

RESEARCH & EDUCATION

A publication of the Department of Microbiology & Immunology, Drexel University College of Medicine

Microbiology & Immunology Overview 05/06

Brian Wigdahl, Ph.D. • Professor and Chair

The Department of Microbiology and Immunology has completed another outstanding year with major achievements realized in research, education, and service to the College of Medicine, University, and surrounding academic, industrial, and private sectors. In the 2005-2006 Annual Report, the state of the Department of Microbiology and Immunology is summarized in areas that are eminently important to the department's overall mission. These areas include (1) human resources, (2) facilities, (3) education, (4) service, and (5) research. I have now completed my third year as Chair of the Department of Microbiology and Immunology and Director of the Institute for Molecular Medicine and Infectious Disease at the Drexel University College of Medicine. During the past three years, I have had a number of major objectives that have included the (1) rebuilding and stabilization of my own research program at Drexel; (2) enhancement of the office and research laboratory infrastructure of the department; (3) provision of additional resources for the continued development of the current faculty and their research programs; (4) enhancement of the training environment and career development pathways for our graduate students, postdoctoral fellows, non-tenure track faculty, and research support staff; (5) development and enhancement of new interactions and collaborations with other academic units within the University and with other external academic and industrial concerns; and (6) recruitment of new tenure-track and non-tenure faculty to enhance the department's research efforts in the areas of cancer biology, immunology, molecular genetics, molecular therapeutics, biodefense, bacteriology, parasitology, and virology. In the area of virology, special emphasis has been placed on the molecular patho-



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genesis of HIV and other opportunistic and comorbidity pathogens involved in AIDS. I am again pleased to report that with the cooperation of the faculty, postdoctoral fellows, graduate students, research and administrative support staff, the administrative arms of the College of Medicine and University, and our colleagues and collaborators, we have achieved significant progress with respect to each of these major objectives and this progress has been detailed in the departmental FY05/06 Annual Report and partially presented here. With the advances achieved over the past year, we are now poised to continue our efforts to enhance the quality of education, research, and service missions of our department.

We have expanded our tenure-track faculty to sixteen with the recruitment of Dr. Steve Jennings. Dr. Jennings, Professor, arrived at the Queen Lane Campus in the Center for Immunogenetics and Inflammatory Disease and the Center for Immunology and Vaccine Science in the Institute for Molecular Medicine and Infectious Disease on July 1, 2005. In addition, we recruited two new non-tenure track positions, Dr. Carol Artlett, Assistant Professor, who arrived in September 2006 at the Queen Lane Campus also in the Center for Immunogenetics and Inflammatory Disease and the Center for Immunology and Vaccine Science in the Institute for Molecular Medicine and Infectious Disease; and Zafar Khan, Research Professor, who arrived July 1, 2006 on the 18th floor New College Building in the Center for Molecular Virology and Neuroimmunology and Center for Molecular Therapeutics of the Institute for Molecular Medicine and Infectious Disease. We have also promoted Dr. Michael

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Drexel University
College of Medicine

In the tradition of Woman's Medical College of
Pennsylvania and Hahnemann Medical College

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- New graduate students arrive!



Lorena Loarca
B.S., Math and Physics
Universidad del Valle de
Guatemala Science and
Technology

In the summer of 2005, I had the opportunity to participate in a three week internship at the Institute for Hepatitis and Virus Research at Doylestown, PA. This experience gave me a general idea of the different

projects focused on finding new therapies to control Hepatitis B replication, which is the area that I want to perform my Ph.D. studies. Hepatitis B is the ninth leading cause of death in the world and every minute 2-3 people die of liver cancer and/or cirrhosis as a consequence of chronic Hepatitis B infection. After having a personal experience with this virus, I developed the motivation and the commitment to dedicate the rest of my life to Hepatitis B research.

Jessica Hulitt
B.S., Biology
Philadelphia University

I was born and raised in Philadelphia. I absolutely love it here. I went to high school at Archbishop Prendergast and would go back in a heartbeat. I completed my undergraduate training at Philadelphia University with a B.S. degree in Biology. After graduation, I proceeded to work at The Children's Hospital of Philadelphia in a research laboratory focused on the study of basic mechanisms involved in the etiology of Leukemia/Lymphoma. I realized that I loved it so much that I wanted to spend the rest of my life doing some type of biomedical research. So here I am, a first year graduate student at the Drexel University College of Medicine. So far it's been great and I'm really happy with my decision. I am looking forward to completing my research rotations and selecting my advisory to begin my research training.



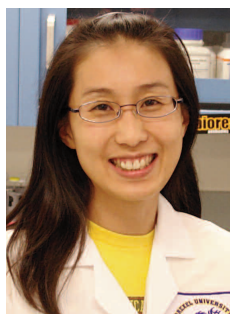
Welcome the New Microbiology & Immunology Graduate Students!



Danielle Loughlin
B.S., Biochemistry and
Molecular Biology
Lebanon Valley College

I am originally from Philadelphia but later moved to the suburbs where I now reside. I received a B.S. degree in Biochemistry and Molecular Biology from Lebanon Valley College, a small liberal arts college close to Hershey, Pennsylvania. While an under-

graduate student, I participated in an ongoing research project within the Department of Chemistry that focused on assessing the interactions between domains of E. coli GMP Synthetase. Throughout my college experience, I had the intention of becoming a physician. It wasn't until I took a class in immunology that I contemplated research as a potential career. After much deliberation, I decided to attend graduate school. I am very happy with my decision to pursue a career in research. Although it was difficult leaving the "Sweetest Place on Earth," I am happy to return to my roots and pursue my Ph.D. degree at the Drexel University College of Medicine. Because I still have a strong love of medicine, my research interests include possible drug targets and therapeutics for autoimmune disorders and infectious disease. In the very distant future I plan to pursue a career in industry, and later return to the academic setting teaching undergraduate or graduate level students in a research based university. When I'm not in the laboratory, I enjoy playing sports, traveling, painting, and taking my kayak out on the open waters.



**Benjamas
Aiamkitsumrit**
BS, Biology
Kasetsart University
MS, Microbiology
Mahidol University

I was born and grew up in Bangkok, Thailand. I went to Kasetsart University which is well known for Agriculture and Biotechnology Sciences. I was happy and satisfied with my undergraduate experience. After that, I decided to continue my education in biomedical sciences. I earned my M.S. degree from Mahidol University which is the best medical and medical science University in Thailand. My thesis work was focused on Immunology in pediatric AIDS in Thailand. My life suddenly changed when I got a scholarship from Harvard University to come to the United States to be a research fellow in the field of HIV DNA vaccine development. One year at Harvard University taught me a lot of things and provided me with a rewarding research experience. Later on, I came to Philadelphia to join Dr. Koprowski's laboratory where I worked on the development of vaccines utilizing edible plants. I then decided to shift my research pursuits to basic molecular virology and joined Dr. Block's research group to focus on the interaction between HSV-1 and the peripheral sensory neuron. I am now looking forward to learning more in graduate school. I am hoping that my knowledge will some day contribute to the benefit of biomedical research in my home country.



Sonia Shah

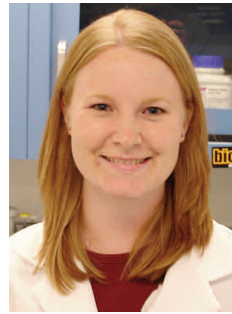
B.S., Biochemistry and Molecular Biology
Pennsylvania State University

I was born in Paramus, New Jersey and spent most of my life growing up just outside of Philadelphia. I graduated with a B.S. degree in Biochemistry and Molecular Biology from The Pennsylvania State University. While an undergraduate at Penn State, I performed three internships to enhance my skills relevant to biomedical research. During my junior and senior year, I interned with Dr. Andrew Henderson of Penn State's Department of Veterinary Science performing an independent research project on the effect of luciferase kinase (Lck) on HIV-1 particle release. At the end of my sophomore year (Summer 2004), I interned at the Drexel University College of Medicine in the Department of Microbiology and Immunology. In Dr. Brian Wigdahl's laboratory, I conducted research on human T-cell leukemia virus type 1 with Dr. Pooja Jain. During the summer of 2005, I again interned with Dr. Wigdahl assisting Dr. Evelyn Kilaeski in developing chromatin immunoprecipitation assays for the analysis of transcription factor binding to integrated HIV viral DNA in cell culture, and cloning HIV-1 viral protein R from isolated viral DNA. This opportunity also allowed me to mentor a high school intern and to present an expanded form of my research in two poster sessions. It is through these experiences that I have decided to pursue a Ph.D. degree in Microbiology and Immunology. I have an immense interest in how the body interacts with pathogens and how different medicines interact with these processes. My dream is to work at the NIH, a biotech start-up, or a pharmaceutical company using the knowledge that I will gain through my graduate school experience.

Priyanka Dutta Gupta

B.S., Devi Ahilya University
M.S., Microbiology
Barkatullah University

Einstein once said "imagination is more important than knowledge" and this quote has played a major influence in my life. I grew up in a small town in India and from a young age, I realized that science gave me the scope to see the world from a different perspective. My mother once said that Nature forms solutions to its own problems and I truly understood the depth of those words, when I stumbled upon the biochemical principles that regulate and control every metabolic need of the human body. Even more fascinating was trying to grasp the mechanics of organisms you don't see; the microorganisms, especially viruses. Having worked as a student volunteer with people who suffer from HIV in my country, I have experienced the agony and trauma from a close range and felt helpless at their state of affairs. I sincerely believe in the power of new ideas, no matter how ridiculous they may seem and I feel that ways to combat viral disease lies in coming up with original thoughts that halt viral replication processes. One of the most interesting aspects of the retroviruses is their tendency to go into a "standby mode" which helps them escape the immune response, it's subtle and thoroughly efficient. However, I feel that there is some underlying host immune response mechanism that does react to this process. I hope during my tenure as a Ph.D. student that I will be able to unravel the mysteries that shroud the existence and proliferation of viruses. Viruses seem to have a mind of their own and appear to have truly grasped Darwin's principles of "Survival of the Fittest."



Sharon Bandstra

B.S., Biochemistry
Lafayette College

Ever since I was very young, I have been interested in the fields of medicine and human disease. I attended a program for high school students at the University of Medicine and Dentistry of New Jersey and learned a lot about specific diseases and was involved in research concerning the basic mechanisms associated with their etiology. I graduated from Lafayette College in 2006 with a B.S. degree in Biochemistry which included an undergraduate research experience. My research consisted of performing thin layer chromatography to analyze the metabolism of snails and mice infected with parasites. I spent much of my time in my senior year at Lafayette developing a simple, noninvasive diagnostic test to detect *Echinostoma caproni* infection. I also had the opportunity to perform a summer internship at a hospital in New Jersey during which I rotated through the laboratories in the Department of Pathology. I am looking forward to the challenges of graduate school. After earning my Ph.D. degree, I plan to continue in biomedical research. My hobbies include playing volleyball, singing, listening to music, spending time with family and friends, and watching movies.

Sharron Manuel

B.S., Biomedical Engineering
Drexel University

I am originally from Wheeling, West Virginia, which is about an hour away from Pittsburgh, PA. Since Wheeling is such a small city surrounded by several rural communities, I decided to attend college in a large city for a change of pace, and therefore, attended Drexel University. I majored in biomedical engineering and received my first taste of research in Dr. Cato T. Laurencin's laboratory. Here, I learned the intimate relationship between clinical medicine and research, and although, I thought about pursuing graduate work then, I wasn't quite sure what path I wanted to take. My initial work was on creating biodegradable replacements for the anterior cruciate ligament and although I really enjoyed research, I became deeply interested in medicine and decided to attend medical school. During my first year of medical school, I got the opportunity to work in the HIV clinic at St. Christopher's Hospital for Children. I became really interested in HIV, but with this clinical experience as well as others, it became apparent to me that I had a thirst for knowledge and really missed working in the field of research. It was at this point when I decided that a career as a medical scientist would be more fulfilling to me. I therefore, applied to Drexel's M.D./Ph.D. program and chose to work with Dr. Wigdahl on human T-cell leukemia virus type 1 (HTLV-1); a retrovirus that causes cancer and neurologic disease. My thesis will focus on the role of dendritic cells in autoimmunity, utilizing the disease model of HTLV-1 associated myelopathy/tropical spastic paraparesis (HAM/TSP) as a model for autoimmunity and neuroinflammation. I see my future career in academic medicine, dividing my time between running a research laboratory, teaching, and seeing patients.



Vision of the Chair (continued from page 1)

Nonnemacher from Postdoctoral Fellow to Assistant Professor. Dr. Nonnemacher is also located in the Center for Molecular Virology and Neuroimmunology on the 18th Floor of New College of Building. An additional adjunct faculty member, Dr. James Thakkar, Adjunct Professor in the Drexel Institute for Biotechnology and Virology Research on the Doylestown Campus has been added in the past year. We have also completed the recruitment of 5 faculty (Drs. Sandeep Kathju, Luanne Hall-Stoodley, Paul Stoodley, Farrell Buchinsky and Christopher Post) located in the Center for Genomic Sciences at Allegheny Singer Research Institute, Pittsburgh, PA.

During FY05/06 the administrative, educational, and research facilities underwent continued improvement and expansion. The administrative office space and laboratory spaces for Drs. Krebs, Martin-Garcia, Navas-Martin and Wigdahl on the 18th floor of New College Building were completed this year. This space will also serve the needs of the Center for Molecular Virology and Neuroimmunology and Center for Molecular Therapeutics in the Institute for Molecular Medicine and Infectious Disease. The administrative office and laboratories of the Drexel Institute for Biotechnology and Virology Research and the Hepatitis B Foundation also moved into a new expansive space in Doylestown in August of 2006. In addition, we have installed new audiovisual and polyCOM conferencing equipment at the Queen Lane, Center City, and Doylestown campuses, with plans to extend this type of communication service to the new group of faculty located in Pittsburgh.

The Department of Microbiology and Immunology continues to play a major role in the education of medical and graduate students. Under the leadership of Drs. Kirsten Larson and Donna Russo, the department again offered Medical Microbiology, Medical Immunology, Medical Genetics, and the Medical Microbiology Laboratory to medical students in their second year of training. The departmental faculty have extensive teaching responsibilities to students in both the IFM and PIL curricula. During the past year, students performed above the national average in all areas of the USMLE Step 1 examination. Under the direction of Dr. Bill Bergman, the department also continues to excel in training graduate students for careers in the biomedical sciences. Another highlight of FY05/06 was the recruitment of 8 new graduate students from undergraduate and graduate institutions from across the United States and from around the world, also highlighted in this issue. This brings the total number of graduate students training in the Microbiology and Immunology graduate program to 48. A training grant entitled Interdisciplinary and Translational Research Training in NeuroAIDS was also submitted for review by the National Institute for Mental Health in May of 2006 to obtain support for graduate students training in a number of graduate programs in the College of Medicine including the Microbiology and

Immunology Graduate Program. This program was submitted in conjunction with research collaborators at Temple University and the University of Pennsylvania.

In the area of service to the University, many departmental faculty served as members and leaders of numerous University and College of Medicine committees. Although the list has been recorded in the FY05/06 Annual Report, a few are worth special recognition including Dr. Richard Rest's service as Co-Chair of the College of Medicine's Strategic Planning Committee, Dr. Fred Krebs as Co-Chair of the Drexel University Biosafety Committee. Dr. Donna Russo's role as Associate Dean of Medical Education, and Dr. Kirsten Larson's overall level of commitment to the success of Discovery 2006 for which she received special recognition from the Office of Biomedical Graduate Studies. Overall, the departmental faculty service to the University and College of Medicine is without question, exceptional.

In the area of research, the Department of Microbiology and Immunology was one of the leading participants from the College of Medicine in both Discovery 2006 and Drexel University's Annual Research Day with a record number of departmental posters at each event. A number of graduate students, and research technicians

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were recognized for their exceptional performance: Jaya Ahuja and Duc Do for Outstanding Technician, Patricia Petritus for

Platform Presentation, Christy Bucks for Outstanding Senior Graduate Student, Christina Kollias for Outstanding Junior Graduate Student, Sharron Manuel for Outstanding Medical Student, and Ender Simsek for Outstanding Postdoctoral Fellow.

Furthermore, the department was represented at numerous meetings at the local, national, and international level with presentations by members of the department. As an additional measure of the department's growth in research and development, departmental research expenditures increased to over 10 million dollars, more than a 25% growth over the preceding year. In light of the continued tightening in the availability of extramural research funding support, the faculty will need to continue to excel in their quest to maintain ongoing sources of support and to identify new sources of funding in this highly competitive funding climate.

Finally, I would like to thank everyone for their contributions during the past year and wish everyone good luck in continuing to help the Department grow and improve in the year to come.

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