CRND News

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SIGNAL

News from the Center for Rare and Neglected Diseases

Second Annual Midwest Neglected Infectious Diseases Meeting

CRND hosted the 2nd annual Midwest Neglected Infectious Diseases (MNID) Meeting held in McKenna Hall at the University of Notre Dame on August 24-25th, 2012. It was made possible through generous support of the Burroughs Wellcome Fund.

Over 130 people convened from across the Midwest. 90 people attended last year, so there was an almost fifty percent increase in participation within a year. MNID’s goal is to create a Midwest network that serves as a platform for regional activities, collaboration and increased exposure for trainees in neglected infectious diseases. "The meeting sprung up almost organically," said Dr. Kasturi Haldar, CRND director and a member of the MNID steering committee, “so the community was eager to make it an annual event.” Dr. Jason McLaughlin (Notre Dame) shared that the 2011 meeting had catalyzed a joint project with Dr. Rob Striker (University of Wisconsin, Madison, Wisconsin).

Participants came from Indiana, Ohio, Michigan, Illinois, Wisconsin, Iowa and Missouri. Areas of interest include basic, translational and clinical research on neglected, eukaryotic pathogens, which include parasitic worms and protozoa, fungi and oomycetes that cause a high burden of disease globally. Some of the same parasites, oomycetes and fungi also cause disease in the Midwest.

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The keynote lecture was given by Dr. Alan Sher from the National Institute of Allergy and Infectious Diseases, NIH. He launched the meeting with a talk titled: "T cells gone wild!". CD4 T-lymphocytes are a type of immune cells that usually protect against infection, but they can cause disease under certain conditions of multiple infections. This is a main concern because CD4 T cells are being considered in therapies for HIV/AIDS. However, this could worsen tuberculosis, which is a common coinfection seen in HIV patients.

The careful balance between disease and health, and new ways to tip it in favor of health, emerged as a common theme for the meeting.

Dr. Laura Knoll (University of Wisconsin, Madison) presented translational studies showing that non-infectious components of the protozoan *Toxoplasma* when injected into animal models protect against viruses, bacteria and other parasites, suggesting novel vaccination strategies. Dr. Rima McCleod (University of Chicago) presented clinical studies conducted by the National Collaborative Chicago-based Congenital Toxoplasmosis Study (NCCCTS). She described a remarkable seventeen-year natural history collaborative, designed to develop more effective screening, detection and treatment strategies for congenital toxoplasmosis, which can cause many problems including blindness and brain disorders. Dr. Miguel Morales (University of Notre Dame) presented on how a simple chemical modification to a protein may control the infection state of *Leishmania* parasites. *Leishmania* causes skin sores (like the Baghdad boil) and disease through the body, which can be fatal if untreated.

Dr. Cory Hoagaboam (U Michigan, Ann Arbor) investigates immune response balance – or lack thereof, in chronic lung disease caused by the fungus *Aspergillus fumigatus*, which causes a broad spectrum of diseases ranging from lethal invasive growth to allergy and asthma. Dr. Stacey Klutts (University of Iowa) investigates the same mold as a cause of disease among stem cell transplant patients. The Klutts lab has targeted the production of a key building block of the cell wall to render the mold unable to survive and spread.

Dr. Brad Day (Michigan State) reported on studies on a plant pathogen *Pseudoperonospora cubensis*, which attacks cucumber, watermelon, and cantaloupe and can be the cause of serious concern to local Michigan farmers and growers. *P. Cubensis* is an invasive species that respects no borders. Interestingly, at the molecular level, it may use pathogenic mechanisms related to those of malaria parasites that infect humans!

Dr. Phil Newmark (University of Illinois Champagne-Urbana) uses planarians as free-living models to understand worms called...
Schistosomes to develop new drugs against them. Schistosomes are difficult to study in the laboratory, but cause devastating diseases. Dr. Ed Pierce (Washington University, St. Louis) provided a quantitative insight into schistosome metabolism and control of egg production: the eggs are responsible for disease pathology.

All of the 16 talks and 45 posters were of outstanding quality. They could not all be summarized here due to lack of space. For a complete listing of speakers visit: nd.edu/~crnd/ However, Geoff Siwo (malaria; Notre Dame, Ferdig lab) deserves special mention. As a graduate student he held his own amongst faculty presentations.

The conference also offered 3 prizes for most outstanding poster presentations. Congratulations to Victoria Jeffers (IUPUI; Sullivan lab), John Davis (University of Michigan; Olsziewski lab) and Dawn Walker (Ohio State; Drew lab) for their award-winning posters!

Dr. Patrick Duffy Starts Clinical and Translational Seminar Series

The Fall 2012 Clinical Translational Seminar Series was kicked off by Dr. Patrick Duffy (pictured) with a presentation entitled ‘Translating Malaria Immunity to Malaria Vaccines’. Dr. Duffy is the Chief of the Laboratory of Malaria Immunology and Vaccinology at NIAID/NIH with responsibility for NIAID’s intramural program to develop and test malaria vaccines. He also leads a training program for young East African scientists based in Tanzania.

Dr. Duffy majored in English at West Point. He then received his M.D. from Duke University. As a clinician–scientist, he trained in internal medicine at Walter Reed and carried out postdoctoral training in molecular vaccine development at the NIH.

Dr. Duffy’s lecture underscored the current emphasis on transmission blocking vaccines that do not directly protect from infection in the human host, but instead block passage through the mosquito, and thus eventually breaking the transmission cycle. After the lecture a lively discussion ensued on key features needed for a successful vaccine against malaria. Dr. Duffy also discussed the need to strengthen malaria research in endemic areas and the associated challenges. Most recently, Dr. Duffy found himself in the midst of a coup d’état in the West African country of Mali while training a group of students!

During his visit Dr. Duffy met with faculty and had lunch with students and postdoctoral fellows after the seminar. A subset of the trainees are part of a new “Topics in Pathobiology” course, offered for credit to graduate students and advanced undergraduates. This course prepares students to contribute to discussions of the CTSS lecture by analyzing a scientific article of the invited speaker. Dr. Shaun Lee and Dr. Patricia Champion are the course instructors, but other CRND faculty members also join in and help stir the discussion.
This Issue’s CRND Data Club
Dr. Zach Schafer and Cassie Buchheit’s research in a rare cancer

CRND Data Club meetings, held every couple of months, feature the most recent work done by center members.

The September 2012 Data Club presentation by Dr. Zach Schafer was on a rare breast cancer, called Inflammatory Breast Cancer or IBC. IBC is often misdiagnosed because it looks like a rash or skin infection when the cancer cells lodge in lymph glands under the skin. Patients are often sent home with antibiotics while the disease continues to fester. The project is funded by a CRND Research Incubator Grant.

Cassie Buchheit (pictured) is a graduate student in the Schafer lab who has spent the last two years studying the unusual properties of cells from IBC patients.

Cassie’s work has established the amount of a certain receptor on the surface of IBC cells and their ability to thrive.

Cassie, who grew up near Saint Louis, became fascinated with biology as an undergraduate researcher at Rockhurst University in Kansas City. “I wanted to join a lab that had a clear translational implications for human health”, commented Cassie. Dr. Schafer’s work seemed like the right fit.

Cassie’s project will be essential in developing early diagnostics and the design of new cancer therapies. It is the quintessential, successful graduate student experience, to train in rigorous research and scholarship and provide hope for patients.

Notre Dame students engage with NORD

Rare Health Exchange (RHE) Summer Intern Joey Kim was supported this summer by the College of Science, to develop approaches by which Notre Dame students can assist in community outreach for rare diseases. One of his projects was to work as an editorial intern with National Organization of Rare Diseases (NORD) to help update in-depth summaries for individual rare diseases. The summaries serve as an invaluable resource for families afflicted by rare diseases. For Joey it was an extraordinary opportunity to serve as a NORD intern. To date, Joey has helped update summaries for Kennedy’s disease (http://www.rarediseases.org/rare-disease-information/rare-diseases/byID/986/viewAbstract) and L1 syndrome (http://www.rarediseases.org/rare-disease-information/rare-diseases/byID/1097/viewAbstract). As follow up, he and Marisa Truong (CRND Program Coordinator) will lead nine students to help update rare disease summaries as a broader partnership with NORD.

RHE students enrolled in the Topics in Rare and Neglected Diseases Course. (Back from left: David Brouch, Lee Haruno, Daniel Balcarcel, Michelle Yanik, Joey Kim, Joseph Lee, Zach Weber. Front from left: Theresa Lai, Sarah Fagan & Marisa Truong). For more information on RHE visit: http://rarehealthexchange.org/
Nanoparticles for targeting a rare cancer: Scientists in Dr. Başar Bilgiçer’s lab formulate a special type of nanoparticle that target cancer cells. The nano-particles are precisely engineered to contain a molecule that directs them to tumor cells, limiting the harmful effects on normal cells. Once at the tumor site, the nano-particles release a drug molecule that kills the cancer cells. The work pioneered by the Bilgiçer group will target multiple myeloma, a rare form of blood cancer that has an extremely high mortality rate.

New study investigates blood cell disorders: Dr. Innocent Safeukui (left), in the Haldar lab, published a leading study in the journal Blood based on his work at the Pasteur Institute on how the spleen senses altered red blood cells, a process that is critical to the management of some anemias.

Private Public Partnership Committed to Malaria eradication: CRND with Medicines for Malaria Venture, a global pharmaceutical cooperative committed to the eradication of malaria and Eli Lilly &Co have completed screening chemical libraries of the pharma giant to develop new anti-malarial drugs. The next step is to identify the best candidates to put into preclinical development.

Additional tools to control malaria: Julie Niedbalski (left) from the lab of Dr. Frank Collins (center) works with Dr. Fabiana Leoratti (right) from Dr. Kasturi Haldar’s lab. The goal is to develop new medicines to treat the early liver-stage of malaria. This has been a major challenge in the fight for eradication.

Private Public Partnership for new TB drugs: Through a unique collaboration Dr. Marvin Miller (right) from the department of Chemistry and Biochemistry is developing new synthetic drugs against tuberculosis (TB) which are then tested by Dr. Jeff Schorey (below) in the department of Biology for their ability to fight TB in biological systems. CRND supported early stage work and we are delighted it has transitioned to a private public partnership with pharma.

Identifying key features of tuberculosis infection: A recent publication in Molecular & Cellular Proteomics by Dr. Patricia Champion’s group describes the development of a new method for identifying critical factors that tuberculosis bacteria use to survive in host cells. Seed funding was provided by a CRND proteomics grant.
Faculty Spotlight: Dr. Shahir Rizk
CRND’s new director of external programs

CRND welcomes Dr. Shahir Rizk as the center’s director of external programs. Dr. Rizk was born in Egypt, but is no stranger to South Bend. He received his bachelor’s degree from Indiana University South Bend. After receiving his PhD from Duke University, Dr. Rizk joined the Department of Biochemistry and Molecular biology at the University of Chicago, where he carried out his postdoctoral work in protein engineering.

In addition to managing and further developing CRND’s portfolio of private public partnerships, Dr. Rizk will coordinate a research program that will integrate his background in biochemistry and molecular biology with CRNDs mission to bridge gaps in developing therapies for rare and neglected diseases.

Dr. Rizk will utilize cutting-edge protein engineering approaches that will allow the research to focus on both studying infectious agents and restoring function to proteins that are affected by mutations found in a number of rare diseases and metabolic disorders.