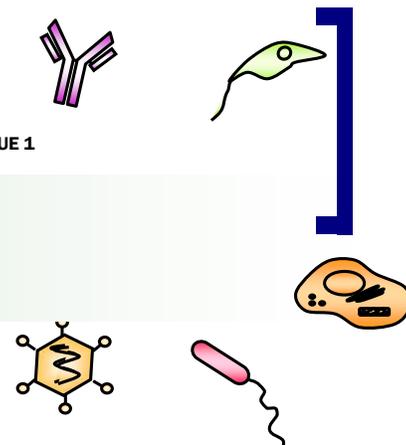


VOLUME 5, ISSUE 1

# THE MICROSCOOP

SPRING 2008



## NEWS FROM RECRUITMENT, QUALIFYING EXAMS AND MUCH MORE: BY PREETA DASGUPTA

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Over the last few months, there have been some new developments both within and outside the Microbiology and Immunology Program/ Department. The qualifying exam set up and the recruitment process for prospective students have been tweaked following recommendations from students. Also, the second Biopark building- where a new research center, the Institute for Genomic Sciences, together with some pharmaceutical and biotechnology companies are going to be housed- is finally ready.

As always, the year began with the second year students taking their qualifying exams. However, for the first time students were allowed to use computers (without internet) to type in their answers as opposed to writing them out by hand, as

done previously. The computer center in MSTF was used for this purpose. Most of the second years agreed that this was a better system, as it allowed them to edit their answers without having to erase everything out- thus shortening the time they spent on the exam and making it less stressful.

February and March brings in the eagerly awaited recruitment season and this year was no different. Current students look forward to meeting and interacting with the applicants, some of whom may become a part of the student body in the months to come. There is always the added attraction of free lunches and dinners of course, not to mention the happy hours! The 2008 recruitment season was an immensely successful one. To begin with, the Microbiology and Immunology Program received a record 121 applications, out of which 32

national and 24 international applicants had GRE scores of over 1200- an all time high. From this year onwards, the admissions committee members and other faculty interviewed applicants on a one to one basis rather than in pairs. June Green, Program Coordinator, said that this worked out well but it meant that she needed more current students as volunteers. She said that over 25 students helped out and that she was

“News” continues on page 3.



UMB BioPark Building Two

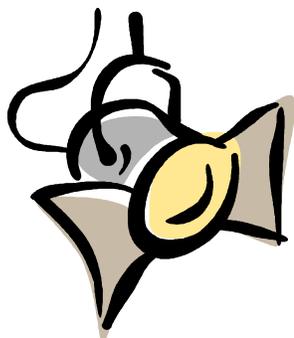
## SPOTLIGHT ON FACULTY: DR. ALAN SCHMALJOHN BY BRIAN PETERS

The focus of this edition's spotlight is on one of the newest members of the Department: Alan Schmaljohn, Ph.D. Although Dr. Schmaljohn may be one of the university's newest acquisitions he is quite well-known by both faculty and students alike. Many of the Microbiology and Immunology students are familiar with Dr. Schmaljohn, as he typically gives yearly lectures in the Virology course on such topics as hemorrhagic fever viruses and vaccine design and development.

Dr. Schmaljohn began his career at UMB in 1980 as a post-doc working for Gerry Cole. His work in the Cole lab focused mainly on the mechanisms of antibody-dependent viral immunity, viral structure, conformational changes in viral proteins, antigenic variation, and interferon-mediated resistance to alphavirus infection.

After his post-doctoral career, Dr. Schmaljohn transitioned into a government position at U.S.

Army Medical Research Institute for Infectious Diseases (USAMRIID), where he worked for 20 years on a variety of emerging and hazardous viruses. Dr. Schmaljohn's experiences at USAMRIID also provided him expertise in biodefense science and policy. Most recently Dr. Schmaljohn's lab focused on therapeutic approaches for Marburg and Ebola virus infection. Dr. Schmaljohn recently resigned from his position at USAMRIID. As a part-



## COMMUNITY IMPACT: BY MELISSA HAYES

*With this issue of the Microscope, I would like to introduce a new column discussing our impact on the Baltimore/Maryland community.*

*One of the things that struck me about our department is the community involvement of our students, faculty and staff. Most of us desire to improve the quality of lives of others through our work, but the payoffs are often long-term and sometimes difficult to foresee. I think for that reason, many of us desire to make an impact in a more tangible way and are involved in social and environmental endeavors.*

*With this issue, I would like to begin by sharing my involvement with a church youth program in the inner city. In the future, I would like to highlight the efforts of members of our department. Through this column, I hope to encourage others to get involved as well as recognize the work of those who strive to improve our community.*

### **MetroKidz at Charm City Church**

Through a complicated network of people leading from Rhode Island to Kansas to Baltimore, my husband and I found a youth program called MetroKidz (MK) operating out of Charm City Church (CCC) on 2001 Frederick Avenue in west Baltimore, run by Pastor Mike Kemper and MK coordinator Colleen Smith. On Wednesday nights, MetroKidz runs a Christian youth program with Bible lessons, games, sports activities and dinner for kids ranging in age from 3 to 18 years old. Once or twice a month, instead of lessons, we hold events where people from the community speak to the

students. The program is still growing, but the pastor and MK coordinator envision many new programs including tutoring, computer lessons, young mother classes, etc. CCC welcomes any and all people from the community including drug dealers, addicts, etc. as long as they have a sincere interest in hearing about God. CCC strives to provide services for the people in the community including a recently begun Work Fund program where the homeless men and women who come to the church can do odd jobs for pay so they don't have to resort to begging for money.

I live just a dozen or so blocks east of this church, but was fearful of going more than one or two blocks west having heard that this was a rough part of town. Indeed it is. On my first excursion to Charm City Church (CCC), I saw many of the things that I was fearful of in those neighborhoods, drugs, prostitution, addictions, crime. What I learned was that the kids who participate in the MK program deal with this everyday and live in these environments in their neighborhoods, their schools and even their homes. I was overwhelmed, but I clearly knew that this was where I could contribute. I found a role assisting the pastor's wife in teaching lessons to 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> grade girls, but my role went well beyond that, growing into an interaction with all the kids, seeing them every Wednesday, gaining their trust, providing structure and showing them sincere love and concern. We've recently begun monthly excursions with our class with activities like picnics, movies, etc. to get to know them better outside MetroKidz.

These kids are certainly hardened by their experiences, but they still desire to be loved. Though I have only been working at MK since September, I have seen great changes in the kids I work with, better attitudes, less discipline issues, and more willingness to open up to me. I ask them about their dreams. Many desire to be doctors, nurses and teachers. Some simply dream about their families being reunited or to be good mothers/fathers to their children. While I could never understand what our kids endure daily, I thank them for sharing their lives and allowing us to make an impact on their lives, albeit small. I hope that by assisting these kids, helping them cope and showing them that they can resist the negative influences around them that they can achieve their dreams.

*If you would like to share your work and how you impact the lives of others, please contact me at*



4<sup>th</sup> and 5<sup>th</sup> graders in the MetroKidz program.

**"I saw many of the things I was fearful of... [the kids] deal with this everyday and live in these environments in their neighborhoods, their schools and even their homes"**



Guest speakers come into to talk to the kids. In February, "Abe Lincoln" came to speak to the kids, they had lots of questions.

## “NEWS” CONTINUED

“extremely grateful” for their support. At the end of each of the recruitment sessions (held on 3 consecutive Fridays), Happy Hours were organized, which allowed current students, post-doctoral fellows and faculty a chance to get to know the applicants better. This was followed by ‘after-happy hours’ at Bedrock and Pickles! This year the program is going to take 8 students- which include 1

international student and 2 MD/ PhD candidates. So far 3 students have accepted offers from the program.

The UMB Biopark II will officially be open from April 2008 onwards, which means that Dr. Claire Fraser-Liggett and other faculty will soon move into the new building and become a part of the Institute for Genomic Sciences (IGS). Barbara Wright, Senior Accountant will

leave the Microbiology and Immunology Department and join the IGS. She will still be interacting with the MMI Program though.

President Ramsay together with the Board of Directors of the UMB Research Park Corporation are hosting a party on March 31, 2008 to celebrate the opening of building two and will launch the development of Biopark-III. When



BioPark Building Two

## SPOTLIGHT CONT.

time faculty member at UMB, he is looking to collaborate with other faculty members. He hopes his experience, knowledge, insights, and scientific reputation will serve as a synergistic value in acquiring research funding and sustaining a fun, productive group in a new lab.

Dr. Schmaljohn believes strongly in education and enriching the public in science and critical thinking skills. As a testament to this,

he teaches science part-time at a local middle school. He enjoys noting the many similarities, and few differences, between teaching 8<sup>th</sup> graders, Army personnel, graduate students, and colleagues. He hopes to be able to continue educating students at UMB by participating in the Virology course and is more than willing to serve on thesis committees if needed.

Outside of science Dr. Schmaljohn enjoys bicycle

touring, tennis, kayaking, recreational reading (both fiction and non-specialty science areas), and news television including CSPAN, the Daily Show, and the Colbert Report.

The Department is pleased to welcome back Dr. Alan Schmaljohn, just as he is pleased to give back to the institution through research, collaborative efforts, and student interactions.

“This year, the program is going to take 8 students- which include 1 international student and 2 MD/ PhD candidates.”

## GRANTS AND AWARDS

**Dr. Abdu Azad** had his R01 grant titled “Murine Typhus: Vector Biology & Transmission” renewed until 2013.

**Dr. Michael Donnenberg** renewed his R01 grant titled “The *eae* Gene Cluster of Enteropathogenic *E. coli*.” for 17-22 years (direct costs = 1,166,667).

**Dr. Martin Flajnik** was invited to edit an issue of *Current Opinions in Immunology* titled “Immunogenetics: alternative strategies in adaptive

immunity and the rise of comparative genomics” Volume 19, 2007.

**Dr. Gregory Melikian** competitively renewed the NIAID R01 grant titled “The Entry Mechanism Used by a Model Retrovirus” for 5 years (direct costs = 250,000/year).

◆ **Quan M. Nhu** (Vogel lab) was awarded a Keystone Symposia scholarship to attend the Keystone Symposium (Innate Immunity: Signaling Mechanisms) in Keystone,

Colorado (Feb 24-29, 2008), with funding provided by the National Institute of Allergy and Infectious Diseases (NIAID), BioDefense.

**Dr. Hervé Tettelin** received a one-year \$52,734 grant from the International Livestock Research Institute, Kenya (prime sponsor: German Federal Ministry for Economic Cooperation and Development) for his work titled “Application of genomics and proteomics to camel *Streptococcus agalactiae*: development of vaccines and diagnostics to



Dr. Hervé Tettelin

## NEW FACULTY AND STAFF

Since the summer our department has had a major growth spurt. **Ellen A. Rorke**, Ph.D. (Asst. Prof.) and **Alan Schmaljohn** Ph.D. (Prof.) recently joined the department along with several new faculty members through the Institute for Genome Sciences (UMIGS). They include **Emmanuel Mongodin**, Ph.D. (Assoc. Prof.), **Julie Hotopp**, Ph.D.

(Asst. Prof.), **Hervé Tettelin**, Ph.D. (Asst. Prof.) and **Joana Carniero da Silva**, Ph.D. (Asst. Prof.). (We also featured new IGS faculty members in the fall 2007 issue.) Among the staff they bring are **Pawel Gajer**, Ph.D. (Res. Assoc., Ravel lab) and post-doctoral fellows **W. Florian Fricke**, Ph.D. (Ravel lab), **Mark Eppinger**, Ph.D. (Ravel lab) and **William Hsiao**, Ph.D.

(Fraser-Liggett lab). Other new staff members include **Diana Miller** (lab assistant in the Feldman lab) and **Rachel Griffin** (Res. Asst. in the Vogel lab). We also welcome **Mr. Olugbenga (Olu) Adewunmi**, who replaces Barbara Wright, to the M&I Administration accounting team. Please welcome all our new department and GPILS faculty and staff!



## PUBLICATIONS

♦ **Brady R**, Leid JG, Calhoun JH, and **Shirtliff ME**. 2008. Osteomyelitis and the role of biofilms in chronic infection. *FEMS Immun Med Micro*. 52:13-22.

Calhoun JH, Sexton DJ, and **Shirtliff ME**. 2007. Hematogenous osteomyelitis in adults. In: *Infectious Diseases. Up To Date* Publishing Corporation. Wellesley, MA.

**Criscitiello MF** and **Flajnik MF**. 2007. Four primordial light chain isotypes, including lambda and kappa, identified in the most primitive living jawed vertebrates. *Eur J Immunol*. 37:522-525.

Holmes SP, Li D, **Ceraul SM**, **Azad AF**. 2008. An aquaporin-like protein from the ovaries and gut of American dog tick (Acari: Ixodidae). *J Med Entomol*. 2008 Jan;45(1):68-74.

♦ **Jacobsen SM**, **Lane MC**, Harro JM, **Shirtliff ME**, and Mobley HLT. 2008. The high-affinity phosphate transporter Pst is avirulence factor for *Proteus mirabilis* during complicated urinary tract infection. *FEMS Immun Med Micro*. 52(2):180-93.

♦ **Jacobsen SM**, **Stickler D**, **Brady RA**, **Mobley H**, and **Shirtliff ME**. 2008. The role of *Escherichia coli* and

*Proteus mirabilis* in catheter-related urinary tract infections. *Clin Micro Rev*. 21 (1): 26-59.

Jiang SM, Ishmael N, **Hotopp JD**, Puliti M, Tissi L, Kumar N, Cieslewicz MJ, **Tettelin H**, Wessels MR. 2008. Variation in the group B Streptococcus CsrRS regulon and effects on pathogenicity. *J Bacteriol*. 190(6):1956-65. Epub 2008 Jan 18.

♦ **Kim EY**, **Chi HH**, **Bouziane M**, Gaur A, **Moudgil KD**. 2008. Regulation of autoimmune arthritis by the pro-inflammatory cytokine interferon- $\gamma$ . *Clin Immunol*. 127(1):98-106. Epub 2008 Feb 13.

LaPorte SL, Juo ZS, Vaclavikova J, Colf LA, Qi X, Heller NM, **Keegan AD**, Garcia KC. 2008. Molecular and structural basis of cytokine receptor pleiotropy in the interleukin-4/13 system. *Cell*. 132(2):259-72.

♦ **Marr S**, **Morales H**, **Bottaro A**, **Cooper M**, and **Flajnik MF**. 2007. Localization and differential expression of activation-induced cytidine deaminase in the amphibian *Xenopus* upon antigen stimulation and during early development. *J Immunol*. 179:6783-6789.

♦ **Saltis M**, **Criscitiello MF**,

**Ohta Y**, Keefe M, Trede NS, Goitsuka R, and **Flajnik MF**. 2008. Evolutionarily conserved and divergent regions of the Autoimmune Regulator (AIRE) gene: a comparative analysis. *Immunogenetics*. 60:105-114.

♦ **Saltis M.**, M. Criscitiello, Y. Ohta, M. Keefe, N. Trede, R. Goitsuka, and M. Flajnik. 2008. Evolutionarily conserved and divergent regions of the Autoimmune Regulator (Aire) gene: a comparative analysis. *Immunogenetics* 60: 105-114.

♦ **He, X.**, Q. Jia, F. Li, **M. Saltis**, Y. Liu, L. Xu, and Q. Zha. 2008. CD8+ T cells specific for both persistent and non-persistent viruses display distinct differentiation phenotypes but have similar level of PD-1 expression in healthy Chinese individuals. *Clinical Immunology*, 126: 222-234.

♦ **Satpute SR**, **Durai M**, **Moudgil KD**. 2008. Antigen-Specific Tolerogenic and Immunomodulatory Strategies for the Treatment of Autoimmune Arthritis. *Semin Arthritis Rheum*. Epub 2008 Jan 2

Wommack KE, Bhavsar J, and **Ravel J**. 2008 Metagenomics: read length matters.

“Since the summer, our department has had a major growth spurt...”



2008. Retrograde trafficking of pertussis toxin in mammalian cells. *Cell Micro*. - In press. Jan 14; [Epub ahead of print]

## MEETINGS AND POSTERS

**Dr. Nicholas Carbonetti** will be giving a seminar at the Asthma and Allergy Center at Johns Hopkins University on April 9, 2008, titled "Immunomodulation by pertussis toxin during *Bordetella pertussis* infection of the airways".

**Dr. Martin Flajnik** was invited to give seminars at Johns Hopkins (October), Vanderbilt University (Nashville, November), the University of Nebraska (Omaha, December), Mayo Clinic (October), and Cornell (Ithaca, February).

**Dr. Cybele Garcia** (post-doc, Lukashevich lab) presented a poster titled "Characterization of Junin Virus Inactivated Particles by Zinc Fingers Reactive Compounds" at the ASM Biodefense and Emerging Diseases Research Meeting in Baltimore, Maryland (Feb 24-27, 2008).

◆ **Marco Goicochea** (Lukashevich lab) presented a poster titled "A Recombinant Viral Vaccine Candidate Against Lassa Fever and Yellow Fever" at the ASM Biodefense and Emerging Diseases Research Meeting in Baltimore, Maryland (Feb 24-27, 2008).

**Dr. Nicola M. Heller** (post-doc, Keegan lab) will be presenting a poster titled "The type I IL-4 receptor complex selectively activates the tyrosine phosphorylation of IRS-2", at the AAAAI (American Academy Of Asthma, Allergy and Immunology) Annual Meeting in Philadelphia, Pennsylvania.

**Dr. Gregory Melikian** was invited to give seminars at the Weizmann Institute, Israel (January), Tel-Aviv University, Israel (January), Dalhousie University, Canada (March), the Aaron Diamond

AIDS Research Center in New York (March), and also presented a poster at the Biophysical Society Meeting in Long Beach, California (February).

◆ **Quan M. Nhu** (Vogel lab) presented a poster titled "PAR2 and TLR4: A novel paradigm for receptor cooperativity" at the Keystone Symposium (Innate Immunity: Signaling Mechanisms) in Keystone, Colorado (Feb 24-29, 2008).

**Dr. Mark Shirliff** presented a seminar titled "Persistent Biofilm Infections" at Harvard Medical School, and at The Schepens Eye Research Institute in Boston, Massachusetts (November 1, 2007), as well as a seminar titled "Biofilms and Polymicrobial Infections" at Johns Hopkins University, Division of Infectious Diseases (January 9, 2008).

American Society for Microbiology in Boston, Massachusetts, titled "Host-Pathogen Interactions in Biofilm Infections" and giving a talk on "Host Immune Response in Chronic *Staphylococcus aureus* Biofilm Infections" at the same meeting (June 1-5, 2008).

◆ **Minjun Yu** (Keegan lab) will be presenting a poster and seminar at the American Association of Immunologists meeting April 5-9 at San Diego, California titled "Regulation of the TRAP promoter by IL-4".

## GOOD NEWS!


**Babies!**

**Stella Rose Dreher-Lesnack** was born to Sheila Dreher-Lesnack (Azad lab) and her husband Sky on November 8, 2007.

**Cole and Ophelia** were born on February 3 to Zoe Worthington (Carbonetti lab) and her husband Larry. The twins spent a few weeks in the NICU but are now doing well at home and are over 4lbs each.

**Sara Venø Shirliff**, daughter of Mark Shirliff and his wife Birthe, was born on February 15, weighing 8lb 8oz. Both mother and daughter are doing well.

**Isla Bree** (pronounced eye-la bree) Morin was born to Cara and Nick Morin (Kaper & Nataro labs respectively) on February 16 at 8:27am; she weighed 5lb 12oz and was

19" long. She decided to come about 5 weeks early and spent several nights in the NICU for observation. She is home now and everyone is doing great!

June Green's 2<sup>nd</sup> grandson, **Otto**, was born on March 20; he weighed in at 8 lbs & 4 oz and was 20 inches long. His proud parents are Anne & Ben Chenot and his big brother, Finn, is now 2.

**Marco and Lindsay Goicochea** are expecting their first child (a boy!) on August 12, 2008.


**Cuppers!**

**Dhan Kalvakolanu** has been elected to the editorial board of the Journal of Biological Chemistry (JBC).

**Nicole Ammerman & Khandra Sears** (Azad lab) have both received travel awards to attend the 5<sup>th</sup>

International Conference on Rickettsiae and Rickettsial Diseases. They were both selected to give oral presentations.


**News**

**Lisa Harrison** (Kaper lab) is now **Lisa Plemons**; she got married on June 22, 2007.

**Martin Flajnik's** daughter **Ariel** has the lead (Maria) in the upcoming musical, *West Side Story*, at Centennial High School April 2-5. Martin also watched every episode of *Terminator: the Sarah Connor Chronicles*, and fell in love with **Cameron**, the new terminator.

**Kristen Burdette's** (Williams lab) brother, **Marty**, plays with the band *Expressway* which won *Battle of the Bands at Fletcher's* on March 16, 2008.



Stella Rose



Cole &amp; Ophelia



Isla Bree



Sara Venø

## SCIENCE IN THE PUBLIC INTEREST: THE GOOD, THE BAD, AND THE UGLY OF BIOFILMS BY SMITA CHANDRAN

Dr. Mark Shirtliff met with Smita Chandran to explain his work to better understand biofilm formation and to devise better diagnostic and therapeutic approaches against it.

Smita (SC): Could you talk a little about the work in your lab?

Dr. Shirtliff (Dr.S): Vaccines against a lot of single-toxin pathogens like *B.pertussis* and *V.cholerae* have seen considerable success. However, organisms like *S.aureus* that can make over 20 toxins and 60 types of virulence factors result in chronic biofilm formation that are resistant to anti-microbial agents or immune responses. Therefore, we are working towards better methods to prevent and treat biofilms.

SC: Are biofilms sequestered from the immune system?

Dr. S: It depends on the bug. Early on, it is susceptible to the immune response. However, it can detach and multiply at another site. Quorum sensing agents then step in and upregulate virulence factors which are then turned down once the biofilm is formed. So this is something we are still trying to figure out.

SC: Is your research directed towards better diagnosis or prognosis?

Dr.S: Both. We would like to achieve better diagnostic strategies at the early stages of biofilm formation. Preventive strategies include designing vaccines against antigens that are biofilm-specific, knocking-out agents required for biofilm formation. Also, we are trying to manipulate the Th1-Th2 immune balance to skew it towards a more effective one.

SC: Can biofilms be used to our advantage? For example, in terms of drug delivery or waste management?

Dr.S: Yes, it can be used in waste management and in bio-remediation. For example, carcinogens like PCB and TNT are typically incinerated which results in pollution and costs a lot of money. Organisms that can dechlorinate PCB or break down TNT are allowed to form a biofilm around the dump site that will then break down the carcinogens. A biofilm matrix that has upregulated electron transfer systems has also been used as a layer between the two electrodes in batteries to generate electricity.

SC: Are biofilms typically made up of one kind of organism or could it be a symbiotic association of different species?

Dr.S: Yes and No. Infections in indwelling medical devices are usually seeded from bacteria in the blood and therefore usually have only one species. Biofilms associated with compound fracture injuries or diabetic foot infections are susceptible to biofilm formation with up to 20 different bacterial species due to environmental exposure. In the natural environment, it is almost always multispecies.

SC: Anything else you would like to add?

Dr.S: Yes. Some advice to future Pls- good molecular biology and biofilm research can only be attained by dedicated graduate students and keeping the PI out of the lab!

Unscramble the spring issue words below. Results will be published in the next issue.

1. ntriecruemt\_\_\_\_\_
2. ecsnsnosfteiontmicceieitgru\_\_\_\_\_
3. tmridoezk\_\_\_\_\_
4. tyaohsccluopcs\_\_\_\_\_
5. rckobed\_\_\_\_\_
6. worktaopbi\_\_\_\_\_

### Opinion Poll

Loves Jays pizza: 30%

Hates Jays pizza: 70%

Want your opinion heard? Look for our next poll in the fall!

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

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