





### MICROSCOOP

SPRING/SUMMER 2009





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Science in the

**Public Interest** 



Dr. Dave Rasko

#### MOVING ON UP... By Melissa Hayes

The dust is finally starting to settle. While students were recovering from Graduate Student Presentations, the departmental administrative offices were moving into HSFI Suite 380. Aside from some allergic reactions to the moving boxes themselves, the move went fairly smooth, according to Michaélé Witcher. You will now find Mickey, Mona, Donna, Olu, and the

rest of the administrative staff over in the new space. Faculty, staff and student mailboxes are located just outside and there will be a lunch room for members of the department to use. Additionally, packages will be delivered to the new space. Please remember to update your mailing and delivery addresses! Our new address is: Department of Microbiol-

ogy & Immunology, 685 W. Baltimore St., HSF I Suite 380, Baltimore, MD 21201.

Aside from improving functionality, Dr. Kaper hopes that the new attractiveness of the space will be a selling point in recruiting new students and

"Moving" continues on page 9

#### SPOTLIGHT ON FACULTY: DR. DAVE RASKO BY DANIEL POWELL

Dr. David Rasko joined the University of Maryland in June of 2008. He received his Bachelors and PhD from the University of Alberta. His graduate work was on the synthesis of O-antigen in Helicobacter. Following his graduate work. Dr. Rasko had a brief stint here in Baltimore as a post-doc in Dr. Harry Mobley's lab before moving to NCBI in Bethesda, Maryland as a GenBank scientist. Dr. Rasko then pursued an opportunity to join TIGR in Rockville, Maryland. After leaving TIGR, Dr. Rasko took a position as a Research Assistant Professor at The University of Texas Southwestern Medical Center. He was very excited to join UMB due to the "great amount of resources available here. Between my familiarity with the Institute of Genome Sciences and the expertise to examine function from the Center for Vaccine Development, this was the best place for me and my career." Dr. Rasko's current work centers on elucidating the role of different plasmids in the pathogenic effects of the Bacillus genus. Dr. Rasko said he is always excited to have students in the lab and thinks

the vast strides made in genomics recently have changed the graduate experience. "The old thought of one grad student, one gene doesn't apply anymore. There is a much larger base of information to start from that the possibilities for a project are endless." Outside of the lab Dr. Rasko enjoys giving tours of Baltimore and Washington D.C. to his frequently visiting family members. He said if he wasn't a scientist he could definitely see himself being a professional tour guide.

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#### COMMUNITY IMPACT BY CARLY PAGE

In this issue, the Microscoop would like to share the community contributions of one of our students, Carly Page. Here, she describes her work at a local elementary school...

All too often in city elementary schools across the country fights break out in recess yards and as a result schools are beginning to cut recess times. In a time when childhood obesity is on the rise and school budgets are cutting out physical education classes, it doesn't make much sense to cut out the one time in the day when kids are still encouraged to play and be active on the playground. Sports4Kids is a non-profit organization that seeks to work with public school systems to bring safe and healthy play environments back to the elementary schools in underprivileged areas.

Each school is assigned a site coordinator that is best suited for the unique challenges of that school. They lead class game times during the day to get kids active and working in teams, develop an after-school program for kids to have a safe and fun place to play before heading home and form intramural sports teams that play against other Sports4Kids teams. Ultimately, Sports4Kids hopes to teach children how to respect each other and themselves while having some fun playing kickball and four-square.

I spent a bit of time helping out with the intramural girls' basketball team at Steuart Hill Elementary where my boyfriend is the site coordinator. This school, which is just a few blocks west of Hollin's Market, near Union Square, serves an underprivileged area of West Baltimore that

most of us have probably never experienced. I got to know these girls over the 6 week season and it was both challenging and fun. I served as a sort of team "mom". In addition to throwing in my two cents in during practices, I also provided Gatorade, labeled tshirts and held bags. drove them to games and home afterward because most of the kids don't have actively involved parents. It was a far cry from what I had experienced as a child; hopping into the family car to go to a T-ball or soccer game and getting ice cream afterward.

The whole experience was humbling. It made me realize how lucky for my experiences and how much these girls need strong, reliable adults in their lives. I think it's valuable for everyone to experience what these kids are up against in these neighborhoods.



Carly Page

Want to find out more about Sports4Kids and how you might be able to contribute?

Visit the Sports4Kids website at:

www.sports4kids.org

#### PROGRAM REVIEW KUDOS

On November 13 and 14, 2008, the Molecular Microbiology and Immunology Graduate Program hosted Drs. Robert Doms (U Penn), Virginia Miller (UNC, Chapel Hill), and Eleanor Metcalf (USUHS) for an external program review. The review team had many praises for the MMI pro-

gram, especially our strong leadership and administrative support. Several people were highlighted in this regard. Specifically, Dr. Nicholas Carbonetti and June Green were recognized by the students for their outstanding leadership, Dr. Martin Flajnik, a 2008 GPILS Teacher of the

Year recipient, and Dr. Jim Kaper, who was recognized as an effective leader for the Microbiology department as a whole.

Many other strengths of the program were cited as well. The review team was impressed by MMI faculty's level of participation and



Dr. Nicholas Carbonetti, GPILS MMI Program Director

Kudos continues on page 8

### RECRUITMENT RECAP BY MELISSA HAYES

The Graduate Program in Molecular Microbiology and Immunology had a successful recruitment season and is welcoming a rather large class this year. Applications rose to 160 for the fall, a 40% increase from the previ-Among the ous year! domestic applications, GRE scores above 1200 rose significantly. Eleven students will be joining the program, including Patrick Kerns an MD/PhD student. and Vidhya Vijayakumar, a 2<sup>nd</sup> year

transfer student. The remaining nine students will be entering their first year in the fall: Brian Astry from St. Olaf College, Aaron Christensen-Quick from University of Minnesota, Lauren Hittle from the UMB Medical Technology program, Katie Howell from Temple University, Pragnesh Mistry from College Park, Sergio Mojica from SUNY Binghamton, Carolyn Morris from University of Vermont, Justin Taylor from University of Colorado, and Subraha-Privanka manyam from the India University of Mumbai. Three of these students will be getting a head start on their rotations this summer. Brian will be rotating with Dr. Garzino-Demo, Lauren will rotate with Dr. Ernst and Sergio will rotate with Dr. Barry. Please stop by and welcome them to the program!

Applications for admission to the Graduate Program in Molecular Microbiology and Immunology rose from 114 to 160 this year, a 40% increase.

## THE NEW DEPARTMENT OF MICROBIAL PATHOGENESIS FROM THE DESK OF DR. JAMES KAPER, DEPARTMENT CHAIR

Congratulations to our microbiology and immunology colleagues in the Dental School who now constitute the Department of Microbial Pathogenesis in the University of Maryland Dental School. Dr. Patrik Bayoil has been named the founding Chair of this new department. Formerly, there was a single basic science department in the DS called the Department of Biomedical Sciences, formed in the early 1990s by the merger of several individual departments of biochemistry, microbiology, etc. In 2008, the Department was reorganized into three separate departments, one of which is the

Department of Microbial Pathogenesis. Dr. Bavoil's colleagues in this department include Drs. Mark Shirtliff, Diana Oram, Robert Ernst, Ru-ching Hsia, and Mark Strauch.

Dr. Bavoil is an internationally recognized expert on the molecular pathogenesis of Chlamydia species. He obtained his PhD at the University of California Berkeley, conducting his dissertation research on the bacterial maltose transport system in the laboratory of Hiroshi Nikaido, the discoverer of bacterial porins. He then pursued postdoctoral research with NAS member, Dr. Stanley



Falkow, at Stanford University. After an initial faculty position at the University of Rochester, School of Medicine, where he was a colleague of Drs. Tom Obrig and David Scott, he joined the faculty at the

Dr. Patrik Bavoil, Dr. Stanley Falkow, and Dr. James Kaper at a meeting together last fall. Both Dr. Patrik and Dr. Kaper were postdoctoral fellows in Dr. Falkow's laboratory.

Microbe continues on page 6

#### **PUBLICATIONS**

- ♦Ammerman NC, Beier-Sexton M, and Azad AF. Laboratory maintenance of *Rickettsia rickettsii*. (2008) Curr Protoc Microbiol. (Nov) Chapter 3:Unit 3A.5.
- ♦Ammerman NC, Beier-Sexton M, and Azad AF. Growth and maintenance of Vero cell lines. (2008) Curr Protoc Microbiol. (Nov) Appendix 4: Appendix 4E.
- ♦Andreasen C, and Carbonetti NH (2008) Pertussis toxin inhibits early chemokine production to delay neutrophil recruitment in response to *Bordetella pertussis* respiratory tract infection in mice. Infection & Immunity 76 (Nov): 5139-5148.
- ♦Andreasen C, and Carbonetti NH (2009) The role of neutrophils in response to *Bordetella pertussis* infection in mice. Infection & Immunity 77 (Mar): 1182-1188.
- ◆Brady RA, Calhoun JH, Leid JG, and Shirtliff ME. (2009) Infections of orthopaedic implants and devices. In: Biofilms and Device-Related Infections. Springer, New York, NY. ed. Shirtliff ME and Leid JG. 15-56

Costerton JW, Veeh R, Shirtliff ME, Pasmore M, Post C, and Ehlich G. (2009) The application of biofilm science to the study and control of chronic bacterial

infections. In: <u>Science in Medicine</u>: The JCI Textbook of Molecular Medicine. ed Marks AR. American Society for Clinical Investigation. Jones and Bartlett, Boston, MA. 121-131.

Fujii J, Wood K, Matsuda F, Carneiro-Filho BA, Schlegel KH, Yutsudo T, Binnington-Boyd B, Lingwood CA, Obata F, Kim KS, Yoshida S, and **Obrig TG**. (2008) Shiga toxin 2 causes apoptosis in human brain microvascular endothelial cells via C/EBP homologous protein. Infection & Immunity 76: 3679-3689.

- ♦Gillespie JJ, Ammerman NC, Dreher-Lesnick SM, Rahman MS, Worley MJ, Setubal JC, Sobral BS, and Azad AF (2009) An anomalous type IV secretion system in *Rickettsia* is evolutionarily conserved. PLoS ONE. 4 (3): e4833 Mar 12. [Epub ahead of print]
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Heller NH, Qi X, Juntilla IS, Shirey KA, Vogel SN, Paul WE, Keegan AD, 2008. Type I IL-4Rs selectively activate IRS-2 to induce target gene expression in macrophages. Sci. Signal., Dec 23;1(51):ra17

**♦Laird MH**, Rhee SH, Per-

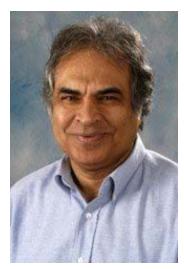
kins DJ, **Medvedev AE**, Piao W, Fenton MJ, and **Vogel SN** (2009) TLR4/MyD88/PI3K interactions regulate TLR4 signaling. J Leukoc Biol. Mar 16. [Epub ahead of print]

Meiller TF, Hube B, Schild L, **Shirtliff ME**, Scheper MA, Ton A, and Jabra-Rizk MA. (2009) A novel immune evasion strategy of *Candida albicans*: proteolytic cleavage of a salivary antimicrobial peptide. PLoS ONE. 4 (4): e5039, 1-9.

Melikyan GB (2008) Common principles and intermediates of viral protein-mediated fusion: the HIV-1 paradigm. Retrovirology 5:111.

Miyauchi K, Kim Y, Latinovic O, Morozov V, and Melikyan GB (2009) HIV Enters Cells via Endocytosis and Dynamin-Dependent Fusion with Endosomes. Cell 137: 433-444. [PMCID: in progess]

- ◆Nymer M, Cope E, **Brady RA**, **Shirtliff ME**, and Leid JG. (2009) Immune responses to indwelling medical devices. In: <u>Biofilms and Device-Related Infections</u>. Springer, New York, NY. ed. Shirtliff ME and Leid JG. 239-264.
- ♦O'May G, Jacobsen SM, Mobley H, and Shirtliff ME. (2009) The high-affinity phosphate transporter Pst in *Proteus mirabilis* HI4320 and its importance in



Abdu Azad, "An anomalous type IV secretion system in *Rickettsia* is evolutionarily conserved"



Michelle Laird, "TLR4/MyD88/ PI3K interactions regulate TLR4 signaling"

"Publications continues on page 9

#### MEETINGS AND POSTERS

**♦Steve Bowen** attended ThymUS 2008 International Conference on Lymphopoiesis, Т cell, differentiation and Immune Reconstitution in San Juan, PR where he presented a poster titled "DNA damage responses to gene rearrangement in CD4/CD8 double negative thymocytes."

♦Nick Carbonetti, Victor Ayala and Carlita Phillip attended the ASM Annual General Meeting in Philadelphia in May, where Victor presented a poster on his work on Exacerbation of Influenza virus infection by Bordetella pertussis.

**Nick Carbonetti** was invited to give a seminar at the University of Illinois at Urbana-Champaign Department of Microbiology in March.

Carrasco J, Tan C, and

Bavoil PM. Polymorphic membrane protein expression is altered in Chlamydia trachomatis exposed to penicillin. 2009. Fourth Biennial Meeting of the Chlamydia Basic Research Society, Little Rock, Arkansas

ightharpoonup Preeta Dasgupta presented "IL-4 Receptor α (IL4Rα) and STAT6 regulate the severity of inflammation but are not absolutely required in a murine model" at the 2009 Midwinter conference of Immunologists in Asilomar, CA, January 24-27, 2009.

George NS, Bavoil PM, Pandya U, Tan C, and Carrasco J. Immune Response to Polymorphic Membrane Proteins of Chlamydia trachomatis. 2008. Annual Biomedical Research Conference for Minority Students, Or-

lando, Florida

Hovis K, Wilson DP, Whittum-Hudson J, Timms P and **Bavoil PM**. 2009. Kinematics of intracellular chlamydiae provide evidence for type III secretion-mediated contact-dependent development. ASM Mid-Atlantic Microbial Pathogenesis Meeting, Wintergreen, Virginia

Achsah Keegan gave a talk at the 2009 Midwinter conference of Immunologists at Asilomar, CA, January 24-27, 2009

Greg Melikyan presented a poster at the Biophysical Society Meeting in Boston in February. During the Cold Spring Harbor meeting on Retroviruses, he gave a talk while Dr. Kosuke Miyauchi, in his lab, presented a poster.

**Dr. Fumiko Obata** presented a paper at the



Preeta Dasgupta presented at the 2009 Midwinter Conference of Immunologists in Asilomar, CA

Meetings and Posters continues on page 8

The Department of Molecular Microbiology and Immunology took in an afternoon baseball game at CamdenYards. The Orioles beat the Toronto blue Jays, 10-12.

Go O's!



#### **GOOD NEWS!**



#### **Happy Trails**

Strauman (Nataro Lab) successfully defended her thesis and is doing post-doctoral training at University of Pennsylvania.

This past spring saw several graduates. Chun Tan (Bavoil Lab) defended her PhD thesis and is now at U. Penn Dental School to obtain her US DDS degree. Kelly Baker (Barry Lab) successfully defended, as well as Nick Bushar (Farber Lab), Sheila Dreher-Lesnick and Kelsv Smith. Nick, Sheila and Kelsy have all joined the FDA.

Lisa Harrison (Kaper Lab) completed her postdoctoral training and will also be joining the FDA in the Center for Food Safety.

This summer will be just as exciting for completing students. Mark Saltis has already defended and will join a corporation in Philadelphia. Cara Morin of the Kaper Lab, (Molecular Medicine Program) successfully defended her thesis and will be returning to the School of Medicine to complete the MD/PhD program.

Additionally, several students are planning to defend this summer: Deepa Rajagopal, June 29<sup>th</sup>; Michelle Laird, July 10<sup>th</sup>; and Elizabeth Urban, July 16<sup>th</sup>.



#### New Bundles

Camilla Marie Ayala was born to the **Ayala**-

Miranda family March 3, 2009 at 6lbs 10oz.

Selena C. Oram is wel-

comed by **Diana M. Oram** and her husband Mark. Selena was born on February 23<sup>rd</sup> 2009 and is doing great. She joins her brother Peter in helping to make her parents lives very busy and very joyful.

**Michelle Laird** (Vogel Lab) is expecting her second child, due November 9.

Jose Carrasco of the Bavoil Lab and wife Rebecca are expecting their second child.



#### Wedding Bliss

Nicole Ammerman was married

on Saturday, April 25<sup>th</sup> to Matt Huxley.

Ranjani Prabhakara was recently engaged to RJ Cepaitis They are planning a fall wedding.



Camilla Marie Ayala



Michelle Laird with husband, Eric and son, Gavin.

#### MICROBE CONT.

London School of Hygiene and Tropical Medicine, U.K. During this time, he and Dr. Ru-ching Hsia, now the Director of the UMB Electron Microscopy Core Facility, discovered a type III secretion system in *Chlamydia*, which led to an invitation to speak at the "First International Conference on Type III Protein Secretion in Bacteria" in Germany in 2001. Also speaking at this meeting was Dr. James

Kaper, now Chair of the Department of Microbiology & Immunology at the UM SOM. Over several beers one evening, Dr. Kaper told Dr. Bavoil about a microbiology faculty position at the Dental School, and urged him to apply. Dr. Bavoil was offered the position and came to the University of Maryland in 2002. In addition to his primary appointment as Professor of Microbial

Pathogenesis in the Dental School, Dr. Bavoil also holds a secondary appointment in the Department of Microbiology & Immunology in the SOM.

Drs. Bavoil and Kaper share a common training legacy in being postdoctoral fellows with Dr. Stanley Falkow, although their times in the Falkow lab did not overlap. Dr. Falkow is known as the father of molecular bacterial patho-



Dr. Patrik Bavoil, Chair of the Department of Microbial Pathogenesis

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#### MICROBE CONT.

genesis and has trained many of the leaders in this field. In 2008, Dr. Falkow received a Lasker Award for his research and training accomplishments and was hailed him as "one of the great microbe hunters of all times"

The two departments they chair along with the Institute for Genome Sciences, the Institute of Human Virology, the Center for Vaccine Development, the Center for Vascular and Inflammatory Diseases, and other faculty members in the

MMI program, comprise an outstanding training and research environment for students and postdoctoral fellows in the areas of microbiology and immunology at the University of Maryland, Baltimore.

Dr. Falkow was hailed as "one of the great microbe hunters of all times" and was the recipient of the Lasker Award. Find out more at:

www.laskerfoundation.org/ awards/2008 s description. htm

#### **GRANTS AND AWARDS**

♦Victor Ayala (Carbonetti Lab) was awarded an F31 Individual Predoctoral Fellowship from NIH for his project, titles "Infection With Bordetella pertussis Exacerbates a Subsequent Influenza Infection".

Patrik Bavoil's and Jacques Ravel's grant application to the U19 STI Cooperative Research Center received one of the top scores and will be funded with a start date in the summer/early fall. The is titled grant Pathogenomics of Chlamydial Reproductive Tract Infection (EPCRTI).

Ricardo Feldman was awarded \$300,000/year for five years from the Maryland Stem Cell Commission. This is the first time these awards were given and Dr. Feldman was the only recipient at the University of Maryland to receive this award.

♦ Marco Goicochea (Lukashevich Lab) was awarded an F31 Individual Predoctoral Fellowship from NIH for his submission titled "Evaluation of LASV Protective Immunity in Mice Using Reassortant Virus ML29".

Bret Hassel, in collaboration with Alan Cross, was recently awarded a four-year R01 grant which focuses on dissecting the molecular mechanisms by which RNase-L functions in the antibacterial response. The project stems out of Xiao-Li (Lynn) Ling's thesis in which she discovered the antibacterial function of RNase-L.

The Institute for Genomic Sciences was awarded a five-year federal grant totaling 9.9 million dollars to provide the Data Analysis and Coordination Center for the Human Microbiome Project.

James Kaper received NIH Merit Award Grant for five more years totaling \$527,312, thus extending the lifetime of this grant to 28 years.

- ♦Joshua Lieberman from the Donnenberg lab was awarded a Graduate Student Association Research Grant for \$1000 for his project entitled "Identification and Characterization of a Putative Interaction Between Core Components of the Bundle-Forming Pilus Biogenesis Machinery of Enteropathogenic E. coli".
- ♦ Preeta Dasgupta from the Keegan Lab was awarded a Graduate Student Association Research Grant for \$1000 for her project entitled "Role of the Type I IL-4 Receptor in Allergic Lung Inflammation".

David Scott has been selected as the 2009 award recipient for the Research Achievement Award in Biotechnology. He will be recognized at American Association of Pharmaceutical Scientists National Biotechnology Conference in Seattle Washington on June 22nd.



Dr. Ricardo Feldman received an award from the Maryland Stem Cell Commission.



Dr. Bret Hassel received a fouryear R01 in collaboration with Alan Cross.

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#### KUDOS CONT.

commitment to the students, as well as the collaborative atmosphere between faculty and students. The establishment of GPILS and the Institute for Genomic Sciences was another significant improvement for the program. Additionally, our scientific strengths in enteric pathogens, vaccine development and microbial genomics as well as our actively managed core cur-

riculum were particularly praised and distinguish MMI from other graduate programs.

There's always room for improvement. However, much of what the review team pointed out as weaknesses is already being addressed by the program by developing more upper level courses, hiring younger

faculty and re-applying for T32 support to carry our program forward.

The review team had one more praise for our program that should be encouraging for our current students. The team noted that the time to graduation has decreased from 5.9 to 5.1 years, something the program can be very proud of.



GPILS 2008 Teacher of the Year, Dr. Martin Flajnik (right) with Quan Nhu.

#### MEETINGS AND POSTERS CONT.

VTEC2009 international meeting in Buenos Aires, Argentina on June 10, 2009 titled "In vivo whole body imaging of luceriferase-conjugated enzymatically inactive Shiga toxin."

**Dr. Tom Obrig** presented a paper at the VTEC2009 international meeting in Buenos Aires, Argentina on June 10, 2009."Shiga toxin 2-induced tubular apoptosis is the cause of renal failure in the murine model of hemolytic uremic syndrome."

◆Brian Peters gave a talked titled "Candida albicans" and Staphylococcus aureus mixed-species biofilms" at the 10<sup>th</sup> Annual NARSA Investigators Meeting. Reston, VA. March 9-10, 2009.

♦Anna Seekatz presented

a poster titled "The effect of immunization with an oral Shigella vaccine on the gut microbiome of cynomolgus monkeys" at the ASM General Meeting in Philadelphia.

**Dr. Mark Shirtliff** gave several talks:

"Biofilm Infections: A case study of Staphylococcus aureus pathogenesis." University of Ottawa, Ottawa, Canada. March 3, 2009.

"Staphylococcus aureus Biofilm Infections: Host immune response and vaccine development." National Research Council of Canada. Ottawa, Canada. March 2, 2009.

"Controversies in Infection: Diagnosing and Treating." 22nd Annual Symposium on Advanced Wound Care and Wound

Healing Society (SAWC/WHS) Meeting. Dallas, Texas. April 26-29, 2009.

Tan C, Hsia R-C, Shou H-Z, Rank RG, Dean D, Gaydos C, Myers G, & PM Bavoil. 2008. The polymorphic membrane protein family of Chlamydia trachomatis is the basis of a mechanism of high frequency antigenic variation. Sixth Meeting of the European Society for Chlamydia Research, Aarhus, Denmark.

Wilson DP, Whittum-Hudson J, Timms P, and Bavoil PM. 2008. Kinematics of intracellular chlamydiae provide evidence for contact-dependent development. Sixth Meeting of the European Society for Chlamydia Research, Aarhus, Denmark

♦ Student publication Faculty member



**Brian Peters** 



Gregory Melikian

#### MOVING CONT.

especially faculty. The space will also be used for future department gatherings including an "officewarming" happy hour to be held on June 26 at 3:30. Feel free to bring a potted plant to make good use of the sunny windows!

Additionally, the office

space that was vacated will be put to good use. The offices formerly occupying HH320 will be converted into a shared equipment room and faculty offices. The space in HH324 will be converted into an LSR II flow cytometer work station as well as

a new office for June Green and space for the GPILS MMI program to use. June is taking suggestions from students on how to use the space most effectively including a full sized refrigerator, lunch table and white board. If you have any suggestions, stop by and let June know!



Michaélé Wichter

#### PUBLICATIONS CONT.

biofilm formation. Microbiology. 155 (5): 1547-1557.

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Rank RG, Bowlin AK, Cané S, Shou H, Liu Z, Nagarajan U and **Bavoil PM**. (2009) Effect of chlamydiaphage fCPG1 on the course of conjunctival infection of guinea pigs with *Chlamydia caviae*. Infection & Immunity 77: 1216-1221. Roche JK, Stone MK, Gross LK, Lindner M, Seaner R, Pincus SH, and **Obrig TG**. (2008) Post-exposure tar-

geting of specific epitopes on ricin abrogates toxin-induced hypoglycemia, hepatic injury and lethality in a mouse model. Lab. Invest. 88:1178-1191.

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◆Smith KF, Bibb LA, Schmitt MP, and Oram DM. (2008) Regulation and Activity of a Zinc Uptake Regulator, Zur in Corynebacterium diphtheriae. J Bacteriol. Mar;191 (5): 1595-603. [Epub ahead of print]

◆Smith KF and Oram DM. (2009) Corynebacteria (including C. diphtheriae), in M. Schaechter Ed., Encyclopedia of Microbiology (3rd Edition), Academic Press.

Spinler JK, Zajdowicz SLW, Haller JC, **Oram DM**, Gill RE, and Holmes RK. (2009) Development and use of a selectable, broad-host-range reporter transposon for identifying environmentally regulated promoters in bacteria. FEMS Microbiol Lett. Feb;291 (2): 143-50.

Stephens RS, Myers GSA, Eppinger M and Bavoil PM. (2009) Divergence without difference: Phylogenetics and taxonomy of *Chlamydia* resolved, FEMS Immun. Med. Microbiol. 55: 115-119.

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Wilson DP, Bowlin AK, **Bavoil PM**, and Rank RG. (2009) Ocular pathology elicited by *Chlamydia* and the predictive value of

quantitative modeling. J. Infect. Dis. [in press]

Xu Z, Li L, **Shirtliff ME**, Alam MJ, Yamasaki S, and Shi L. (2009) Occurrence and characteristics of class 1 and 2 integrons in *Pseudomonas aeruginosa* isolates from patients in southern China. J Clin Microbiol. 47(1): 230-4.

Yousef Mohamad K, Roche S, Myers GSA, **Bavoil PM**, Laroucau K, Magnino S, Laurent S, Rasschaert D, and Rodolakis A (2008) Preliminary phylogenetic identification of virulent *C. pecorum* strains. Infect. Genet. Evol 8: 764-771.

Yousef Mohamad K., Rekiki A, Myers GSA, **Bavoil PM**, and Rodolakis A (2008) Identification and characterization of coding tandem repeat variants in incA of *C. pecorum*. Vet. Res. 39:56.

♦Student publication Faculty member

#### SCIENCE IN THE PUBLIC INTEREST:

#### **Novel Developments in Anti-Cancer Therapy**

Dr. Paul Anthony, MD, assistant professor in the Department of Pathology, spoke with Brian Peters about his research in the increasingly important field of cancer treatment.

BP: Tell me a little about your career?

PA: While working towards my MD at the University of Michigan, I knew that I wanted to focus my career on science and research. After obtaining my MD, I decided to go straight to the National Cancer Institute as postdoctoral fellow, where I studied under Nick Restifo, MD, my primary mentor, and Steve Rosenberg, MD, PhD. I arrived at UMB a little more than a year ago to serve my first appointment as junior faculty.

BP: How would you summarize your research to date?

Cancer researchers PA: used to believe that tumors expressed antigens that were unique to the tumor but it turns out that 90% of tumors express selfantigens. So, while at NCI, I developed a CD4+ transgenic mouse expressing a TCR specific for a selfantigen commonly found in melanoma. These transgenic T cells can then be adoptively transferred to treat mice that have developed melanoma.

BP: And the results?

PA: In most mice, we see complete tumor regression.

Even up to 1 year post treatment the mice never relapse. However, due to the fact that the immune response is directed against self-antigens, the mice develop autoimmune vitiligo. Because the antigen is an enzyme involved in pigmentation, the originally black C57BL/6 mice turn white.

BP: That's very exciting news! Is there anyway to avoid the autoimmunity issue?

PA: There are traditional supportive measures to ease the side effects, such as immunosuppressant agents. We are currently exploring ways in which the autoimmunity may be avoided by potentially using T regulatory mediated suppression.

BP: Do you see cancer as manageable chronic illness or truly a treatable disease?

PA: Both. Some cancer diagnoses, like testicular cancer, that were devastating to patients are now routinely curable. Solid tumors are more difficult to treat but current therapies are leading to longer life expectancies and promising patient outcomes.

BP: What future goals do you have for yourself or your lab?

PA: I would love to see my adoptive cell transfer therapy carried through from bench to bedside. If even 1 patient receives the therapy that I helped pioneer and it extends their life or cures their cancer, then I feel my research has been a success.

BP: Lastly, are there any comments that you have for students interested in cancer research?

PA: Although more difficult, it's much more practical to research therapies that can treat already established tumors because this more closely mimics the real life diagnosis. Also, always keep your research translational, so that your basic science research can be applied in the clinic.



Dr. Paul Antony, MD

# NEWSLETTER OF THE SCHOOL OF MEDICINE DEPARTMENT OF MICROBIOLOGY & IMMUNOLOGY

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