

◀ *P. falciparum* sporozoite in a mosquito midgut



Infectious Diseases

Washington University in St. Louis
SCHOOL OF MEDICINE

DIVISION NEWSLETTER

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Parasitology Research from the Field to the Laboratory and Back to the Village

Peter Fischer, PhD



Peter Fischer, Research Associate Professor of Medicine (left), working with colleagues on Alor Island, eastern Indonesia.

Overview: I am a zoologist with a special interest in parasitology. I moved from Germany with my family to join the ID Division at Washington University School of Medicine in 2005. I conduct applied field research on the epidemiology and control of helminthic infections and basic research on parasite biology and genomics. I am currently involved in field research projects in Indonesia, Papua New Guinea, Liberia, Ivory Coast and the Republic of Congo. It is challenging to manage multiple field research projects in parallel with basic laboratory research projects in St. Louis. Fortunately the work is shared with Dr. Gary Weil (also in the ID Division at Washington University) as we pursue the common goal of controlling and eliminating neglected tropical diseases (NTDs) caused by worm parasites.

Identification, characterization and diagnostics of worm parasites: I have conducted research on worm parasites for the past 20 years. I obtained my PhD at the Bernhard Nocht Institute for Tropical Medicine in Hamburg, Germany, and my Ph.D. thesis project was on river blindness (onchocerciasis) in western Uganda. Although my research has focused mainly on filarial infections, I recently established an animal model for North American paragonimiasis (a lung fluke infection that occurs in Missouri) and have developed an improved serodiagnostic test for that infection (Am J Trop Med Hyg, 2013; 88:1035-40). I have worked with Drs. Makedonka Mitreva (ID Division and The Genome Institute) and Reid Townsend (Proteomics Core, Siteman Center) to conduct systems biology research on this parasite, and I am now working to develop a more convenient diagnostic test that could be a useful tool for controlling paragonimiasis around the world.

Applied field research: I serve as the principal investigator for one of the major components of Dr. Weil's DOLF grant ('Death to Onchocerciasis and Lymphatic Filariasis') which is funded by the Bill and Melinda Gates Foundation. I am responsible for community studies that aim to improve mass drug administration (MDA) programs for eliminating filariasis and river blindness. In another project, I worked with Indonesian colleagues to study the impact of six annual rounds of MDA on brugian filariasis and soil-transmitted helminth (STH) infections on Alor Island, Indonesia. This study showed that it is feasible to eliminate Brugian filariasis and that MDA has a dramatic (but temporary) impact on STH infections (PLoS Negl Trop Dis, 2013; 7:e2586).

ID NEWS & NOTES

All are welcome to join us in celebrating the legacy of Dr. Gerald Medoff
Saturday, April 5, 2014
"Festschrift"
Clopton Auditorium
Washington University
School of Medicine
9:00 am - 12:30 pm
.....
Infectious Diseases Society
of St. Louis dinner meeting
Wound Management
Thursday, June 19, 2014
Engineers' Club of St. Louis
Mark your calendar!

We are interested in your achievements, clinical and/or research activities, and other personal news since leaving Washington University School of Medicine. Please contact Dr. Gerald Medoff at gmedoff@dom.wustl.edu with any information you would like to share.

All division newsletters can be found at:
ID Division Newsletters

Above image (*P. Falciparum*): CDC/Dr. Mae Melvin (PHIL #2704), 1973. == Licensin). Masthead image: Ute Frevert; false color by Margaret Shear; Copyright: © 2005 Frevert et al.

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FEATURED COLLEAGUE



Woraphot Tantisiriwat, M.D., MPH

In 1993, after becoming junior staff of a new medical school in Thailand (Faculty of Medicine, Srinakharinwirot University), I received the Royal Thai government scholarship for training in internal medicine and infectious diseases in the US. I had my internal medicine training at the University of Hawaii in 1994. In 1996, I interviewed for an infectious diseases fellowship position at around 11 places all over the US. That was the first time I met with Dr. Powderly in St. Louis.

I was impressed with the Washington University infectious diseases training program and was very pleased and fortunate for having a chance to further my education here especially in HIV medicine. In July 1997, I began my training in St. Louis. I received the best training with many respected mentors including Dr. Medoff. In the second and third year, I specialized in HIV medicine and trained with Dr. Powderly, Dr. Tebas and Dr. Fichtenbaum. They had been the important mentors who helped build my current practices. I also had a chance to have the elective training in infection control with Dr. Fraser and that experience prepared me to run the infection control programs in many hospitals now.

I returned to Bangkok in 2000 and worked with my university. I also have had the chance to practice at Samitivej Hospitals through my private practice where I have seen many VIPs. I

continued next column

parasitology research continued from page 1

Wolbachia endosymbionts and lateral gene transfer in filarial nematodes:

My laboratory also studies the role of obligatory Wolbachia endobacteria in filarial nematodes. Together with Dr. Wandy Beatty and the Imaging Core facility in the Department of Molecular Microbiology we used high pressure freezing/freeze substitution fixation and transmission electron microscopy to show that Wolbachia secrete polymorphic outer membrane vesicles (PLoS One, 2014; 9:e86383). We were also able to show that some filarial parasite species that do not contain Wolbachia endosymbionts contain Wolbachia-like DNA sequences in their genomes. These studies provided evidence of lateral gene transfer from bacteria to their worm



Collection of finger prick blood for filarial antigen testing in Harper District, Maryland County, Liberia



Mass drug administration for lymphatic filariasis and soil-transmitted helminthes in Sikka District, Flores Island, Indonesia

hosts in the remote past. Some of the Wolbachia-like sequences are expressed in specific tissues within filarial worms (Parasit Vectors, 2013; 6:2). Improved understanding of interactions between Wolbachia and filarial worms may lead to new treatments or strategies for controlling or eliminating these infections.

Concluding statement: I am fortunate to have found a research home at Washington University. The facilities, faculty, and students here are outstanding for scientists like me who are interested in multidisciplinary research. I am happy that my work includes both cutting edge laboratory research in St. Louis and applied field research that aims to improve the lives of people in Africa and Asia who are afflicted by neglected tropical diseases.

Tantisiriwat, M.D., MPH continued

was promoted to an Associate Professor in infectious diseases in 2005 and the head of the department of Preventive Medicine in 2007. I have taken care of approximately 1,400 HIV patients in both the university medical center and private practice. I founded and supervise the infection control programs at the university medical center and Samitivej Sukhumvit hospital. The Samitivej Hospitals, have received JCI accreditation since 2007. I am also a treasurer of the Thai AIDS society and an educational subcommittee member of the Infectious Diseases Association of Thailand. I have thus far 83 publications in both Thai and English primarily in HIV and infection control. I also have received the Infectious Diseases Association of Thailand Young Investigator Award in 2001 and the Faculty of Medicine, Srinakharinwirot University: Excellence in Clinical Teaching Award in 2011. I presented on many occasions throughout Southeast Asia regions in both HIV and infection control topics.

I am very grateful to have had my training at Washington University School of Medicine. I am certain that I am able to do what I do these days because of all the education I received from Washington University. I would like to use this opportunity to thank all my mentors who were involved in my training. I will continue to do the best I can, caring for patients and teaching new students the way I was taught.

awards & announcements

RECENT AWARDS

PRINCIPAL INVESTIGATOR(S)	AWARD	PROJECT TITLE
Daniel E. Goldberg, MD, PhD	NIAID	Role of PfHO-1 in P. falciparum intraerythrocytic development
Kerry Bommarito, PhD, MPH	ICTS KL2 Career Development Award	Effect of Chorloamnionitis on Subsequent Pregnancy and Infertility
Jacco Boon, MD	R21 NIH/NIAID	Identification of Host Generic Determinant causing severe influenza pathogenesis.

special recognition

Jennie Kwon, MD, has been selected to present her abstract as an oral presentation at the 2014 Society for Healthcare Epidemiology of America (SHEA) meeting. This opportunity is given to the top 4 research abstracts submitted to the SHEA meeting.

Abstract Title: Randomized Controlled Trial to Determine the Impact of Lactobacillus GG on Multidrug Resistant Organism (MDRO) Colonization in Critically Ill Patients.

Benjamin S. Thomas, MD and Sergop Trevino, second year fellows, submitted an article on "De novo Propionibacterium acnes Meningitis in a Patient with Melanoma," which has been recently accepted for publication by the Journal of Clinical Microbiology (JCM).

Jennie Kwon, first year fellow, Sergio Trevino, and Ben Thomas, both second year fellows, are recipients of the Jonathan Freeman Scholarship for the SHEA 2014 conference in Denver, CO.

congratulations.....

Keith Woeltje, MD, PhD, is among only five Washington University physicians and 423 physicians total nation wide who were recently certified in a new medical subspecialty — clinical informatics. The board certification exam was offered for the first time in October by the American Board of Preventative Medicine.

Washington University faculty who also became certified in clinical informatics are Phillip Asaro, MD, emergency medicine; Daniel Helsten, MD, anesthesiology; Walton Sumner, MD, medicine; and Feliciano "Pele" Yu Jr., MD, pediatrics and chief medical information officer at St. Louis Children's Hospital. Clinical informatics is the combination of health information and communications technology intended to help make better clinical decisions and delivery processes. It's a great asset to have experts at the university certified in this cutting-edge field.



Keith Woeltje, MD, PhD



Kerry Bommarito, PhD, MPH

Kerry Bommarito, PhD, MPH, has successfully defended her PhD thesis titled "The Impact of Chorioamnionitis on Maternal Morbidity" on December 19th. Dr. Bommarito will join the ID Division on July 1st as Research Instructor in Medicine

Stephanie Fritz, M.D., Assistant Professor of Pediatrics, and her husband Joe Fritz, M.D., welcomed a baby girl, Lillian Grace Fritz, on Wednesday, December 4, 2013. Joe completed his ID fellowship at Washington University in 2008 and is now in private practice.



Lillian Grace Fritz

In celebration of the work of Gerald Medoff, M.D.



All are welcome to join us in celebrating the legacy of
Dr. Gerald Medoff



Saturday April 5, 2014 **Festschrift**

Clopton Auditorium

Washington University School of Medicine

8:30 Coffee and light breakfast

9:00 Introduction

*William G. Powderly, MD, FRCPI, J. William Campbell Professor of Medicine and
Daniel Goldberg, M.D., PhD, Professor of Medicine
Co-directors, Infectious Diseases, Washington University School of Medicine*

9:15 Role of Universities in the Next Century

Samuel Stanley, Jr., MD, President, Stony Brook University, New York, NY

9:45 Success and Challenges of Preventing Health Care Acquired Infections

Victoria Fraser, MD, Chairman, Department of Medicine, Washington University School of Medicine

10:15 Washington University Infectious Diseases in the 1990's

Erik Brown, MD, Adjunct Professor of Medicine, University of California, San Francisco

11:00 How Do We Educate Doctors for Medicine in the 21st Century

Mary Horgan, MD, Professor of Medicine, University of Cork, County Cork, Ireland

11:30 Paragonimiasis in Missouri: Monsters in the Stream

Gary Weil, M.D., FASTMH, Professor of Medicine, Washington University School of Medicine

.....
continuing education opportunities

Infectious Diseases Society of St. Louis CME accredited dinner meeting

Wound Management

Thursday, June 19, 2014

Engineer's Club of St. Louis | 4359 Lindell Blvd. St. Louis, MO
Announcement coming soon!

global health center's visiting speaker series

João Biehl, PhD

Professor, Department of Anthropology Princeton University

Wednesday, April 2, 4 pm

"Patient-Citizen-Consumer: Claiming the Right to Pharmaceuticals in Brazilian Courts"

McMillan Hall, Rm. G052, Danforth Campus

João Biehl, PhD

"The Right to a Nonprojected Future: Human Values in Global Health" | Thursday, April 3, 8 am Clopton Auditorium, Medical Campus

Wayne C. Koff, PhD, International AIDS Vaccine Initiative
"Accelerating Development of Vaccines: HIV and Other Major Global Diseases" | April 11, 2014, 12:15 pm to 1:15 pm
North Building, Moore Auditorium, Medical Campus

supporting the ID Division

The Infectious Diseases Fund

Dr. Gerald Medoff has been among the most influential leaders in the School of Medicine in the past half century, and the contributions of Dr. Medoff to the field of medicine are clearly reflected in the quality of the School and in the extraordinary individuals he has mentored.

We believe that you share our sense of pride in what we have been able to build, much of which is due to the leadership of Dr. Medoff. This year, unrestricted gifts directed to the Division will be used to honor Dr. Medoff with a lecture in his honor. Please consider a gift toward this effort.



*Gerald Medoff, M.D.
Emeritus Professor of Medicine*

Thank You to Our 2013 Supporters

Infectious Diseases Division

Dr. Mary Karen Cullen
Dr. Hope Cranston Damato
Dunagan Foundation, Inc.

Dr. Daniel Goldberg
Dr. Michael B. Gutwein
Mrs. Michael B. Gutwein

Dr. James Hinrichs
Dr. William Powderly
Dr. Corina Warren

Thomas H. Steinberg Memorial Trainee Award

Dr. Erik R. Dubberke

Dr. Gerald Medoff



Thomas H. Steinberg, M.D.

In Memoriam

The Infectious Diseases Division is establishing a student prize in Tom Steinberg's honor that will be awarded annually. Contributions can be made to this Memorial Award by donating to the

Thomas H. Steinberg Memorial Trainee Award

To support the research, education and activities of the Infectious Diseases Division, please contact
Dan Korte, Division Administrator, Infectious Diseases Division
Campus Box 8051, 660 S. Euclid Ave., St. Louis MO 63110
phone: 314-454-8354 email: dkorte@dom.wustl.edu

\$4 million grant to fund AIDS research

The AIDS Clinical Trials Site at Washington University School of Medicine in St. Louis has been awarded a National Institutes of Health (NIH) grant that supports testing of treatments for HIV, AIDS and the many complications they cause. The grant will provide up to \$4.9 million over the next seven years to the Washington University site and the researchers' collaborators at Vanderbilt University.

The funding allows the Clinical Trials Site group to continue to recruit patients for testing new ways to treat AIDS and HIV through a nationwide network of research sites known as the AIDS Clinical Trials Group. Centers that belong to the group work cooperatively to enroll patients in trials, making it possible to conduct studies that otherwise might not recruit enough participants.

"Our site has been active in the AIDS Clinical Trials Group since 1988, and together we have led the way in optimizing treatments for AIDS," said principal investigator **David Clifford, MD**, the Melba and Forest Seay Professor of Clinical Neuropharmacology in Neurology. "Our work has helped change the prognosis from almost-certain death within a couple years of AIDS diagnosis to life expectancies that are now approaching normal duration."



David B. Clifford, MD
Professor of Clinical Neuropharmacology

Among its many accomplishments, the national AIDS Clinical Trials Group has helped develop and test many of the therapies now used to treat AIDS. The group also has made significant contributions to treatment of infections associated with AIDS, including tuberculosis, herpes virus and hepatitis. The group's research includes efforts to develop a cure for HIV and investigations of the long-term side effects of HIV infection and the drugs used to control it. Other trials are studying the damage HIV inflicts on the brain, lungs and heart, and the effects of co-infections such as hepatitis and tuberculosis.

Developing Hospital Patient Early-warning System

Washington University researchers are developing a hospital in-patient early-warning system. Nearly 20 percent of hospital patients are readmitted within 30 days of discharge, a \$15 billion problem for both patients and the health-care system. Under the federal Affordable Care Act, Medicare is reducing its payments to hospitals with excessive readmission rates.

Yixin Chen, PhD, associate professor of computer science and engineering in the School of Engineering & Applied Science at Washington University in St. Louis, has received a \$718,042 grant from the National Science Foundation to mine data from hospital records to improve an early-warning system that has been tested at Barnes-Jewish Hospital for several years. He is collaborating with Chenyang Lu, PhD, professor of computer science and engineering; **Thomas Bailey, MD**, and Marin Kollef, MD, both professors of medicine at Washington University in St. Louis School of Medicine.

With the funding, Chen and his colleagues will develop a large database gathering data from various sources, including 34 vital signs, from routine clinical processes, real-time bedside monitoring and existing electronic data sources from patients in general wards at Barnes-Jewish Hospital. Then they will develop algorithms that will mine and analyze the data looking for any signs of potential deterioration or life-threatening event in a patient, such as a heart attack, stroke or septic shock. Those identified as being at risk will then be attached to a commercial sensor that provides data on vital signs every minute, then transmits the data wirelessly to a server, where a second algorithm will analyze it to predict deterioration.

The system will also provide an alert to physicians on the patients' deteriorating condition with an explanation of the cause and suggest possible interventions. "Our algorithms can detect potential deterioration by finding hidden patterns in large amounts of data," Chen said. "These hidden patterns are hard to detect manually." Kollef and Bailey have been working on a data system for about eight years in response to a mandate by the Institute for Healthcare Improvement that hospitals reduce cardiac arrests and other sudden, life-threatening events in patients on general medical floors by implementing a system of rapid response teams. Because they wanted to expand the early-warning system and make improvements, they brought in Chen and Lu for their engineering expertise.

"Being physicians, this is something for which we need a lot of support from the engineering school," Kollef said. "It's a nice example of taking the clinical side and the engineering side and bringing them together to come up with a solution for a problem that hasn't had a good solution in the past."

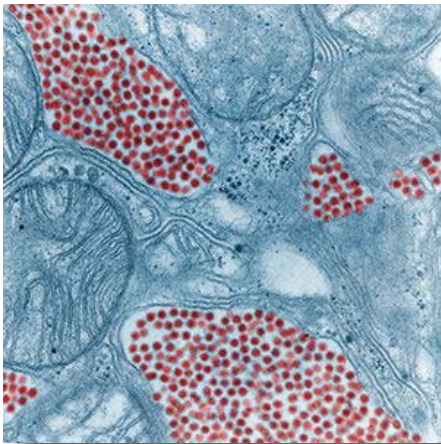
*Reprinted from Physician Connect Barnes Jewish Hospital Washington University in St. Louis Physicians
November 25, 2013*

trick that aids viral infection is identified

Scientists have identified a way some viruses protect themselves from the immune system's efforts to stop infections, a finding that may make new approaches to treating viral infections possible. Viruses have well-known strategies for slipping past the immune system. These include faking or stealing a molecular identification badge that prevents a cell from recognizing a virus.

Scientists at Washington University School of Medicine in St. Louis and elsewhere have found some viruses have another trick. They can block the immune system protein that checks for the identification badge.

The blocking structure is called a stem-loop, found at the beginning of the virus's genetic material. This is the first time scientists have found an immune-fighting mechanism built directly into the genetic material of a virus. They are looking for ways to disable it and searching for similar mechanisms that may be built into the genetic material of other disease-causing microorganisms.



Scientists have discovered a defense system - built into some viruses - that may be vulnerable to treatment. The researchers studied alphaviruses similar to the Eastern equine encephalitis virus, pictured above in red. This virus is transmitted to humans and horses by mosquito bites.

"When the stem-loop is in place and stable, it blocks a host cell immune protein that otherwise would bind to the virus and stop the infectious process," said senior author **Michael Diamond, MD, PhD**, professor of medicine. "We found that changing a single letter of the virus's genetic code can disable the stem-loop's protective effects and allow the virus to be recognized by the host immune protein. We hope to find ways to weaken the stem-loop structure with drugs or other treatments, restoring the natural virus-fighting capabilities of the cell and stopping or slowing some viral infections."

Most life forms encode their genes in DNA. To use the instructions contained in DNA, though, cells have to translate them into a related genetic material, RNA, that can be read by a cell's protein-making machinery.

Some viruses encode their genes directly in RNA. Examples include West Nile virus and influenza virus, and the viruses that cause sudden acute respiratory syndrome (SARS), yellow fever and polio.

When a virus infects a cell, it co-opts the cell's protein-making machinery to make viral proteins. These proteins allow the virus to replicate. Copies of the virus break into other cells, repeat the process, and the infection spreads.

The researchers studied alphaviruses, a group of RNA viruses that cause fever, encephalitis and infectious arthritis. They showed that a single-letter change in the RNA of an alphavirus strengthened the stem-loop. When the structure was stable, a key immune system protein called Ifit1 was blocked from binding to the viral RNA and the infection continued unchecked. But when the stem-loop was unstable, Ifit1 would bind to the viral RNA and disable it, stopping the infectious process.

"Knowing about this built-in viral defense mechanism gives us a new opportunity to improve treatment of infection," Diamond said. "To control emergent infections, we must continue to look for ways that viruses have antagonized our natural defense mechanisms and discover how to disable them."

Funding from the National Institutes of Health (NIH) (U19 AI083019 (M.S.D.), R01 AI104972 (M.S.D.), R01 AI083383 (W.B.K.) and Training Grant AI049820 (D.W.T.)), and the Institute for Human Infections and Immunity, University of Texas Medical Branch (S.P.) supported this work. This study made use of the National Magnetic Resonance Facility in Madison, Wis., which is supported by NIH grants P41RR02301 (BRTP/ NCRR) and P41GM66326 (NIGMS).

Hyde JL, Gardner CL, Kimura T, White JP, Liu G, Trobaugh DW, Huang C, Tonelli M, Paessler S, Takeda K, Klimstra WB, Amarasinghe GK, Diamond MS. A viral RNA structural element alters host recognition of non-self RNA. *Science Express*, Jan. 31, 2014.

Modified from the original publication in the *Washington University Record*, January 30, 2014
author: Michael C. Purdy