S. Nowakowski^{1,2}

¹Biomedical Engineering, Rutgers University, Piscataway, New Jersey

²Neuroscience and Cell Biology, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

Abstract:

The mouse retina is composed of 5 types of neurons and Muller glial cells, all of which are generated from embryonic day 10 (E10) to postnatal day 11 (P11). The cells that comprise the retina at E10 are exclusively proliferative. The total retinal population increases by ~150 fold by the time the proliferative population is exhausted at P11. With each cell cycle during this period, systematic changes occur in both the proportion of progeny cells that continue to proliferate vs those that quit (Q) the cell cycle to become postmitotic, and the fate of the progenitor cells. We developed an *in silico* model of retinal neurogenesis based on: 1) an estimate of 22 cell cycles during this period, 2) changes in Q as a function of elapsed cell cycle, and 3) a set of probability density functions that describe the cell fate per cell cycle for each of the retinal cell classes. Comparison of the model output with data from actual retinal development established that a sigmoidal-shaped pathway describing cell cycle exit from Q=0 to Q=1 and modified normal distributions for each cell class probability density function accounts well for both the number and classes of cells produced both *in toto* and at each stage of the developmental period. The power of this model is its capability to provide specific predictions of time, magnitude, and systematic causes of differences in retinal neurogenesis. This was exploited by inducing systematic perturbations to support quantitative hypotheses about the variability in retinal cell composition occurring subsequent to aberrant development, e.g., in ocular albinism and various knockout such as *Math5* and *Brn-3b*. Preliminary findings show that the ratio of neuronal cell classes produced can be changed by 1) cell cycle exit decisions alone, 2) cell fate determination, or 3) a combination of the two. Such changes can also be applied to make predictions in normal retinal development where a central-to-peripheral difference in cell composition is observed.

The Na⁺/H⁺ exchanger and the nigrostriatal dopamine system

Marcelo Rocha and Patricia K. Sonsalla

Neurology, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

Abstract:

Na⁺/H⁺ exchanger (NHE) proteins are involved in intracellular pH and volume regulation and may influence neurotransmission. The abundant NHE isoform 1 (NHE1) has also been linked to brain cell damage during metabolic stress. It is not known whether NHE proteins are involved in striatal dopamine (DA) neurotransmission under normal or metabolic stress conditions. Striatal DA neurotransmission is essential for motor function and is disrupted in Parkinson's disease (PD) due to loss of nigrostriatal DA neurons. The present studies tested the hypothesis that NHE proteins are involved in DA neurotransmission and nigrostriatal DA neuron damage.

Using *in vivo* microdialysis, striatal NHE inhibition elicited a bi-phasic effect on DA neurotransmission with a concomitant increase in DA turnover. Striatal NHE inhibition reduced DA overflow caused by the mitochondrial inhibitor malonate, but did not modify subsequent damage to nigrostriatal DA terminals. RT-PCR studies revealed that mRNA transcripts for NHE1-5 are expressed in the striatum and ventral midbrain. Although NHE1 protein was detected in striatal synaptosomes, confocal microscopy revealed that NHE1 was not directly co-located with nigrostriatal DA neurons.

Together the data support a role for NHE proteins in DA neurotransmission but not in damage to DA neurons. These results are consistent with expression of multiple NHE isoforms in the nigrostriatal regions and the absence of NHE1 immunoreactivity in DA neurons. While future studies are needed to elucidate the mechanisms by which NHE proteins influence nigrostriatal DA neuron homeostasis, the present data raise new implications for understanding DA neurotransmission in health and disease states.

A neuromuscular junction-based neural interface for neural signal acquisition

Christopher Langhammer¹ and Bonnie Firestein^{1,2}

¹Biomedical Engineering, Rutgers University, Piscataway, New Jersey

²Cell Biology and Neuroscience, Rutgers University, Piscataway, New Jersey

Abstract:

The ideal neural interface establishes two way contact between a technical device and neural structures within the body. The objective of such devices is to record bioelectrical signals originating in the nervous system in order to restore motor and sensory function in disabled patients. Most efforts to design neural interfaces target cortical neurons in the primary motor cortex using penetrating multielectrode arrays, which have yet to perform at a level necessary to justify their use in large-scale clinical trials. A modification of the “cultured probe” design, a neural interface in which neurons cultured directly onto an electrode surface prior to implantation facilitate incorporation into the host nervous system, may significantly improve the recording capabilities of current neural interfaces. By using muscle cells rather than neurons as the electrogenic cell type cultured onto the electrode surface and by targeting the peripheral nervous system as the implantation site, many of the roadblocks to progress in this field can be overcome. The myotubes have the added benefit of naturally encouraging the ingrowth of damaged motor axons using naturally secreted cell signaling molecules. This regenerative capacity may potentially be used to target the growth of damaged spinal neurons into an electrode. We are using cultured myotubes as a biological signal amplifier, enabling us to tap the neural signals encoding motor intention in PNS axons. Using the myotube cultured probe technique, we hope to design an electrode that improves the robustness of neural interface recording without sacrificing the resolution associated with implanted electrodes.

***In vivo* calcium imaging with genetically encoded calcium indicators in the rodent cerebellum**

Richard Sun, Bernd Kuhn, and Samuel S.-H. Wang

Department of Molecular Biology, Princeton University, Princeton, New Jersey

Abstract:

Brain activity can be monitored at the cellular level by measuring changes in cytosolic calcium, which occur in response to activity in neurons and glia. Synthetic calcium-binding dyes have enabled the first wave of studies in which two-photon laser scanning microscopy has been used to monitor activity *in vitro* and *in vivo*. However, organic dyes do not target specific cell types and label subcellular structures such as dendrites poorly. More recently, genetically encoded calcium indicator (GECIs) proteins have been developed. One of these indicators is G-CaMP2, a fusion protein of the calcium binding calmodulin, circularly permuted GFP, and the M13 binding domain. The usefulness of G-CaMP2 in monitoring calcium transients has been demonstrated *in vivo* in heart tissue (Tallini et al. 2006) and in Bergmann glia (Hoogland et al., *in review*). Our focus is to express GECIs in mouse cerebellar neurons. We are taking two approaches to transgenesis. First, we are generating transgenic mouse lines in which G-CaMP2 is expressed under the control of a conditional stop sequence and can be activated by cre recombinase. Second, we are performing *in utero* electroporation to introduce G-CaMP2 into the cerebellar anlage of embryonic mice. Results of successful cortical transfections (Saito 2006) suggest the viability of electroporation in the cerebellum. With both methods of labeling we seek to analyze neuronal network activity in the cerebellar cortex in the anesthetized and awake mouse. GECIs will allow us to investigate neuronal subpopulations and subcellular compartments, as well as repeated imaging of neurons over the span of weeks to months. In this way we plan to dissect cerebellar function at the level of intact brain circuits.

Early prediction of long-term material-mediated stem cell fates

Matthew D. Treiser^{1,2}, Eric Yang¹, Simon Gordonov¹, Abrham Joy², Er Liu¹, Hak-Joon Sung², Daniel Cohen⁵, Doyle Knight³, Christopher Chen⁵, Loannis Androulakis^{1,4}, Joachim Kohn², and Prabhas V. Moghe^{1,4}

¹Biomedical Engineering, Rutgers University, Piscataway, New Jersey

²New Jersey Center for Biomaterials, Rutgers University, Piscataway, New Jersey

³Mechanical and Aerospace Engineering, Rutgers University, Piscataway, New Jersey

⁴Chemical and Biochemical Engineering, Rutgers University, Piscataway, New Jersey

⁵Bioengineering, University of Pennsylvania, Philadelphia, Pennsylvania

Abstract:

The role of synthetic biomaterials on long-term stem cell differentiation is poorly understood and thus stem cell regenerative materials are difficult to rationally design. Recently, it has been demonstrated that the cytoskeletal proteins, particularly actin, are strong mediators of human mesenchymal stem cell (hMSC) differentiation, with early cell shape having large consequences on longer-term functions such as differentiation. As the cytoskeleton mediates the outside-in stem cell signaling, we sought to "profile" the effects of biomaterials based on the analysis of material induced changes in intracellular, quantitative descriptors of the cytoskeleton of stem cells. The ultimate goal is to predict long-term stem cell fates and lineage commitment based on the signature trends of early intracellular cytoskeletal organization correlated to biomaterial chemistry. hMSCs were sub-cultured on various polymeric biomaterial substrates for up to two weeks. Initial findings indicate that substrate chemistry has a strong effect on the lineage commitment fates of stem cells, with different materials altering the percentage of cells committed toward either the adipocytic or osteoblastic lineages. Utilizing high content imaging of cells at early time points (24 hours), over 50 morphometric descriptors of actin were quantified for each substrate. Multi-dimensional scaling of the calculated descriptors on a per cell basis permitted the visualization of distinct cell populations that we hypothesize are representative of either the osteoblastic or adipocytic stem cell fates. This study highlights the possibility of using a combination of high content imaging and materials informatics toward predicting longer-term stem cell differentiation outcomes on complex biomaterials.

The role of Rif1p in preferential elongation of short telomeres

Jean S. McGee and Virginia A. Zakian

Department of Molecular Biology, Princeton University, Princeton, New Jersey

Abstract:

In both lower and higher eukaryotes, telomerase preferentially elongates short telomeres. Consistent with previous findings, I propose that the difference in the binding level and activity of Rif1p and Rif2p, negative regulators of telomerase, on short telomeres marks those telomeres for preferential telomerase recruitment. I hypothesize that the reduced Rif2p binding at short telomeres recruits Tel1p, an ATM/ATR-like kinase shown to be necessary for recruiting telomerase subunits to short telomeres. Tel1p subsequently phosphorylates Rif1p and this phosphorylation relieves the ability of Rif1p to inhibit telomerase *in cis*. According to this model, the inactivation rather than the displacement of Rif1p allows telomerase recruitment and activation. I propose to test this hypothesis with the following aims 1) confirm the reduced Rif2p and WT-level Rif1p binding to short telomeres using chromatin immunoprecipitation and quantitative PCR 2) determine if Rif1p is regulated by Tel1p-dependent phosphorylation by employing synthetic dosage lethality, and 3) assess if Rif1p phosphorylation affects telomerase action by performing site-directed mutagenesis of the Tel1p consensus sites on Rif1p, and then analyzing telomere lengths. As telomerase is active in more than 85% of all human cancers, the study of its regulation will provide important insights into cancer biology.

Proteomic and metabolomic approaches to characterize the role of pUL37x1 in the human cytomegalovirus life cycle.

Sean T. Liu and Thomas E. Shenk

Department of Molecular Biology, Princeton University, Princeton, New Jersey

Abstract:

Human cytomegalovirus (HCMV) is a linear, double-stranded DNA virus belonging to the beta-herpesviridae family. The essential HCMV protein, pUL37x1, has been well documented to inhibit apoptosis, decrease cellular ATP levels, induce cytoskeleton rearrangement, and release calcium ion stores from the endoplasmic reticulum. I have fluorescently labeled pUL37x1 in order to highly specifically immunoprecipitate the protein along with its binding partners in the context of viral infection. The sample has undergone mass spectrometry proteomic analysis to allow for identification of most interactors of pUL37x1. This proteomic profile will help generate novel hypotheses to explain uncharacterized UL37x1 functions. Secondly, I will examine the downstream effects of pUL37x1 action on the cellular metabolome. HCMV has been shown by our laboratory to exert profound effects on the steady state levels of cellular metabolites. The mitochondrial interaction of pUL37x1 makes it a reasonable viral candidate for metabolomic study. To pursue this aim, I will use mass spectrometry to generate metabolomic profiles changes upon wild-type HCMV infection and infection with pUL37x1 defective mutant strains. By accomplishing these aims, I hope to gain a greater understanding of the mechanism by which pUL37x1 is able to function in the life cycle of HCMV and to characterize its influence on the cellular metabolome.

A role for autophagy in cellular quiescence

Erin M. Haley and Hilary A. Collier

Department of Molecular Biology, Princeton University, Princeton, New Jersey

Abstract:

Quiescence is a reversible exit from the cell cycle in which cells are not dividing, yet retain the ability to return to the cell cycle upon proper stimulation. Little is known about what regulates quiescence, even though the vast majority of cells in the human body spend most of their existence in this state. Several lines of evidence suggest that quiescent fibroblasts are not inactive, just waiting or “sleeping” until the proper stimulus is presented. On the contrary, quiescence is marked by high transcriptional activity, with up- and down-regulation of hundreds of genes defining a “quiescence program” of gene expression. Quiescence can be experimentally induced in culture by withdrawal of serum from growth medium or starvation for amino acids. Because macroautophagy, a cellular survival mechanism characterized by nonspecific “self-cannibalism” of cytoplasm and organelles at the lysosome during starvation or other suboptimal conditions, can be induced by similar experimental conditions, we hypothesized that autophagy might have an integral role in the quiescent state. To test this, we induced primary human fibroblasts to exit the cell cycle reversibly by growing them to confluence (contact inhibition) while maintaining their medium and serum conditions constant. We monitored autophagy by Western blot, flow cytometry and immunofluorescence microscopy under various autophagy-inducing and inhibiting conditions. We report that autophagy is induced to a high level in otherwise unperturbed contact-inhibited, quiescent fibroblasts as compared to growing controls by all aforementioned measurements. Our results demonstrate that there is a close connection between reversible cell cycle exit and the induction of autophagy that does not depend upon either stressful conditions or a depletion of nutrients or growth factors. Future work will focus on whether autophagy is essential for successful quiescence, and how autophagy induction by quiescent cells may help to limit DNA damage and ROS accumulation.

The role of Notch signaling in breast cancer metastasis

Nilay Sethi and Yibin Kang

Department of Molecular Biology, Princeton University, Princeton, New Jersey

Abstract:

The metastatic spread of tumor cells from primary sites to distant organs accounts for over 90% of cancer-related deaths. Our lab has employed non-invasive imaging technologies to study the role of fluid processes such as signaling pathways in cancer progression; in particular we have elucidated the dynamic role of TGF β signaling in organ-specific metastasis. Utilizing this novel mouse model, our lab is interested in investigating other signaling pathways that have been implicated in breast cancer such as the Notch pathway. Intriguingly, the Notch pathway has been recently shown to interact with the TGF β pathway in several different tissues in both a cooperative and antagonistic fashion depending on the context. Moreover, Notch signaling has been shown to be oncogenic in the context of mammary tissue and aberrant activation has been associated with poor clinical outcome in breast cancer patients. As such, I propose to elucidate the direct and indirect role, via molecular interactions with the TGF β pathway, for Notch signaling in breast cancer metastasis. To accomplish this, I have conducted experiments to determine the relationship between these two pathways in the context of various breast cancer cell lines. In particular, I have genetically and pharmacologically manipulated the Notch pathway and subsequently evaluated its effect on TGF β reporter breast cancer cell lines as well as TGF β -responsive genes. Following this, I plan to address the functional relationship between these two pathways by testing the effect of Notch pathway manipulation on TGF β -dependent processes such as growth inhibition and metastasis. Finally, catering to the strengths of our lab, I will conduct mouse xenograft experiments elucidating the role of the Notch pathway in breast cancer metastasis and evaluating the therapeutic value of a Notch pathway inhibitor. In light of the poor clinical outcome associated with Notch pathway activation in breast cancer and the emerging implications of Notch pathway inhibitors in cancer therapy, it has become critical to study the role of notch signaling in breast cancer metastasis

Using kinetic textural features for improved classification of breast lesions on dynamic contrast enhanced (DCE)-MRI

Shannon C. Agner¹, Salil Soman², Edward Libfeld², Margie McDonald², Mark A. Rosen³, Deanna Chin², Sarah Englander³, Kathleen McCarthy³, Mitchell D. Schnall³, John Noshier², and Anant Madabhushi^{1,2}

¹Biomedical Engineering, Rutgers University, Piscataway, New Jersey

²Radiology, Robert Wood Johnson University Hospital, New Brunswick, New Jersey

³Radiology, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania

Abstract:

Breast MRI is gaining widespread use in the Radiology community as a useful complement to x-ray mammography in breast cancer screening. Because of its higher sensitivity compared to ultrasound and x-ray, MRI can provide additional information in identifying lesions in instances where conventional x-ray mammography or ultrasound may be suboptimal. Currently, radiologists evaluate breast lesions based on qualitative description of lesion morphology and contrast uptake profiles that are approximated by measuring image signal intensity of suspicious lesions. However, the subjective nature with which radiologists evaluate breast lesions introduces high rates of inter-observer variability. In addition, the high sensitivity of MRI results in poor specificity and thus a high rate of biopsies on benign lesions.

We recently developed a computer-aided diagnosis (CAD) analysis for breast lesions as imaged on DCE-MRI that uses a multi-feature analysis scheme, extracting over five hundred morphological, textural, and kinetic features for classification of manually segmented breast lesions as detected by expert radiologists. In our CAD analysis, we also introduce a novel lesion feature that we call the kinetic texture feature. The multi-feature set for each lesion is first transformed into a reduced feature space using both linear and nonlinear dimensionality reduction methods. Each reduced feature space is then run on a support vector machine (SVM) classifier to classify each lesion as either benign or malignant. 25 breast lesions (6 benign, 19 malignant) with histopathologic correlation were evaluated by DCE-MRI at 1.5 Tesla. Kinetic texture characteristics outperformed both signal intensity kinetics and lesion morphology as a classifier of breast lesions. Accuracy and positive predictive value (PPV) of kinetic texture was 78.1% and 85.5%, respectively. Signal intensity had accuracy and PPV of 76.2% and 76.9%, respectively, and morphology features had accuracy and PPV of 70.0% and 81.8%, respectively.

Receptor isolation and characterization of a novel feline leukemia virus envelope with high titers on human osteosarcoma cell lines

Peter Mazari, Daniela Linder-Basso, Anandita Sarangi, and Monica Roth

Biochemistry, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

Abstract:

Our laboratory has developed a system to retarget retroviral entry through the screening of random libraries generated within the receptor-binding domain of the FeLV envelope (Env). This has led to the isolation of several novel Env proteins that utilized receptors other than those of the wildtype FeLV Env.

One isolate of particular interest, because of its high titers on human osteosarcoma cell lines, was generated through the randomization of an 11 amino acid stretch the receptor binding domain. This isolate referred to as CP encodes an internal cysteine loop. Alanine scanning and site directed mutagenesis indicates that both the internal cysteines, a Glu at position 8 and a Trp at position 11 are absolutely necessary for infection. Viral binding studies with the CP Env protein and mutants correlated receptor binding with viral titer.

Tropism studies revealed high titers on 3 human osteosarcoma cell lines (143B, CRL1543, and CRL 1427). Non-permissive cells included feline AH927 cells and NIH/3T3 cells, eliminating the receptor usage within the known murine and feline leukemia viruses. In order to isolate the viral receptor a cDNA library was generated from 143B cells and inserted into the retroviral backbone pMX. Through library screening we have identified a 1.9kb cDNA that encodes the viral receptor. This cDNA has 100% sequence homology within the coding region to the G-protein coupled receptor 172A (GPR172A), which is ubiquitously expressed and noted to be upregulated in various human cancers including pancreatic carcinoma and primitive neuroectodermal tumors (medulloblastoma). Studies illustrating the tissue specificity and receptor isolation and characterization will be presented.

Intercellular signaling in the tumor microenvironment: Roles of the tumor-associated macrophage

Kevin Anton¹, Debabrata Banerjee^{1,2}, and John Glod^{1,3}

¹Pharmacology, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

²Medicine, Cancer Institute of New Jersey, New Brunswick, New Jersey

³Pediatrics, Division of Hematology and Oncology, Cancer Institute of New Jersey, New Brunswick, New Jersey

Abstract:

The tumor microenvironment is composed of many different cell types, including tumor-associated macrophages (TAMs), mesenchymal stromal cells (MSCs), fibroblasts, and tumor cells. Tumor types such as glioblastoma multiforme and some breast carcinomas contain a stroma dominated by a large population of macrophages. In invasive breast cancers, TAMs can account for more than 50% of the total tumor mass and up to 80% of the tumor-associated leukocyte population. TAMs are required for tumor survival and may independently influence the metastatic potential of certain tumors.

Macrophages influence other cell types through the release of soluble factors, such as cytokines, chemokines, and growth factors. The release of specific factors and specific concentrations of those factors is dependant upon the local environment. For example, the cytokine profile of glioblastoma-associated macrophages (GAMs) is significantly different from that of normal human macrophages. Activation of these GAMs elicits an altered cytokine profile from that of non-activated GAMs.

Preliminary data suggest that macrophages may influence solid tumor growth by promoting the localization of MSCs to the tumor. We propose that macrophages exert their effects on MSC localization through the release of specific chemotactic cytokines. Results of an ELISA cytokine panel show that IL-8, MCP-1, and CCL5 may be involved in MSC localization. We hypothesize that through specific interactions, macrophages elicit multiple effects on the tumor microenvironment, including MSC migration, MSC differentiation, and tumor growth. In addition, by inhibiting macrophage function or via macrophage depletion, we expect both MSC migration and tumor growth to be reduced.

MD/PhD Student Biographies

Jean-Paul J. Abboud

Hometown:

College(s) Attended and Degree(s) Earned: Rutgers University, Biological Sciences.

Year in MD/PhD Program: ?

PhD Thesis Laboratory: Richard Nowakowski, PhD

Area of Interest in Clinical Practice: Surgery

Area of Interest in Research: Neural Development

Personal Information:

I was born between two mountains – in a valley, that is.

I was given a composite of two first names – Jean and Paul.

I was raised on two continents separated by two large bodies of water – the Mediterranean Sea and the Atlantic Ocean.

I hold citizenships in two countries, but I am not eligible to be president in either one. (Then again, why would I ever want to?)

I went to two colleges.

I have two siblings.

My girlfriend says I have two personalities.

I was blessed with two eyes, two ears, two hands, and two feet.

And to carry on with the tradition of two's, I am going for two doctoral degrees.

Two to be continued...

Shannon Agner

Hometown: Cherry Hill, NJ

College and year of graduation: Dartmouth College, 2002; MS in Engineering, Dartmouth College, 2004.

Program Year: PhD I

PhD Thesis Laboratory: Laboratory for Computational Imaging and Bioinformatics, Department of Biomedical Engineering, Rutgers University

Area of Interest in Research: Image Analysis, Computer-Aided Diagnosis (e.g., MRIs and digitized histopathological images)

Personal Information: Since “free time” is purely an aspiration during the school year, this summer, Shannon is spending her time trying to catch up on her leisure reading, traveling, hiking when she is around mountains, and hanging out at the beach when she is down at the Jersey Shore. Oh, and you'll probably find her in the lab during the week.

Kevin Anton

Hometown: Westfield, NJ

College(s) Attended and Degree(s) Earned: Penn State University, B.S. – Pre-Medicine

Year in MD/PhD Program: PhD III

PhD Thesis Laboratory: John Glod

Area of Interest in Clinical Practice: Hematology/Oncology

Area of Interest in Research: Oncology - Investigating the role of macrophages in the tumor microenvironment.

Personal Information: In addition to long walks on the beach, romantic sunsets, and candlelit dinners.... Kevin enjoys spending time with his dog, Bauer, who could best be described as 50 pounds of pure magnificence. During the summer months, you are most likely to find them on the hiking trails of central NJ, where his canine friend, normally scared of anything that moves in the wind, is willing to take swan dives off 8-foot cliffs in order to escape the heat and enjoy the river below. Some of his most coveted activities include, frequent trips to the Poconos, golf, hockey, and bumper boats.

Tim Arlow

Hometown: Southampton, NJ

College(s) Attended and Degree(s) Earned: B.S. Biomedical Engineering, Syracuse University

Year in MD/PhD Program: MS II

PhD Thesis Laboratory:

Area of Interest in Clinical Practice: Pathology or Endocrinology

Area of Interest in Research: Aging

Personal Information: I enjoy spending my spare time writing music and swimming. I'd like to eventually build my own home with an uncanny resemblance to Tumulty's Pub (of New Brunswick fame). Finally, I just scheduled an echocardiogram to confirm/deny Marfan's syndrome. Depending on the result, I may need to change my area of interest in research!

Issa Bagayogo

Hometown: Weehawken NJ, originally from the Ivory Coast

College and Year of Graduation: Hunter College, CUNY, BA, 2000

Program Year: PhD IV

PhD Thesis Laboratory: Dreyfus Lab, Neuroscience and Cell Biology, UMDNJ-RWJMS.

Area of Interest in Clinical Practice: Right now, I am thinking neurology, but who knows, I might change my mind once I hit the clinics full times.

Area of Research Interests: Neuron-Glia interaction

Personal Information: Recently got married to a wonderful woman. I have 2 guinea pigs. Hobbies are: the beach, independent movies, soccer and traveling to Europe.

Brian Barlow

Hometown: Utica, NY

College(s) Attended and Degree(s) Earned: University of Rochester, 2002, BS Biological Sciences: Neuroscience, BA Psychology

Year in MD/PhD Program: PhD III

PhD Thesis Laboratory: Dr. Mona Thiruchelvam, Environmental & Occupational Health Sciences Institute, UMDNJ-RWJMS

Area of Interest in Clinical Practice: Keeping an open mind...

Area of Interest in Research: Developmental Origins of Disease / Parkinson's Disease / Toxicology

Personal Information: In my free time, I really enjoy baking, riding my motorcycle, and standing ashamedly near the fence of the dog park while my sheepdog-werewolf hybrid, Baxter, gets all up in everyone's business.

Desmond Brown

Hometown: Brown's Town, St. Ann, Jamaica

College(s) Attended and Degree(s) Earned: B.S., Chemistry, Temple University, 2003; M.S., Biochemistry, Temple University School of Medicine, 2006

Year in MD/PhD Program: PhD I

PhD Thesis Laboratory: Jonathan Eggenschwiler, Ph.D.

Area of Interest in Clinical Practice: Neurosurgery

Area of Interest in Research: Brain tumor development; Neuroembryology; Sonic hedgehog signaling

Personal Information: The last two years of medical school were a breeze- they literally flew by. As a result, there is nothing much to report in terms of "extracurricular" activities. On Sunday mornings (given no impending exams on Monday morning), I enjoy taking my daughter, Tsyon, and our Great Dane, Faith, to the Wissahickon park in Philadelphia. Vegan cooking and baking is a second passion, and I wouldn't mind trading recipes with anyone with similar interests.

Eric Chen

Hometown: Livingston, NJ

College and year of graduation: Dartmouth College 2006

Year in MD/PhD Program: MS II

PhD Thesis Laboratory: Currently rotating in the Berry Lab at Princeton University's Department of Molecular Biology

Area of Interest in Research: Oncology, Cardiology, Microbiology

Personal Information: When he is not studying or working in lab, Eric likes to duff it up on the golf course and occasionally enjoys a beer or three.

Thomas M. Coyne

Hometown: East Windsor, NJ

College(s) Attended and Degree(s) Earned: Rutgers College, 1999

Year in MD/PhD Program: M IV

PhD Thesis Laboratory: Ira B. Black Center for Stem Cell Research, RWJMS-UMDNJ, Neuroscience and Cell Biology

Area of Interest in Research: Stem Cell Biology; Neural Transplantation; Neurogenesis

Personal Information: Tom completed his Ph.D. dissertation, "The Plasticity of Marrow Stromal Cells Transplanted to the Embryonic and Adult Brain", in June 2006 under the supervision of the late Ira Black, M.D. He has since begrudgingly left the lab to complete his clerkship years. He resides in East Windsor with his beautiful wife, Charlene. Once he completes the medical school years he will attempt to have interests again.

Christiaan R. de Vries

Hometown: Milltown, NJ

College(s) Attended and Degree(s) Earned: Rutgers University, BA in Biology

Year in MD/PhD Program: MS II

PhD Thesis Laboratory: None yet

Area of Interest in Clinical Practice: Infectious disease or Oncology

Area of Interest in Research: Lymphocyte trafficking, adoptive cell transfer immunotherapy

Personal Information: During my first year of medical school, I started going to gymnastics class. Hand stands are a great way to relax.

Clifton Fulmer

Hometown: Closter, NJ

College(s) Attended and Degree(s) Earned: The College of New Jersey, B.S. in Biology

Year in MD/PhD Program: MS II

PhD Thesis Laboratory: Rotated in the labs of Cheryl Dreyfus and Emanuel DiCicco-Bloom.

Area of Interest in Clinical Practice:

Area of Interest in Research: Neuroscience

Emmanuel Gabriel

Hometown: Hillsborough, NJ

College(s) Attended and Degree(s) Earned: Drew University, 2002

Year in MD/PhD Program: MS IV

PhD Thesis Laboratory: Dr. Edmund Lattime

Area of Interest in Research: cancer immunology

Personal Information: My cat's name is Toby. He enjoys long walks on the beach. Sadly, he outgrew anagrams.

Bekah Gensure

Hometown: Pittsburgh, PA

College(s) Attended and Degree(s) Earned: Boston University, BS in Biomedical Engineering c/o 2005

Year in MD/PhD Program: MS II

PhD Thesis Laboratory: none yet

Area of Interest in Clinical Practice: Radiology, anesthesiology, surgery, oncology, sports medicine, PM&R...I'm pretty much open to anything

Area of Interest in Research: Imaging, biomechanics, rehabilitation

Personal Information: My parents have a dog and a very fat cat at home in Pittsburgh, and they are very excited to have me living in NJ now (much closer than Boston!). I have an older brother who works as a software engineer in CT. I figure skated competitively throughout college, and I also dance, ski / snowboard, and play a few instruments. And yes, figure skating is a sport! My boyfriend (aka live-in chef) and I live in Franklin Township. We like to cook, watch movies, go out and have fun, and occasionally bike ride around the trails near us.

Hilary Grosso

Hometown: Delran, NJ

College(s) Attended and Degree(s) Earned: New York University; BS in neuroscience and psychology

Year in MD/PhD Program: PhD I

PhD Thesis Laboratory: Dr. Maral Mouradian

Area of Interest in Clinical Practice: neurology

Area of Interest in Research: neuroscience

Personal Information: Hilary enjoys running, Tae Kwon Do, and singing. She recently began work in her PhD lab studying Parkinson's disease and is excited about the research she'll be doing there. Hilary also recently traveled to Arizona and is therefore the tannest you will ever see her, which, unfortunately, is still not saying much.

Erin Haley

Hometown: Palmyra, NJ

College(s) Attended and Degree(s) Earned: Loyola College in Maryland; B.S. in Biology

Year in MD/PhD Program: PhD II

PhD Thesis Laboratory: Dr. Hilary Collier, Princeton University, Department of Molecular Biology

Area of Interest in Clinical Practice: Hematology/Oncology

Area of Interest in Research: How quiescent fibroblasts use a process of self-cannibalism (autophagy) to survive, and how aberrations in quiescence and/or autophagy might lead to cancer or other clinically relevant disease states.

Personal Information: I recently got engaged to a wonderful fellow medical student at RWJMS (Chris Tarassoff, MS III), and I could not be happier! We went on a cruise to celebrate our engagement and our personal milestones of finishing USMLE Step 1 (Chris) and Generals (me) successfully. I am back at the lab in New Jersey after a week of relaxation on the white sand beaches of the Bahamas, Miami, and Key West. I am looking forward to wedding planning, decorating my new apartment in Somerset, and working hard on my PhD thesis project. Go Team Collier!

Bonnie Huang Hall

Hometown: Sayreville, NJ

College(s) Attended and Degree(s) Earned: UC Berkeley 1997-2001; B.S. Chemistry, Honors

Year in MD/PhD Program: MS III

PhD Thesis Laboratory: Dr. David J. Foran- Biomedical imaging

Area of Interest in Clinical Practice: Don't know.

Area of Interest in Research: Imaging and Pathology

Personal Information: Married-happily – 5 years in December! I have a 2 ½ year old named Eliot. He occasionally attends MDPH meetings. I recently traveled to Australia with my family to make an international presentation on my research.

Eileen Hwang

Personal Information: Eileen Hwang is beginning the first year of her PhD with Professor Barbara Brodsky in the RWJMS Department of Biochemistry. Eileen is studying diseases such as Alport syndrome and epidermolysis bullosa caused by mutations in non-fibrillar collagen. After she graduated from Princeton University with a degree in physics and a minor in biophysics, Eileen worked for a year in Death Valley National Park.

Christopher Makoto Kimes

Hometown: Leawood, KS

College(s) Attended and Degree(s) Earned: Attended Benedictine College, then transferred to Case Western Reserve University; earned Bachelors of Science in Chemistry at Case Western Reserve University

Year in MD/PhD Program: MS I

PhD Thesis Laboratory: Don't know; doing summer research in the Murphy Lab at Princeton

Area of Interest in Clinical Practice: Undecided

Area of Interest in Research: Something interesting

Personal Information: I was born in Seattle. I then moved to Kansas City as a junior in high school. I later transferred colleges from Kansas to Ohio. Now I'm in New Jersey!

I'm half-Japanese and I've been speaking, reading and writing Japanese since I was a toddler. The last time I was there was when I was in high school. I hope to make a visit there sometime soon in the future.

The sport I was really into while I was in grade school was kendo. However, I've been spending a lot of my time in the lab since I went to college. I've worked on nanoparticle research for two and a half years. I don't know really what I am gonna work on as a PhD student; I hope to find out soon.

Christopher Langhammer

College(s) Attended and Degree(s) Earned: Princeton University, 2003

Year in MD/PhD Program: PhD III

PhD Thesis Lab: Department of Biomedical Engineering, Rutgers University

Personal Information: Chris devotes his spare time to extracurricular activities including the AAMC Organization of Student Representatives, health care policy reform and education, school government, and is an avid intramural athlete.

Gerard Limerick

Hometown: Beltsville, MD

College(s) Attended and Degree(s) Earned: Oakwood University, B.S. in Biochemistry

Year in MD/PhD Program: M II

PhD Thesis Laboratory: None yet

Area of Interest in Clinical Practice: Still thinking...

Area of Interest in Research: proteomics, cellular metabolism, intracellular signaling

Personal Information: I play basketball and football. Reading was also a hobby prior to med school. I play the piano and saxophone. I am a Christian. My family is from Antigua, W.I. That's the short of it.

Sean Liu

Hometown: Oceanside, NY

College(s) Attended and Degree(s) Earned: MIT, BS

Year in MD/PhD Program: PhD II

PhD Thesis Laboratory: Dr. Thomas Shenk, Princeton University

Area of Interest in Clinical Practice: Uncertain.

Area of Interest in Research: Virology

Personal Information: I enjoy going to the gym, cooking, and painting in my free time. Ultimately, I aim to lead a simple and happy life while helping to keep the world spinning.

Akiva J. Marcus

Hometown: Teaneck, NJ

College(s) attended and degree(s) earned: Yeshiva University, 2001

Year in MD/PhD Program: MS IV

PhD Thesis Laboratory: Ira B. Black Center for Stem Cell Research, Dept. of Neuroscience and Cell Biology, Graduate School of Biomedical Sciences, Robert Wood Johnson Medical School

Area of Interest in Research: Adult and Fetal Stem Cells, Developmental Biology.

Personal Information: Married 7 years, 2 sons (ages 5 and 2). I love fishing and spending time with my family.

Adriana A.T Martin

Personal Information: Adriana A.T Martin grew up on the beautiful island of Trinidad and Tobago, West Indies; where she spent her days in 90 degree weather, tropical beaches, Carnival, abundant fruit trees...well you get the picture. She returned to New Jersey in 2004 for college, liking the atmosphere of community (being an island girl) she received her Bachelor's of science, May '08 in Chemistry and Biology at Bloomfield College. Adriana is an incoming first year MD, PhD student with an optimistic outlook on the challenges she has before her. She has always felt a calling to become a doctor, but she got bitten by the research bug and, fortunately, it is not a curable condition. She has research experience in a smaller, academic Biology lab as well as industry in drug design and optimization, Medicinal and Synthetic Organic Chemistry. She has still, however, not made up her mind on her destined research track. If I know her at all, she prefers interdisciplinary studies, as this allows her to see the big picture, combine the best of both worlds and appease her insatiable curiosity. Whatever path she takes, God willing, she would like to contribute her skill set to the field of cancer research. Whenever possible, she escapes to her own world of art (painting up a storm), spending time with her little sister, reading, traveling, cooking and gardening. On a side note she is notorious for making conversation with complete strangers as she enjoys meeting new people, so please be nice to the person next to you, just in case.

Peter Mazari

Hometown: Wildwood Crest, NJ

College(s) Attended and Degree(s) Earned: Rutgers University B.A. Biology

Year in MD/PhD Program: PhD II

PhD Thesis Laboratory: Dr. Monica Roth

Area of Interest in Clinical Practice: Oncology

Area of Interest in Research: Gene Therapy

Personal Information: Like any graduate student I find myself with little free time to pursue any extracurricular activities. I'm engaged so that tends to take up a good deal of my time outside of the lab (not that I'm complaining or anything). However, in the free time that I can find I try to be outdoors as much as possible whether it be golfing, fishing, or sitting on a beach enjoyably doing nothing.

Jean S. McGee

Hometown: Bridgewater, New Jersey

College(s) Attended and Degree(s) Earned: B.A. in Biological Sciences from Cornell University, 2003; M.S. in Nutritional Biochemistry from Cornell University, 2006

Year in MD/PhD Program: PhD II

PhD Thesis Laboratory: Dr. Virginia Zakian at Princeton University

Area of Interest in Clinical Practice: Oncology

Area of Interest in Research: Telomere length regulation

Personal Information: I've been with my husband, Jim, for a total of 8 years (no, I'm not 40 years old!), and we've been happily married for 2 years. A conditional knockout mouse, named Beyonce, is the latest addition to our family. When not working in the lab, my favorite thing to do is to spend time with my husband. Other things I enjoy doing are painting, yoga, and boxing. This summer, Jim and I are planning to improve our golf swings.

Jay Oza

Hometown: East Windsor, NJ

College and year of graduation: Rutgers College, 2006

Program Year: PhD I

School and Department of Current Research Lab: Shridar Ganesan, CINJ

Research interests: Cell Biology, Molecular Biology, Oncology

Personal Information: I was born in Ahmedabad, India where I lived for 15 years. After immigrating to the United States, I finished my high school at West-Windsor Plainsboro (South) and decided to attend Rutgers where I majored in Physics and Biology. During my undergraduate years, I worked in a research lab trying to better characterize the differences in cytoprotective heat shock response of undifferentiated and differentiated neural progenitor cells and investigated the mechanisms responsible for such differences. My research experience cultivated into a passion for bench science. I often quote Mary Shelley's Frankenstein to describe my enthusiasm for research:

“None but those who have experienced them can conceive of the enticements of science. In other studies you go as far as others have gone before you, and there is nothing more to know; but in a scientific pursuit there is continual food for discovery and wonder.”

In my spare time, I like to play sports: table-tennis, basketball, cricket, tennis, volleyball, badminton, almost anything. And now the amusing tidbit: I can speak the alphabet backwards faster than any of you can speak them forward! If you don't believe it, then challenge me. You'll be surprised.

Marcelo Rocha

Hometown: Rio de Janeiro

College(s) Attended and Degree(s) Earned: UMBC, BA; UMDNJ, PhD.

Year in MD/PhD Program: 7th year overall, currently MS III

PhD Thesis Laboratory: Patricia Sonsalla, Neurology department

Area of Interest in Clinical Practice: clinical pharmacology, neurology

Area of Interest in Research: neuroscience

Personal Information: enjoys swimming, soccer, reading the New Yorker on Sunday mornings, world travel, film, and music.

Ian Rossman

Hometown: East Brunswick, NJ

College(s) Attended and Degree(s) Earned: Vassar College, BA. UMDNJ-GSBS, PhD

Year in MD/PhD Program: 7

PhD Thesis Laboratory: Emanuel DiCicco-Bloom, MD

Area of Interest in Clinical Practice: Child Neurology

Area of Interest in Research: Brain development and neuroimmunology

Personal Information: Married with dog. Juggler. Irrational fear of Flemish caterpillar species.

Nilay Sethi

Hometown: Cranbury, NJ
College(s) attended and Degree(s) Earned: The College of New Jersey, 2004
Year in MD/PhD Program: PhD II
PhD Thesis Laboratory: Dr. Kang, Molecular Biology, Princeton
Area of Interest in Research: Cancer Metastasis
Personal Information: 1 older sister who is also in medical school; Love sports: basketball, tennis, soccer, football

Abhishek Singh

Hometown: Edison, NJ
College(s) Attended and Degree(s) Earned: MIT, 2001
Year in MD/PhD Program: MS IV
PhD Thesis Laboratory: I'm done baby! (Lab of Dr. Sarah Hitchcock-DeGregori in Biochemistry Department)
Area of Interest in Research: Proteins, proteins, proteins (especially of the muscle variety...)
Personal Information: In my extensive free time, I enjoy playing sports, hanging out in the lab, making gels, running binding assays, and attending the occasional seminar. Now I have added hanging out at the hospital as well! As for pets, don't have any due to the fact that I can barely take care of myself, so taking care of another living creature is out of the question.

Jenny Stundon

Hometown: Lewistown, PA
College(s) Attended and Degree(s) Earned: Bryn Mawr College, BA Biology
Year in MD/PhD Program: MS I
PhD Thesis Laboratory: N/A
Area of Interest in Clinical Practice: peds, oncology
Area of Interest in Research: cancer, genetics

Xiaonan (Richard) Sun

Hometown: Paramus, NJ
College(s) Attended and Degree(s) Earned: BA, Rutgers University
Year in MD/PhD Program: PhD II
PhD Thesis Laboratory: Samuel S.-H. Wang, Princeton University
Area of Interest in Clinical Practice: Neurosurgery, Neurology
Area of Interest in Research: Neuroscience
Personal Information: I am an avid windsurfer and I love my golden retriever.

Natasha Telesford

Hometown: South Orange, NJ

College(s) Attended and Degree(s): Rutgers University – Cook College, 1999

Year in MD/PhD Program: MS IV

PhD Thesis Laboratory: UMDNJ/GSBS, Molecular Genetics, Microbiology and Immunology; Lab of Abram Gabriel, MD

Area of Interest in Research: My research was in double strand break repair in yeast; however, my interest is genetic basis of disease in different ethnic populations

Personal Information: With her free time, Natasha enjoys quite time with her daughter, going to the gym, teaching, and watching TV. She hopes to have the time in the future to rediscover her love of the violin and volleyball.

Matthew Treiser

Hometown: North Brunswick, NJ

College(s) attended and Degree(s) Earned: Columbia University, 2003

Year in MD/PhD Program: PhD IV

PhD Thesis Laboratory: Rutgers, The State University, Department of Biomedical Engineering

Area of Interest in Research: Biomaterials, Cell-biomaterial interactions, Stem Cells, Orthopedic Implant Devices

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