

*Third Annual
MD/PhD Summer
Research Symposium*



*August 2, 2007
Rutgers, The State University of New Jersey*

2007
Robert Wood Johnson
Medical School

MD/PhD Program Symposium

Thursday, August 2, 2007
Life Sciences Building
Rutgers, The State University of New Jersey
Piscataway, NJ

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 MD/PhD Program
Professor, Department of Molecular Genetics, Microbiology,
and Immunology, UMDNJ-RWJMS

Peter Amenta, MD, PhD

Interim Dean, UMDNJ- Robert Wood Johnson Medical School
Professor and Chair, Department of Pathology and Laboratory
Medicine

Lori Covey, PhD

Rutgers Liason to the UMDNJ-RWJMS MD/PhD Program
Professor, Department of Cell Biology and Neuroscience,
Rutgers University

Student Presentations (Session 1) 9:30 to 10:45 a.m.

Break 10:45 to 11:00 a.m.

Student Presentations (Session 2) 11:00 to 12:15 p.m.

Luncheon 12:30 to 1:30 p.m.

Student Presentations (Session 3) 1:30 to 3:00 p.m.

Keynote Address 3:00 to 4:00 p.m.

"Optical approaches to cracking the cerebellar code"

Samuel S-H Wang, PhD

Associate Professor, Department of Molecular Biology,
Princeton University

Acknowledgments:

The MD/PhD Symposium was made possible by the support of Dr. Kathleen Scotto, Senior Associate Dean for Research and Peter Amenta, MD, PhD Interim Dean UMDNJ-Robert Wood Johnson Medical School; Kenneth Breslauer, PhD, Vice President For Health Science Partnership, Rutgers, The State University of New Jersey; the Administration of the MD/PhD Program: Terri Goss Kinzy, PhD and Perry Dominguez; and the Symposium Committee Members: Shannon Agner, Desmond Brown, Xiaonan Sun, and Akiva Marcus.

We would also like to thank Laura Panos and Christopher Stastny for their assistance in planning and organizing the event.

Order of Presentations

Student Presentations (Session 1)

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

Randel L. Swanson, “Intracellular localization of neurocalcin- δ in rat SCN 2.2 cells”

Natasha A. Telesford, “Factors affecting chromosomal rearrangements at DNA double strand breaks in *Saccharomyces cerevisiae*.”

Akiva J. Marcus, “Fate of amnion-derived stem cells transplanted to the fetal rat brain: migration, survival and differentiation”

Student Presentations (Session 2)

Abhishek Singh, “Increasing the affinity and cooperativity beyond wildtype tropomyosin”

Christiaan R. de Vries, “A Toll-like receptor 4 agonist can cause a systemic anti-tumor response in the MB49 murine model when combined with the anti-CD25 monoclonal antibody PC61.”

Emmanuel M. Gabriel, “Modulation of regulatory T cells overcomes systemic anergy to tumor-associated antigen and enhances the antitumor effects of recombinant Vaccinia virus vaccines.”

Bonnie Huang, "Development and evaluation of a computer-assisted quantification system for the human epidermal growth factor receptor-2 immunohistochemical assay"

Student Presentations (Session 3)

Matthew D. Treiser, “Parsing stem cell differentiation on biomaterials: Use of high content single cell imaging and biomaterial informatics”

Grace G. Kim, “Comparison of point of care micro-coagulation test values between children and adults and heparin effect for management of heart disease”

Marcelo Rocha, “Implication of the Na⁺/H⁺ exchanger-1 in striatal dopamine neurotransmission”

Ian T. Rossman, “Functional characterization of the autism-associated gene, ENGRAILED2, during postnatal cerebellar granule neuron development”

About the MD/PhD program...

The University of Medicine and Dentistry of New Jersey - Robert Wood Johnson Medical School (RWJMS, <http://rwjms.umdnj.edu/>) was established as a part of Rutgers, The State University of New Jersey (Rutgers University) in 1966 and is located on the Busch Campus of Rutgers University in Piscataway, New Jersey and adjacent to Robert Wood Johnson University Hospital 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 RWJ University Hospital (RWJUH). Rutgers, The State University of New Jersey (Rutgers University, <http://nbp.rutgers.edu/>), 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 Graduate program 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 have 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

Several new initiatives over the past few years include the annual MD/PhD program symposium organized by the students, the monthly colloquia meetings for the program students, and the wide variety of committees to advance the program, on which student participation is a key component. In addition, the PhD phase clinical experiences have now been developed into:

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 choice can also change from year to year. All students that anticipate returning to the M3 year must declare their intention during their August meeting with the program leadership, in preparation for the more structured transition year program (including meetings with student affairs, OSCE, CPR, scheduling). The C²alc options are below, and we welcome student suggestions.

1. Cognitive skills tutoring

WHAT: Serve as a tutor.

WHY: A way to review the M1 and M2 material

HOW: Contact Dr. Norma Saks at: saks@umdnj.edu or 732-235-4129
<http://www2.umdnj.edu/cogskweb/>

2. Physical Diagnosis tutoring

WHAT: Serve as a tutor

WHY: A way to review clinical skills

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

3. M1 Integrated Cases Facilitator

WHAT: Serve as a facilitator for one (or more) of the M1 integrated cases. This includes attending the faculty prep sessions, attending the panel discussion and facilitating the small group.

WHY: A way to review the M1 material and gain teaching skills

HOW: Contact Dr. Will Zerhing at: zehrinwa@umdnj.edu or 732-235-4480

4. PCM mentor contact

WHAT: Shadow your PCM mentor or contact them to help identify a mentor for shadowing

WHY: A way to review clinical skills and use the contact of a person that know you well.

HOW: Contact your M1/M2 mentor.

5. Promise clinic or other service learning

WHAT: Serve in one of the service learning clinics

WHY: A way to review clinical skills

HOW: Apply to these programs, for more info see: <http://rwjms.umdnj.edu/hiphop/>

6. Interim OSCEs

WHAT: Complete an OSCE

WHY: A way to review clinical skills and receive objective feedback

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

7. Local Shadowing

WHAT: Shadow a physician in your area, and for New Brunswick students this includes CINJ and at Princeton includes The University Medical Center at Princeton

WHY: A way to review clinical skills and experience a specific area before choosing clinical electives.

HOW: Options include contacting our clinical program faculty (contact Perry for an updated list).

Abstracts

Regulated release of neurotrophins by oligodendrocytes

Issa Papiss Bagayogo, Lauren Lercher, Ashlee Van't Veer, Ying Jean and Cheryl F. Dreyfus

Department of Neuroscience and Cell Biology
University of Medicine and Dentistry of New Jersey-Robert Wood Johnson
Medical School, Piscataway, NJ

Abstract:

Recent literature suggests that oligodendrocytes (OLGs) not only myelinate cells, 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). Astrocytes, another glial cell population also express BDNF and in other studies are shown to release BDNF in a regulated manner (Jean and Dreyfus, Society for Neuroscience 2006 conference, abstract #423.4/B76). To determine whether regulated release of BDNF also occurs in OLGs, isolated progenitor and differentiated OLG populations from the cingulate and parietal cortices were stimulated with the neurotransmitter glutamate or glutamate receptor agonists to evaluate BDNF release. ELISA assays indicated that 10 minutes application of glutamate increases the amount of BDNF released by OLGs. Western blot analysis revealed that OLG lineage cells exhibit metabotropic and ionotropic AMPA/Kainate glutamate receptors. However, while ACPD, a metabotropic agonist is able to mimic the effects of glutamate on BDNF release, the ionotropic AMPA/KA receptor agonist kainate is not. The glutamate effect was blocked by a metabotropic antagonist, MCPG, further supporting the possibility that metabotropic receptors mediate glutamate actions. Furthermore, addition of the intracellular calcium chelator BAPTA-am blocked the ACPD-mediated BDNF release, suggesting that release of intracellular calcium stores play a role. Additionally, when evaluated immunocytochemically, OLGs exhibit secretogranin II, VAMP 2 and chromogranin-A associated synaptic vesicular proteins, as well as a vesicular-like staining pattern when OLGs are stained for BDNF. Together, these results suggest that OLG lineage cells may be neuronally regulated to secrete trophic factors, possibly through the activation of metabotropic glutamate receptors.

Support: NIH HD23315
HHMI Research Training Fellowship For Medical Student 2005
HHMI Continued Support, Second Year of Research 2006

Intracellular Localization of Neurocalcin- δ in Rate SCB 2.2 Cells

R. L. Swanson II,^{1,2}; T. Duda, PhD³; V. Venkataraman, PhD²

¹UMDNJ-SOM, Stratford, NJ

²UMDNJ-GSBS, Department of Cell Biology, Stratford, NJ

³Section of Regulatory and Molecular Biology, Pennsylvania Collage of Optometry, Philadelphia, PA

Abstract:

Objective: The goal of this study was to determine if there is a possible role for neurocalcin- δ in altering cyclic GMP synthesis during day-night cycles by testing the following SPECIFIC AIMS: 1) is there a change in the intracellular localization of neurocalcin- δ in SCN 2.2 cells during “day” Vs. “night;”? 2) is the change associated with an increase in membrane-bound guanylate cyclase (mGC) activity? Methods: A synchronization/serum shock protocol was used to cause SCN 2.2 cells to cycle on a 24h Day/Night cycle. Cycling cells were harvested at 4h (night) and 16h (day) time points and assayed using the following techniques: RNA isolation, RT-PCR, cycle sequencing, isolation of membranes and soluble fractions, western blotting, radioimmunoassay. Results: The total amount of neurocalcin- δ mRNA and protein in SCN 2.2 serum shocked cells increased from 4h (night) to 16h (day). In the soluble fraction the monomeric form of neurocalcin- δ predominated, and increased from 4h to 16h. The membrane fraction contained both monomeric and dimeric forms of neurocalcin- δ and both increased from 4h to 16h; however, the monomeric form of neurocalcin- δ increased more than the dimeric form. Radioimmunoassays for mGC activity demonstrated an increase in activity from 4h to 16h. Conclusions: Neurocalcin- δ is present in rat SCN and the amount of both neurocalcin- δ mRNA and total protein increases from 4h (“night”) to 16h (“day”). More specifically, the monomeric form of neurocalcin- δ increases more than the dimeric form from 4h to 16h, and the increased monomeric neurocalcin- δ is moving from the cytosol at 4h (night) to the membrane at 16h (day). Finally, membrane-bound guanylate cyclase activity follows the increase in neurocalcin- δ from 4h to 16h, implying a functional role for neurocalcin- δ in stimulating mGC in SCN cells.

Factors Affecting Chromosomal Rearrangements at DNA Double Strand Breaks in *Saccharomyces cerevisiae*.

Natasha A. Telesford¹ and Abram Gabriel^{1,2}

¹Department of Molecular Genetics, Microbiology, and Immunology, UMDNJ-RWJMS, Piscataway, NJ

²Department of Molecular Biology and Biochemistry, Rutgers University, Piscataway, NJ

Abstract:

DNA double strand breaks (DSB) are potentially lethal to a cell. Mechanisms of DNA DSB repair have been identified and characterized using a variety of genetic and physical DSB assays. This is particularly true for the yeast *Saccharomyces cerevisiae*, which serves as a model organism to study DSBs and the pathways involved in their repair. Many studies in yeast have generated DSBs using endonucleases such as HO or I-SceI. Both endonucleases have been thought to give similar results when studying repair mechanisms. Homologous and non-homologous recombination repair pathways have been identified and studied using these endonucleases.

This study demonstrates that many factors influence the preferred pathway utilized by yeast, depending on particular and sometimes subtle differences in the origin of DSBs. Our DSB assay performed at varied temperatures suggests that repair pathways have a temperature-dependent component. Temperature also plays a role in the type of extrachromosomal DNA that can be found at a break site – with Ty elements identified readily at lower temperatures in comparison to mitochondrial DNA found at higher temperatures. Differences in repair profiles of DSBs induced by either HO or I-SceI endonucleases suggest that the endonuclease may play other roles in the repair pathways than just the creation of a break. These differences can also be seen when modes of induction, orientation of a cut site, or temperature variation are present.

Mitochondrial DNA fragments have been identified within the nuclear genome of many organisms, and we and others have shown that these fragments can integrate at DSB sites. This study demonstrates that their integration is influenced by the endonuclease or the endonuclease recognition sequences involved in generating the break. Currently, it is not known how mitochondrial DNA fragments are generated, transported or integrated into the nuclear genome. This study suggests that reverse

transcriptase associated with group II mobile introns located in the mitochondria are not involved in this process.

This study also shows that DSB repair by large-scale deletion is non-random and preferred junctional sites depend on the endonuclease recognition sequences involved in generating the initial break. The deletional repair mechanism appears to involve elements of both the homologous and nonhomologous repair pathways.

This study uses a model system to identify the types of rare chromosomal rearrangements that can have profound effects on genome stability and evolution. By showing the importance of environmental factors, sequence-specific factors, and experimental conditions in determining the nature of repair events, we underscore the complexity of the repair processes involved and the need to consider context when designing and interpreting studies of DSB repair.

Fate of amnion-derived stem cells transplanted to the fetal rat brain: migration, survival and differentiation

Akiva J. Marcus, Ph.D and Dale Woodbury, PhD

The Ira B. Black Center for Stem Cell Research and the Department of Neuroscience and Cell Biology, University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School, Piscataway, NJ

Abstract:

We have recently characterized a stem cell population isolated from the rodent amniotic membrane termed amnion-derived stem cells (ADSCs). *In vitro* ADSCs differentiate into cell types representing all three embryonic layers, including neural cells. In this study we evaluated the neuroectodermal potential of ADSCs *in vivo* after *in utero* transplantation into the developing rat brain. A clonal line of green fluorescent protein–expressing ADSCs were infused into the telencephalic ventricles of the developing embryonic day 15.5 rat brain. At E17.5 donor cells existed primarily as spheres in the ventricles with subsets fused to the ventricular walls, suggesting a mode of entry into the brain parenchyma. By E21.5 GFP ADSCs migrated to a number of brain regions. Examination, at postnatal time points revealed that donor ADSCs expressed vimentin and nestin. Subsets of transplanted ADSCs attained neuronal morphologies, although there was no immunohistochemical evidence of neural or glial differentiation. Some donor cells migrated around blood vessels and differentiated into putative endothelial cells. Donor ADSCs transplanted *in utero* were present in recipients into adulthood with no evidence of immunological rejection or tumor formation. Long-term survival may suggest utility in the treatment of disorders where differentiation to a neural cell type is not required for clinical benefit.

Increasing the Affinity and Cooperativity beyond Wildtype Tropomyosin

Abhishek Singh and Sarah Hitchcock-DeGregori

Department of Neuroscience and Cell Biology Department and UMDNJ-Graduate School of Biomedical Sciences, Piscataway, NJ

Abstract:

Tropomyosin is a coiled coil with subtle variations to allow interactions with actin and other proteins. What in the sequence and structure specifies binding to actin? The tropomyosin sequence contains a seven-fold repeat proposed to correspond to actin binding sites, as well as quasi-periodic Ala clusters, a motif rich in destabilizing interface alanines. The period 1 and 5 Ala clusters are unusual; they are embedded within the periodic non-interface “consensus” residues proposed to be important for actin binding (Phillips, 1986). We showed the relationship is required for period 5 function and suggested that periods without embedded Ala clusters are “weak” and contribute less to overall cooperative actin affinity, compared to periods 1 and 5 (Singh and Hitchcock-DeGregori, 2006). To attempt to make “weak” binding sites “tight” we made two types of mutations: (1) we substituted the “weak” period 3 sequence with the corresponding “tight” period 5 (P5P3) sequence making three “tight” binding sites and (2) we moved adjacent Ala clusters into the consensus regions of period 3 (P3 Shift) and period 2 (P2 Shift). (1) In cosedimentation assays, the P5P3 and P3 Shift mutations increased the cooperativity of binding, while (2) The P2 Shift mutant had increased actin affinity. Differential scanning calorimetry of the Ala shift mutants bound to actin showed the tropomyosin dissociated from F-actin at a higher temperature than wildtype. The results show there are two components to binding: cooperativity and affinity, and they underscore the functional specificity of periods 1 and 5. This, and previous work, support the hypothesis that in order to bind to actin there must be local instability (flexibility) in the coiled coil within a consensus sequence to allow for the non-interface side chains to obtain an optimal conformation to bind to actin.

Supported by NIH.

A Toll-like receptor 4 agonist can cause a systemic anti-tumor response in the MB49 murine model when combined with the anti-CD25 monoclonal antibody PC61.

Christiaan R. de Vries¹, Claude E. Monken², and Edmund C. Lattime^{1,2}

¹Department of Molecular Genetics, Microbiology and Immunology, UMDNJ-RWJMS, Piscataway, NJ

²Department of Surgical Oncology, The Cancer Institute of New Jersey, New Brunswick, NJ

Abstract:

The tumor microenvironment and tumor draining lymph node develop a balance between effector and regulatory components of the immune system that can result in anergy to tumor associated antigens (TAA). We investigated whether a synthetic Toll-like receptor 4 (TLR4) agonist, either alone or in combination with the anti-CD25 monoclonal antibody PC61, can produce systemic anti-tumor immunity to TAA. We have shown previously that PC61-induced modulation of regulatory T cells (Treg) can produce systemic CTL and IFN- γ responses in the MB49 murine model. MB49 is a male C57BL/6 (B6) urothelial cell carcinoma that expresses the minor histocompatibility antigen HY. MB49 growth in female B6 (MB49-fB6) does not induce significant systemic CTL responses. Activation of TLR4, a lipopolysaccharide (LPS) receptor found on dendritic cells (DCs), is thought to stimulate the release of proinflammatory mediators and cause DC maturation that leads to a reversal of the anergic state of Tregs. Synthetic TLR4 agonists have the added benefit of being easier to produce than LPS, but maintaining the ability to stimulate TLR4. In a pilot study, we treated MB49-fB6 intra-tumorally with a synthetic TLR4 agonist, either alone or in combination with intraperitoneal injection of PC61. Both TLR4 agonist alone and TLR4 agonist + PC61 successfully slowed tumor growth in MB49-fB6 at comparable rates. HY-specific CTL and IFN- γ responses were generated systemically by both groups. However, TLR4 agonist + PC61 produced a more significant response in both assays. These results demonstrate that, especially when combined with PC61, TLR4-induced activation of dendritic cells by a synthetic TLR4 agonist can produce an anti-tumor response that overcomes systemic anergy to TAA.

Modulation of Regulatory T Cells Overcomes Systemic Anergy to Tumor-Associated Antigen and Enhances the Antitumor Effects of Recombinant Vaccinia Virus Vaccines

Emmanuel Gabriel¹, Claude E. Monken², and Edmund C. Lattime^{1,2}

¹Department of Molecular Genetics, Microbiology and Immunology, UMDNJ-RWJMS, Piscataway, NJ

²Department of Surgical Oncology, The Cancer Institute of New Jersey, New Brunswick, NJ

Abstract:

Whereas immunosurveillance against tumorigenesis has been known to induce antitumor responses against tumor-associated antigens (TAA), tumors have evolved mechanisms which escape host defenses resulting in anergy to TAA. We investigated the role of regulatory T cells (Tregs) in the tumor-host interaction and tested immunotherapies aimed at enhancing systemic immunity to TAA. MB49, a male C57BL/6 (B6) urothelial cell carcinoma, expresses the minor histocompatibility antigen HY, constituted by an MHC Class I dominant epitope encoded by Uty and an MHC Class II dominant epitope encoded by Dby. While MB49 growth in female B6 (MB49-fB6) has been shown to generate HY-specific CTL responses in tumor draining lymph nodes, these effectors were not detected systemically (in the spleen). To determine if Tregs were induced by MB49 and contributed to this compartmentalization of antitumor responses, cells derived from MB49-fB6 were phenotyped using flow cytometry and showed robust expression of CD25, GITR and Foxp3. Attempting to demonstrate Treg specificity for HY, Tregs were restimulated in vitro with peptides derived from Dby or Dbx (the non-stimulatory female homologue of Dby). Tregs derived from primary tumor produced increased levels of IL-10 following Dby-peptide stimulation compared to Dbx-peptide stimulation. Establishing a potential role of Tregs in MB49-induced immunosuppression, we treated intraperitoneally MB49-fB6 with the anti-CD25 monoclonal antibody PC61 alone in both a prophylactic and treatment setting, and in combination with our recombinant antigenic vaccinia vaccines encoding Uty or Dby (designated VV-Uty or VV-Dby). Overall, PC61 generated systemic HY-specific CTL and IFN- γ responses, providing evidence that Treg modulation was sufficient to overcome systemic anergy to TAA, and also enhanced the effects of our vaccinia vaccines. Strikingly in the presence of minimal disease, treatment with combined VV-Uty/VV-Dby in conjunction

with PC61 produced significantly prolonged survival when the vaccines were administered into the tumor or when given systemically. The enhanced therapeutic benefit of combined MHC Class I and Class II immunization in the context of Treg modulation supports the participation of both CD4 and CD8 effector cells. In addition, these studies demonstrate that the compartmentalization of HY-specific effector function in the tumor microenvironment was reversed following Treg modulation using CD25-targeted immunotherapy.

Development and evaluation of a computer-assisted quantification system for the human epidermal growth factor receptor-2 immunohistochemical assay.

Bonnie Huang and David J. Foran

Center for Biomedical Imaging and Informatics, UMDNJ-RWJMS,
Piscataway, NJ

Abstract:

In breast cancer, a patient's HER2 status (human epidermal growth factor receptor 2) is vital to their treatment and prognosis. HER2 overexpression is associated with poor clinical outcomes; however, they are also eligible for trastuzumab (Herceptin) therapy. A computer-assisted quantification system has been developed to assess HER2 status in breast cancer based on the immunohistochemical (IHC) assay. The system generates a numerical score for HER2 immunohistochemistry by utilizing clinically based features. We introduce an intensity based computer-generated IHC score of patient tissue that is normalized by the positive control on the same slide.

Parsing Stem Cell Differentiation on Biomaterials: Use of High Content Single Cell Imaging and Biomaterial Informatics

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¹Department of Biomedical Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ

²Department of Chemical and Biochemical Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ

³Department of Chemistry and Chemical Biology, Rutgers, The State University of New Jersey, Piscataway, NJ

⁴Department of Mechanical and Aerospace Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ

⁵The New Jersey Center for Biomaterials, Rutgers, The State University of New Jersey, Piscataway, NJ

Abstract:

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. The presented study utilizes hMSC engineered with ACGFP-actin based fluororeporters coupled with "high content imaging" to yield quantitative cellular and subcellular descriptors of cellular morphological responses to a subset of combinatorially designed tyrosine derived polycarbonates. The descriptors that best correlated with hMSC lineage commitment and differentiation will be identified utilizing Monte Carlo based decision tree analysis. Utilizing the top descriptors, an artificial neural network will be employed to predict long term hMSC differentiation based on early (~24-72 hour) substrate induced actin morphology. These predictions can help streamline the biological screening of polymeric biomaterial substrates for the steering of hMSC differentiation, as well as identify the key chemical structure-function relationships that underlie the major cellular behaviors of interest in tissue engineering.

Comparison of point of care micro-coagulation test values between children and adults and heparin effect for management of heart disease

Kim GG¹, El Rouby S², Thompson J¹, Gupta A¹, Williams J¹, Jobes DR^{1,3}

¹Department of Anesthesiology and Critical Care, The Children's Hospital of Philadelphia, Philadelphia, PA

²Clinical Affairs and Research & Development, ITC, Edison, NJ

³School of Medicine, University of Pennsylvania, PA

Abstract:

With medical advancements, congenital heart disease (CHD) patients are living longer and the population of young patients who need heparin management is increasing. Therefore, it is essential to determine the utility of point of care (POC) tests in managing heparin anticoagulation in pediatric patients which may result in a reduction of bleeding or clotting complications, as well as prevent unnecessary blood transfusions. Children are recognized to have age-related differences in clotting protein concentration and laboratory test results show some values that differ from adults. Extreme variability in clotting has been recognized in the young and is based in part on the developing coagulation system. Heparin, an anticoagulant given for cardiac catheterization and heart surgery, is monitored by POC tests. Unlike adults, pediatric patient response to heparin based upon POC tests has not been systematically studied. Similarly, reference ranges for POC tests in pediatric patients have not been studied. The objective of this study was to establish reference ranges for POC tests in normal healthy children and pediatric patients with congenital heart disease, as well as make comparisons to the adult POC ranges.

This is a prospective cross-sectional study of normal healthy children undergoing minor procedures in the OR and children with CHD undergoing invasive cardiac surgical procedures in the OR and Cath Lab at the Children's Hospital of Philadelphia. POC tests developed and validated in adults, including ACT+, ACT-LR, and APTT, are being used in a number of clinical applications to monitor heparin therapy. In addition, Hemonox has been developed to monitor anti-Xa activity of low molecular weight heparin. POC clotting tests were evaluated at baseline and after heparin administration. Cohorts were normal healthy adults (40.3 ± 7.6 years), normal healthy pediatric patients (5.6 ± 5.3 years), adults with heart disease (62.5 ± 12.5 years), and pediatric patients with CHD (4.6 ± 5.3 years).

The data is consistent with previous knowledge that children are significantly different than adults in clotting, as demonstrated by all POC tests in

normal healthy patients. In heart diseased patients, all POC tests except ACT-LR showed pediatric patients to be different from adults. When comparing heart diseased to normal adults, we found the ACT-LR, Hemonox, and aPTT to be different ($p=0.001$). Similarly, comparing CHD to normal pediatric patients, we found both the ACT-LR ($p=0.0334$) and aPTT ($p=0.001$) tests to be different, whereas ACT+ showed no significant difference ($p>0.05$). Taken together, our data suggests that ACT+ may be the most reliable micro-coagulation test. Furthermore, activated clotting time (ACT+) was the optimal POC test for high heparin dose during cardiac bypass. Additionally, ACT tests may provide a useful indication of heparin anti-Xa levels. Elevated ACT+ clotting time ranges (280-502s) were comparable ($R^2=0.92$, $n=92$) to anti-Xa levels (3.52 ± 1.1 , range 1.35-5.7). In conclusion, the data demonstrates that specific POC test values are necessary for pediatric patients since adult reference values cannot be applied to young patients.

Implication of the Na⁺/H⁺ exchanger-1 in striatal dopamine neurotransmission

Marcelo Rocha and Patricia K. Sonsalla

Department of Neurology, UMDNJ-Robert Wood Johnson Medical School, Piscataway, NJ

Abstract:

Parkinson's disease (PD) leads to debilitating movement impairment that occurs with loss of striatal dopamine (DA) neurotransmission and degeneration of nigrostriatal dopaminergic (DAergic) neurons. Multiple factors have been implicated in the pathogenesis of PD including mitochondria defects and associated metabolic stresses. The plasma membrane Na⁺/H⁺ exchanger-1 (NHE-1) regulates intracellular pH and volume in numerous cell types under normal conditions but also contributes to brain tissue damage during ischemia/hypoxia. We have previously reported that the NHE inhibitor 5-(N-ethyl-N-isopropyl)-amiloride attenuates the striatal response to metabolic stress *in vivo*. The present study further examined the effects of NHE-1 inhibition on striatal DA neurotransmission under normal and metabolic stress conditions. To that end, we used brain microdialysis in mice to measure changes in striatal DA overflow caused by local delivery of the selective NHE-1 inhibitor HOE-642 and the mitochondrial inhibitor malonate. Striatal exposure to HOE-642 caused a short-lived increase followed by a prolonged depression in DA overflow. Malonate elicited a large increase in striatal DA overflow that was blunted when preceded by HOE-642. One week later, the content of DA and tyrosine hydroxylase in striatal homogenates was determined to assess the delayed treatment effects on DAergic terminal viability. Although HOE-642 pretreatment attenuated the early effects of malonate on striatal DA overflow, it did not prevent the malonate-induced loss in striatal DA and TH content one week later. The data suggest that NHE-1 inhibition depresses striatal DA overflow under normal conditions and during metabolic stress. Current studies are examining the localization of NHE1 protein relative to nigrostriatal DAergic neurons and the mechanisms by which NHE1 may modulate striatal DA neurotransmission.

Supported by NIH grant NS052733.

Functional Characterization of the Autism-Associated Gene, ENGRAILED2, During Postnatal Cerebellar Granule Neuron Development

Ian Rossman and Emanuel DiCicco-Bloom

Department of Neuroscience and Cell Biology, UMDNJ-RWJMS,
Piscataway, NJ

Abstract:

Autism Spectrum Disorder (ASD) is a highly prevalent (1:150) and strongly genetic neurodevelopmental disease, yet molecular mechanisms underlying ASD pathogenesis remain undefined. Recently, the homeobox transcription factor ENGRAILED2 (EN2) was genetically associated with ASD in three separate human datasets. Association studies were performed because En2 mutant mice exhibit pathologic abnormalities consistently observed in ASD neuropathological studies, including cerebellar hypoplasia and Purkinje neuron deficits. Thus, determining En2 function may elucidate mechanisms of cerebellar development and ASD pathogenesis. In postnatal cerebellum, En2 is first expressed in postmitotic granule neuron precursors (GNPs), suggesting En2 promotes cell cycle exit and differentiation. To define functions, I examined proliferation and differentiation in En2 knockout (KO) and wildtype (WT) GNPs, and following En2 cDNA overexpression. Proliferation markers were increased in KO GNPs in vivo as well as in 24h cultures, suggesting En2 promotes cell cycle exit. However, while GNPs of both genotypes responded identically to Shh and several positive and negative mitogenic signals, suggesting normal cell cycle regulation, IGF1 stimulated DNA synthesis to a greater degree in KO cells, a finding recapitulated in vivo following peripheral IGF1 injection. Furthermore, KO GNPs exhibited reduced neurite outgrowth and differentiation markers. Conversely, En2 overexpression increased cell cycle exit and neuronal differentiation in P4, P7, and P10 rat GNPs, as well as in KO and WT mouse cells. In aggregate, my observations suggest that the ASD-associated gene En2 promotes GNP cell cycle exit and differentiation, interacts with IGF1, and identify cellular pathways potentially contributing to ASD pathogenesis.

**MD/PhD Program
Student Biographies**

Jean-Paul J. Abboud

Hometown: North Brunswick, NJ

College and year of graduation: Rutgers University, 2002

Program Year: M2/PhD III

School and Department of Current Research Lab: UMDNJ – Graduate School of Biomedical Sciences, Biomedical Engineering

Research interests: Neural Development

Rotated in labs of : Gary Nackman, MD – Vascular Surgery/UMDNJ; Richard Nowakowski, PhD – Neuroscience/UMDNJ

Personal: Still mourning the loss of my pet hamster that died under very mysterious conditions. Can write from right to left. Placed second in the 2006 Mr. Olympia competition, which was held in Las Vegas, NV.

Shannon Agner

Hometown: Cherry Hill, NJ

College and year of graduation: Dartmouth College, 2002

Program Year: M2

School and Department of Current Research Lab: Rutgers, Department of Biomedical Engineering

Research interests: Image Analysis (e.g., Digitized histological images and MRIs)

Rotated in labs of : Anant Madabhushi, PhD, Biomedical Engineering, Rutgers University; Shridar Ganesan, MD, PhD CINJ

Personal: 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 and year of graduation: Penn State University, 2003

Program Year: PhD II

School and Department of Current Research Lab: Department of Pharmacology

Research interests: Investigating the role of macrophages in the tumor microenvironment. Studying the effects of macrophages on different cell types in the tumor stroma, including tumor cells, endothelial cells, and mesenchymal stromal cells.

Rotated in labs of: John Glod – Pharmacology; Patrizia Casaccia-Bonnel – Neuroscience; Ira Black – Neuroscience; Sidney Pestka – Microbiology/Immunology; Cheryl Dreyfus – Neuroscience

Personal: In his spare time, he enjoys spending time with his dog, Bauer, who could best be described as 50 pounds of pure magnificence. Some of his most coveted activities include, frequent trips to the Poconos, golf, hockey, and catching a sunset on the beach.

Tim Arlow

Hometown: Southampton, NJ

College and year of graduation: Syracuse University, 2007

Program Year: Entering M1

School and Department of Current Research Lab: Princeton University, Molecular Biology

Research interests: Aging, Gene Therapy

Rotated in labs of: Murphy Lab - Princeton University

Personal: I'm the oldest of 7, albeit the three youngest are dogs (yes, they are synonymous to a family member). I love music; listening, playing, writing and, at the risk of sounding unprofessional, I can create three different frequencies on the noble instrument known as the arm pit. I also enjoy personal fitness, reading and trying to be optimistic.

Issa Bagayogo

Hometown: Weehawken NJ, originally from the Ivory Coast

College and year of graduation: Hunter College, CUNY, 2000

Program Year: PhD III

School and Department of Current Research Lab: UMDNJ-RWJMS, Neuroscience and Cell Biology

Research interests: Neuron-Glia interaction

Rotated in labs of: Currently in Dr. Cheryl Dreyfus Lab. I did not rotate in any other lab.

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

Brian K. Barlow

Hometown: Utica, NY

College and year of graduation: University of Rochester, 2002

Program Year: PhD I

School and Department of Current Research Lab: UMNDJ-RWJMS, Environmental and Occupational Health Sciences Institute (EOHSI)

Research interests: Environmental risk factors in Parkinson's Disease; Fetal and Developmental Origins of Adulthood Diseases

Rotated in labs of: Dr. Mona Thiruchelvam, EOHSI

Personal: After having a wonderful time babysitting a sweet cockapoo belonging to the MD/PhD Program Assistant (Perry Dominguez), I adopted Baxter, a beautiful sheepdog-mix puppy, from a local animal shelter.

Desmond A. Brown

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

College and year of graduation: Temple University, 2003

Program Year: MII

School and Department of Current Research Lab: N/A

Research interests: Neuroscience

Rotated in labs of: J. Stock, Ph.D., J. Eggenschwiler, Ph.D. - Princeton

Personal :

Family: Wife (April), Daughter (Tsyon)

Pets: Faith- a Great Dane

Interesting Factoids: used to be a professional kick boxer

Amusing tidbits: I'm pretty stoic, nothing really amusing about me that I can think of...

Eric Chen

Hometown: Livingston, NJ

College and year of graduation: Dartmouth College, 2006

Program Year: M1

School and Department of Current Research Lab: RWJMS – Currently rotating in the Kang Lab at Princeton University's Department of Molecular Biology

Research interests: Oncology, Cardiology, Microbiology

Rotated in labs of: Kang Lab (Princeton University)

Personal: Eric Yensen Chen, sometimes known as "Chener," is the only child of parents Chunggho and Sunghlan. After graduating from Dartmouth College in 3 years, he realized that leaving school a year early was not so great of a move and has now decided to join the MD/PhD program at RWJMS and stay in school for the next 7-8 years. 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, Ph.D.

Hometown: East Windsor, NJ

College and year of graduation: Rutgers College, 1999

Program Year: M3

School and Department of Current Research Lab: Ira B. Black Center for Stem Cell Research, RWJMS-UMDNJ, Neuroscience and Cell Biology

Research interests: Stem Cell Biology; Neural Transplantation; Neurogenesis

Rotated in labs of : Thomas J. Walsh, Ph.D., Biological and Behavioral Neurosciences/Rutgers University; Kenneth R. Reuhl, Ph.D., Toxicology/Rutgers University; Ira B. Black, M.D. (advisor), Neuroscience and Cell Biology/UMDNJ

Personal: 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. They are currently awaiting the arrival of their first child, a boy, due in November. Once he completes the medical school years he will attempt to have interests again.

Christiaan R. de Vries

Hometown: Milltown, NJ

College and year of graduation: Rutgers University-New Brunswick, 2004

Program Year: M1

School and Department of Current Research Lab: UMDNJ-RWJMS, CINJ

Research interests: cancer immunotherapy, tumor immunology, lymphocyte trafficking

Rotated in labs of: Dr. Edmund Lattime, UMDNJ-RWJMS, Department of Surgery/CINJ

Personal: Christiaan enjoys running, traveling, and classical piano. He has a younger sister and two cats. He is also an avid enthusiast of Chevy Astro minivans and just about every reality TV show on Bravo (though he might have to give up that last interest when he starts M1).

Clifton Fulmer

Hometown: Closter, NJ

College and year of graduation: The College of New Jersey, 2006

Program Year: M1

School and Department of Current Research Lab: NJMS, Neuroscience, Wood Lab

Research interests: Oligodendrocyte development and survival

Rotated in labs of: None yet.

Personal : My parents names are Eileen and Cliff. My younger sister Amanda is a student at Ramapo College of New Jersey and is an amazing athlete. My girlfriend Ashley is an elementary school teacher. I also have a dog named Gizmo who has separation anxiety and panics each time I leave my house. My interests include cooking and jam bands.

Emmanuel Gabriel

Hometown: Hillsborough, NJ

College and year of graduation: Drew University, 2002

Program Year: M3

School and Department of Current Research Lab: UMDNJ: GSBS - MGMI

Research interests: cancer immunology

Rotated in labs of: Edmund C. Lattime – UMDNJ: RWJMS/GSBS/CINJ –
Surgery/MGMI; James S. Goydos – UMDNJ: RWJMS/CINJ - Surgery

Personal: My cat's name is Toby. He enjoys long walks on the beach. And anagrams.

Bekah Gensure

Hometown: Pittsburgh, PA

College and year of graduation: Boston University, 2005

Program Year: M1

School and Department of Current Research Lab: none yet

Research interests: Biomechanics, imaging, and rehabilitation

Rotated in labs of: none yet

Personal: I have one brother (older). My parents have a dog and a very fat cat at home. I figure skated competitively throughout college, and I also dance. When I was younger, I used to know all the words to Bart Simpson's "Do the Bartman," and frequently performed it to my family and friends.

Hilary Grosso

Hometown: Delran, NJ

College and year of graduation: NYU, 2006

Program Year: M2

School and Department of Current Research Lab: Currently rotating in Dr. Ito's lab – neurology department at RWJMS

Research interests: Neurology

Rotated in labs of : Dr. Patricia Sonsalla, Neurology, RWJMS; Dr. James Zheng, Neurology, RWJMS; Dr. Kouichi Ito, Neurology, RWJMS

Personal: My hobbies include running, singing, and Tae Kwon Do.

Erin Haley

Hometown: Palmyra, NJ

College and year of graduation: Loyola College in Maryland, 2005

Program Year: PhD I

School and Department of Current Research Lab: Princeton University, Department of Molecular Biology, Research lab of Dr. Hilary Collier, PhD

Research interests: The study of quiescence is the main focus of the rapidly growing Collier laboratory. The quiescence program and its regulation are of great interest, and lab members are currently attacking questions pertaining to these topics from many different angles. Additionally, the connection between quiescence and cancer is a popular topic among current lab members, myself included. I am interested in studying the relationships between autophagy (a survival mechanism of cellular self-eating that has been shown to be misregulated in cancerous states), various types of cancer, and quiescence.

Rotated in labs of: Dr. Rick Padgett, PhD of Waksman Institute and Dr. Hilary Collier, PhD of Department of Molecular Biology of Princeton University

Personal: Since Erin just finished her second year of medical school and Board exam studying a few weeks ago, she is finding it quite difficult to come up with interesting tidbits and amusing stories to pass on to her fellow Symposium participants. With her spirit slowly regaining strength after being beaten into submission over the past year with Robbins Book of Pathology, she has high hopes that she will have fun and exciting news to add to next year's Symposium program. Stay tuned...

Bonnie H. Hall

Hometown: Sayreville , NJ

College and year of graduation: UC Berkeley, 2001

Program Year: PHD IV

School and Department of Current Research Lab: Center for Bioimaging and Informatics, Department of Pathology, RWJMS, UMDNJ

Research interests: Pathology Image Analysis

Rotated in labs of: Dr. David J. Foran (same as above)

Personal: Happily married, with one child named Eliot, who is almost 2 years old. One day I will write my book about an epidemic that sweeps the globe.

Christopher Langhammer

College and year of graduation: Princeton University, 2003

Program Year: PhD II

School and Department of Current Research Lab: Department of Biomedical Engineering, Rutgers University

Personal: 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 and year of graduation: Oakwood College, 2007

Program Year: M1

School and Department of Current Research Lab: RWJMS, Physiology and Biophysics

Research interests: Biochemistry, Cellular and Molecular Biology, anything with a biomedical aspect

Rotated in labs of: Estela Jacinto, Physiology and Biophysics/RWJMS

Personal: two younger brothers, no pets, basketball, football, computers, piano, international cuisine, family is from Antigua, I am a new fan of bubble tea.

Sean Liu

Hometown: Oceanside, NY

College and year of graduation: MIT 2004

Program Year: PhD I

School and Department of Current Research Lab: Princeton, Molecular Biology

Research interests: Virology, human Cytomegalovirus

Rotated in labs of: Tom Shenk, Mol. Bio. Princeton; Lynn Enquist, Mol. Bio Princeton

Personal: During M2, I was ranked the #1 Most Uninteresting Person in the World. Currently, I aspire to lose my title and regain my life as I began grad school.

Denise Livingston

Hometown: Highland Park, NJ

College and year of graduation: Johns Hopkins University, 1999

Program Year: MS IV

School and Department of Current Research Lab: PhD work completed in the lab of Cheryl Dreyfus, PhD, Dept of Neuroscience

Research interests: finishing medical school

Rotated in labs of: Cheryl Dreyfus, Dept. of Neuroscience, RWJMS

Personal: Denise lives in Highland Park with her husband, Joe and their guinea pig, Otis. When not in the hospital or studying, Denise loves spending time with her family or doing artsy things like dancing and throwing pottery.

Akiva J. Marcus

Hometown: Teaneck, NJ

College and year of graduation: Yeshiva University, 2001

Program Year: MS III

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

Research interests: Adult and Fetal Stem Cells, Developmental Biology.

Rotated in labs of: N/A

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

Peter Mazari

Hometown: Wildwood, NJ

Program Year: PhD I

School and Department of Current Research Lab: Department of Molecular Biology, UMDNJ- RWJMS

Research Interests: Virology, gene therapy

Personal: I like sports, the ocean, and long walks on the beach.

Jean McGee

Hometown: Bridgewater, NJ

College and year of graduation: Cornell University, 2003

Program Year: PhD I

School and Department of Current Research Lab: Department of Molecular Biology at Princeton (PhD advisor: Dr. Zakian)

Research interests: Telomerase regulation

Rotated in labs of: Spring 2006: Dr. Yigong Shi (Department of Molecular Bio at Princeton); Summer 2006: Dr. Virginia Zakian (Department of Molecular Bio at Princeton)

Personal: I live in Watchung, NJ with my husband, Jim. We recently celebrated our 1st wedding anniversary! My goal over this summer is to learn how to sail a 24-footer.

Jay Oza

Hometown: East Windsor, NJ

College and year of graduation: Rutgers College, 2006

Program Year: M2

School and Department of Current Research Lab: Princeton, Department of Molecular Biology (Rotation # 2)

Research interests: Cell Biology, Molecular Biology, Neuroscience

Rotated in labs of: Cheryl Dreyfus, Department of Neuroscience and Cell Biology, RWJMS; Hilary Collier, Department of Molecular Biology, Princeton

Personal: 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(s): Rio de Janeiro (Brazil), Strasbourg (France), Fort Worth, TX, Columbia, MD, and Edison, NJ.

College and year of graduation: University of Maryland, Baltimore County, 2001

Program Year: PhD III and 1/2

School and Department of Current Research Lab: RWJMS, Neurology department

Research interests: neuropharmacology, neuronal transmission and degeneration

Rotated in labs of: Drs. Gail Zeevalk and Patricia Sonsalla, Neurology Department, RWJMS

Personal : for interesting factoids see categories 1 and 3 above, for interests please refer to last year's symposium booklet (page 28), or for other info feel free to call me in the lab at 732-235-5535 (toll free number 1 800 GO MDPHD).

Ian Rossman

College and year of graduation: Vassar College, 2001

Program Year: M3

School and Department of Current Research Lab: Neuroscience

Research interests: Autism

Rotated in labs of: Emanuel DiCicco-Bloom, MD

Nilay Sethi

Hometown: Cranbury, NJ

College and year of graduation: The College of New Jersey, 2004

Program Year: PhD I

School and Department of Current Research Lab: Dr. Kang, Molecular Biology, Princeton

Research interests: Cancer Metastasis

Rotated in labs of :

Dr. Kang, Molecular Biology, Princeton

Dr. Ganesan, Medicine Dept., Cancer Institute of New Jersey

Personal: 1 older sister who is also in medical school; Love sports: basketball, tennis, soccer, football

Abhishek Singh

Hometown: Edison, NJ

College and year of graduation: MIT, 2001

Program Year: M3

School and Department of Current Research Lab: I'm done baby! (Lab of Dr. Sarah Hitchcock-DeGregori in Biochemistry Department)

Research interests: Proteins, proteins, proteins (especially of the muscle variety...)

Rotated in labs of: None

Personal : 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.

Xiaonan (Richard) Sun

Hometown: Paramus, NJ

College and year of graduation: Rutgers College, 2006

Program Year: PhD I

School and Department of Current Research Lab: Princeton University, Molecular Biology Department

Research interests: Transgenic expression of fluorescence calcium indicator proteins in rodents and in vivo imaging of rodent central nervous system.

Rotated in labs of:

1. James H. Millonig Ph.D, Department of Neuroscience, RWJMS
2. Samuel S.-H. Wang Ph.D, Department of Molecular Biology, Princeton University

Natasha Telesford

Hometown: South Orange, NJ

College and year of graduation: Rutgers University – Cook College, 1999

Program Year : M3

School and Department of Current Research Lab: UMDNJ/GSBS, Molecular Genetics, Microbiology and Immunology

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

Rotated in labs of: Abram Gabriel, MD – Molecular Biology and Biochemistry – Rutgers University

Personal: 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 and year of graduation: Columbia University, 2003

Program Year: PhD III

School and Department of Current Research Lab:
Rutgers, The State University, Department of Biomedical Engineering

Research interests: Biomaterials, Cell-biomaterial interactions, Stem Cells, Orthopedic Implant Devices

Rotated in labs of: Drs. Joachim Kohn and Prabhas Moghe of the Department of Biomedical Engineering at Rutgers/UMDNJ

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