News Letter

IBASM

Volume 6, #2 October 2003

Message from the President- Jim Mitchell

I am behind in my classes, I got stuck on P&T Committee, my wife and I are in the process of moving into the farm we just purchased and now it is time to write an article for this newsletter.....and Thanksgiving break is still weeks away! One thing I can look forward to is the three very exciting speakers at the upcoming spring meeting. The ASM Foundation speaker is Dr. Tim Ford, Professor & Chair of the Department of Microbiology at Montana State University and adjunct Professor at Harvard School of Public Health. His research interests have included source and drinking water microbiology, microbial cycling and transformation of pollutants, surface microbiology (biofilms), microbiologically influenced

Continued on page 2

WHAT'S INSIDE...

PAGES 1-3: Messages from the Pres. & Pres.-Elect
PAGE 3: Selection of new officers
PAGES 4-7: Undergrad. award paper
PAGES 8-9: Announcements from ASM
PAGES 10-11: Sept. & Oct. ASM Tipsheets
PAGE 12: New BSU faculty
PAGE 13: Congartulations and student poster requirements
PAGE 14: IBASM Officers

Message from the President-Elect Jeanne Barnett

Planning for the spring meeting in Indianapolis is in full swing. The meeting will be Friday evening through Saturday afternoon, April 16-17, 2004. The meeting will be in Indianapolis at the Indiana University School of Dentistry. The University Place Conference Center and Hotel has been reserved for lodging. The cost for the lodging is $115 for a single, $130 for a double, and $145 for a triple or quad (plus tax). University Place is within walking distance of the Dental School. We hope the central location will be good for all of you. We are planning a social gathering with snacks for Friday evening and breakfast and box lunch for Saturday. The cost for those items is not known at this time, but we are trying to keep it within reason.

Continued on page 4

The IBASM thanks the Indiana University School of Medicine-Fort Wayne for financially supporting the publication of this newsletter.

deterioration of materials, and microbial populations as biomarkers of environmental stress. Dr. Ford has both directed and participated in water quality related projects in the US, Canada, the UK, Honduras, Mexico, India and Russia. Current work in the US focuses on two areas: fate of the opportunistic pathogen, *Mycobacterium avium*, in drinking water biofilms, and the microbial interactions with pollutants in marine sediments from an EPA-designated Superfund site, New Bedford Harbor. His international work is currently focused on source and drinking water quality in Russia, India and the Philippines. His presentation for the meeting is entitled, "Biofilms as Ideal Environments for Pathogen Survival and Proliferation; Knowledge Gaps and Key Areas for Research."

Our second speaker is Dr. Dominique Galli from the Department of Oral Biology, Indiana University School of Dentistry. She will present current research endeavors of her lab which involve virulence factors of *Actinobacillus actinomycetemcomitans* (I refer to this bacterium as Ac ac!). Ac ac is a Gram-negative, facultative, capnophylic coccobacillus found in the oral cavities of healthy and periodontally affected individuals that has been implicated as a cause of localized juvenile and some forms of adult periodontitis, as well as other types of human infections, such as endocarditis and soft tissue abscesses. Dr. Galli's goal is to identify Ac ac-specific factors involved in neutrophil resistance by comparing a variety of phenotypically distinct Ac ac strains and studying their interaction with human neutrophils; specifically evaluating the potential ability of leukotoxin and [Cu, Zn]-superoxide dismutase to protect Ac ac from being killed by neutrophils.

Our third speaker is Dr. Charles (Chuck) Kulpa, Professor & Chair of the Department of Biological Sciences at the University of Notre Dame and Director of the Center for Environmental Science and Technology (CEST). He is also currently the president of the Southern Great Lakes section of the Society for Industrial Microbiology. CEST research areas include the manipulation and monitoring of microorganisms in unique environments, biodegradation of PAHs, metals removal from waste streams and microbial ecology of contaminated and natural environments. Dr. Kulpa is currently developing molecular and microbial methods for the investigation of mixed cultures and for enhancing the activity of microbial processes in the above environments. These studies utilize PCR, specific functional gene probes and primers, phylogenetic probes and primers, density gradient gel electrophoresis (DGGE), DNA sequencing as well as more traditional/microbial techniques. The goal of CEST is to understand microbial community structure and the activity of specific microbes within the community in a number of environmental situations, human made and natural. Dr. Kulpa is the recipient of the IBASM Academic Scientific Achievement Award and will present a seminar entitled, "From Toxic Waste to Environmentally Friendly (Green) Chemicals: Assessing Microbial Degradation and Transformation".

Jeanne will fill you in on registration, room & board and tentative agenda for the upcoming meeting. I look forward to seeing you all next Spring in Indianapolis!

Selection of New Officers

IBASM will need to identify a person for the President-Elect position at the upcoming meeting. We have not received any nominations as yet and welcome any full-member to submit their name by email. This is a very important position as this person is responsible for local arrangements at next annual meeting site including registration and room & board fees. Please contact Jim Mitchell asap if you are interested or have someone you would like to recommend.

We are also in need of a person to volunteer as the Educational Representative. This person is responsible for providing details of poster abstract submission in the newsletter, coordinating judges and presenting student awards at the spring meeting. If anyone is interested in volunteering for this post please contact Jim Mitchell.

J. Barnett's message (continued from page 1)

is not known at this time, but we are trying to keep it within reason.

A tentative schedule for the meeting has been set as follows:

Friday, April 16
- 7:00 p.m. – Dr. Tim Ford
- 8:30 p.m. – Social Time

Saturday, April 17
- 8:30 a.m. – 11:30 – Poster set up and viewing
- 12:00 noon – Lunch
- 1:00 p.m. – Business meeting – election of officers
- 1:45 p.m. – Dr. Dominque Galli
- 2:30 p.m. – Dr. Charles Kulpa
- 3:15 p.m. – Presentation of awards
- 4:00 p.m. – Adjourn

The schedule is busy, but it will hopefully allow for meaningful interactions while limiting the stay to one night. We are also not arranging for meals on Friday or Saturday evening to allow each participant to choose where they want to eat.

We're excited about the meeting and hope for good attendance again this year. We'll be publishing registration forms and more information in the next newsletter.

So you can plan ahead, the meeting for 2005 has been set. It will be at Abe Martin Lodge in Brown County State Park on April 15-17, 2005.

I'm looking forward to seeing many of you again in 2004. Let's make this meeting better than 2003!

First Place Undergraduate Winner

An Investigation of Lyme Disease Risk Within Southeastern New York Forests

Valerie C. Horobik
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Lyme disease, the most common vector-borne disease in the United States, is caused by a bacterium, *Borrelia burgdorferi*, which is transmitted between hosts, including to humans, via the bite of infected blacklegged ticks (*Ixodes scapularis*) (Fish 1993, Mather et al. 1990). Because this disease, which infects over 17,000 people per year, is becoming increasingly widespread, much concern exists as to how risk of contraction of Lyme disease can be reduced (CDC 2002). Because diagnosis and treatment remain problematic and no vaccine is currently available, avoidance of high-risk areas is a major part of the public health arsenal against this disease. Since the nymphal stage of the blacklegged tick is responsible for the majority of human Lyme disease cases, it is from data regarding the nymphal population that Lyme disease risk inferences are drawn (Mather 1993). Specifically, density of infected nymphs (DIN) is regarded as the primary measure of disease risk (Mather 1993, Ostfeld & Keesing 2000). DIN, in turn, is the product of the density of nymphal ticks in an area (DON) and the infection prevalence of those nymphs (NIP), which are functions of both abiotic factors affecting tick survival and the composition of the host community from which larval ticks feed and become infected with the etiological agent, *Borrelia burgdorferi*. Because abiotic factors and host communities vary across habitats, Lyme disease risk would also be expected to vary across habitats.

Indeed, past studies have demonstrated increased nymphal abundance within the forest habitat (Maupin et al. 1991, Schmidtmann et al. 1994, Ostfeld et al. 1996), likely because of the forest canopy's and leaf litter's ability to hold moisture, block drying winds and direct sunlight, and buffer temperature (Adler et al. 1992, Maupin et al. 1991), and because frequent larval hosts tend to be more prevalent within the forest habitat (Morris 1991, Markowski et al. 1998). Beyond looking simply at nymphal density,

Horobik (In Press) also found DIN to be many times greater within the forest habitat than at the forest-old field edge or at any distance within old fields. Intrigued by the finding of forests being macrohabitat "hot spots" for Lyme disease risk, the current study sought to further specify the characteristics of high-risk Lyme disease habitats on a smaller spatial and microhabitat scale within forests. Because of the potential for edge effects influencing both microclimate and host habitat preferences, there was reason to believe that Lyme disease risk might vary with location relative to forest edge. Further, it was suspected that certain micro-habitat features, such as downed wood and deep leaf litter would lend themselves to favorable tick microclimates and host refuges, possibly contributing to an increase in Lyme disease risk. Thus, the objective of this study was to determine whether Lyme disease risk (DIN) and its components (DON and NIP) vary, within the forest, as a function of distance from the forest edge or as a function of downed wood abundance and leaf litter depth.

To investigate this question, sampling of DON, via a procedure known as drag-sampling, was undertaken along 34 transects located at six distances from forest edge to forest interior (50 m from edge) in Dutchess County, NY, a hyperendemic zone for Lyme disease. Collected nymphs were then subjected to Direct Immunofluorescence Assay, to determine NIP, which was then multiplied with DON to arrive at the measurements for DIN, the primary measure of Lyme disease risk, for each transect. Also, for each transect, leaf litter depth was measured, and the number of intersections with downed wood of different diameters was recorded. Regression analyses were performed to assess DON, NIP, and DIN as functions of distance into the forest and as functions of the measured microhabitat variables. One-way ANOVAs and t-tests, where appropriate, were performed to determine whether mean DON, NIP, or DIN differed between distances from edge.

The results indicated that within the forest, DON, NIP, and DIN did not vary significantly as a function of distance from the forest edge ($r^2 = 0.076$, $P = 0.114$, N = 34; $r^2 = 0.054$, $P = 0.186$, N = 34; $r^2 = 0.027$, $P = 0.351$, N = 34, respectively). However, the interior transects (20-50 m from the forest edge) had a significantly higher mean DON ($t = 1.88$, $P = 0.035$, N = 34) and nearly significantly higher DIN ($t = 1.41$, $P = 0.084$, N = 34) than the edge transects (0-10 m from the forest edge). Looking at the micro-habitat data, neither leaf litter depth nor abundance of downed wood were significantly related to Lyme disease risk or to any of its parameters. However, a positive and nearly significant trend in DON and DIN

as a function of the abundance of large-diameter downed wood was noted.

These results support past studies indicating high Lyme disease risk within the forest, with every third to fourth nymph examined in this study infected and an encounter rate of approximately one infected nymph every 13 m within the forest interior. Also, it appears that forest interiors may present a higher risk of exposure to Lyme disease than forest edges, though the high degree of variation seen between sites would indicate that factors other than distance from edge contribute to variation in Lyme disease risk. Future studies should attempt to identify some of these other factors, on the habitat and microhabitat level, that influence Lyme disease risk variation because prevention of exposure to Lyme disease is a key component of protection against the disease. Results of this study, combined with those of another recent study (Allan, Keesing, and Ostfeld 2003) that found small forest patches to have higher tick densities and infection prevalence than larger patches, would implicate the interiors of small forest patches as being of highest risk for exposure to Lyme disease, with areas of great amounts of downed wood possibly presenting an added risk. However, it must be remembered that, in the study area, infected ticks have been found in all habitats, including open fields, meaning that exposure is possible in all habitats. The results of this and similar studies will hopefully benefit the general public by providing them with knowledge of the habitats in which they are most at risk for contracting Lyme disease, allowing them to take the proper precautions.

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STUDENTS AND MENTORS-- LOOK NO FURTHER

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October 15-18, 2003
San Diego

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May 21-23, 2004
Xavier University of Louisiana, New Orleans

Learn new teaching practices, keep abreast of the sciences, and network with peers. Scientific and education sessions, workshops, posters, exhibits, and discussions. Travel grants for graduate students, post-doctorates, early career faculty, non ASM-members faculty at minority-serving institutions and community colleges.

Abstract Submissions: **February 20, 2004**
Travel Grants, and Early Registration Deadline: **March 19, 2004**
Final Registration Deadline: **April 16, 2004**
www.asmcue.org

COPIES OF THE F0LLOWING JOURNAL ARTICLES CAN BE ACCESSED ONLINE AT: http://www.asm.org/pcsrc/tip.htm

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INGREDIENT IN DOMESTIC DETERGENT MAY NOT CONTRIBUTE TO ANTIBIOTIC RESISTANCE

An ingredient commonly found in antibacterial products does not appear to contribute to antibiotic resistance, say researchers from the University of Manchester, United Kingdom and Proctor and Gamble in Cincinnati, Ohio. Their findings appear in the September 2003 issue of the journal Applied and Environmental Microbiology.

Triclosan is an antibacterial compound frequently found in domestic and clinical applications. Although concentration levels are often low, specific areas such as kitchen sink drains are highly exposed because triclosan is so commonly used in domestic products. Recent research has suggested that exposure to this compound may lead to antibiotic resistance in some bacteria.

In the study, long-term bacterial communities found in sink drains were established and maintained over a period of six months and then subjected to detergents containing triclosan for three months. Cultures were then extracted and susceptibility to four biocides and six antibiotics were analyzed. With the exception of *Escherichia coli*, results showed that minimal levels of triclosan exposure did not affect antimicrobial susceptibility in environmental communities.

"Long-term exposure of domestic-drain biofilms to sublethal levels of triclosan did not effect bacterial vitality or significantly alter antimicrobial susceptibility," say the researchers. "We conclude therefore that the emergence of antibiotic resistance through triclosan in the kitchen is highly improbable."

(A.J. McBain, R.G. Bartolo, C.E. Catrenich, D. Charbonneau, R.G. Ledder, B.B Price, P. Gilbert. 2003. Exposure of sink drain microcosms to triclosan: population dynamics and antimicrobial susceptibility. Applied and Environmental Microbiology, 69. 9: 5433-5442.)

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NEW TEST QUICKLY DIAGNOSES WEST NILE VIRUS INFECTION

A new test differentiating West Nile virus from similar viruses may be useful in quickly diagnosing infections in both clinical and veterinary practices say researchers from New York, Connecticut, Colorado and Canada. Their findings appear in the September 2003 issue of the Journal of Clinical Microbiology.

West Nile virus is one of many pathogens belonging to the flavivirus group. Current methods of diagnosis involve testing antibodies against viral structural proteins, the main one being the E protein As the E protein is found in other flaviviruses such as Dengue virus and St. Louis encephalitis, positive antibody E results are not a definitive diagnosis of West Nile virus. Therefore, additional testing is required to differentiate between the viruses and specifically identify the West Nile virus infection.

The researchers have discovered a protein, called nonstructural protein 5 (NS5) that can differentiate between West Nile virus and Dengue virus or St. Louis encephalitis, as well as between flavivirus vaccination and natural WNV infection. This method also indicates if the infection was incurred recently, all of which would allow for a faster and more efficient diagnosis of West Nile virus.

"Our results demonstrate that the NS5-based immunoassay reliably discriminates between WNV infections and DEN or SLE virus infections and that it differentiates between flavivirus vaccination and natural WNV infection," say the researchers. "These unique features of the NS5-based immunoassay will be very useful for both clinical and veterinary diagnosis of WNV infection."

(S.J. Wong, R.H. Boyle, V. L. Demerast, A. N. Woodmansee, L. D. Kramer, H. Li, M. Drebot, R. A. Koski, E. Fikrig, D. A. Martin, P. Y. Shi. 2003. Immunoassay targeting nonstructural protein 5 to differentiate west nile virus infection from dengue and st. louis encephalitis virus infection and from flavavirus vaccination. Journal of Clinical Microbiology, 41. 9: 4217-4223.)

Selected Highlights from the Journals of the ASM, October 2003 (from ASM Tipsheet)

COPIES OF THE F0LLOWING JOURNAL ARTICLES CAN BE ACCESSED ONLINE AT: http://www.asm.org/pcsrc/

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HUMANS MAY CONTRACT SALMONELLA FROM PET TREATS

Pet treats containing dried beef may be contaminated with the foodborne pathogen, Salmonella enterica, and could infect humans say researchers from Canada and Nebraska. Their findings appear in the October 2003 issue of the Journal of Clinical Microbiology.

In the study, strains of *S. enterica* were collected from five Canadian patients suffering from salmonella infections and compared to a strain isolated from a commercial pet treat found on the property of one of the patients. The human and pet treat salmonella were found to be "highly related," suggesting that the patients may have contracted an infection when handing their pet a treat.

"This study is the first to implicate the transfer of multidrug-resistant Salmonella species through the handling of commercial pet treats containing animal products," say the researchers. "Therefore, the association between animals, humans, and the handling of pet treats containing animal products, which are available in pet shops and retail stores, could play a role in the increasing prevalence of AmpC-producing *S. enterica* stereotype Newport infections observed in the United States and Alberta."

(J.D.D. Pitout, M.D. Reisbig, M. Mulvey, L. Chui, M. Louie, L. Crowe, D.L. Church, S. Elsayed, D. Gregson, R. Ahmed, P. Tilley, N. Hanson. 2003. Association between handling of pet treats and infection with *Salmonella*
enterica serotype newport expressing the AmpC B-Lactamase, CMY-2. Journal of Clinical Microbiology, 41. 10: 4578-4582.)

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GUM DISEASE CONTRIBUTES TO HEART DISEASE

Periodontitis may be a contributing factor in the development of heart disease say researchers from Boston University and Harvard Medical School. Their findings appear in the October 2003 issue of the journal Infection and Immunity.

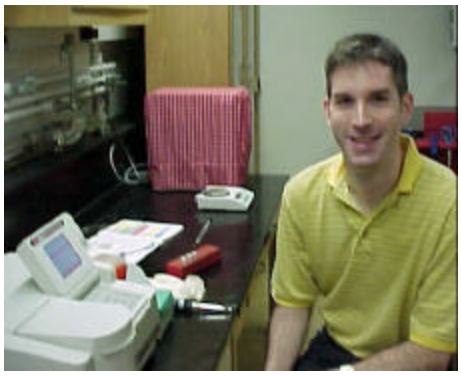
In the study, rabbits were fed a high-fat diet, one of the main factors contributing to the buildup of cholesterol deposits in the aorta, for 13 weeks. The periodontal pathogen, *Porphyromonas gingivalis*, was administered to half the group to induce periodontitis. Researchers found the infected rabbits had significantly greater amounts of cholesterol accumulation in the aorta.

"The results provide direct evidence that periodontitis may be a risk factor and may contribute to the pathogenesis of atherosclerosis," say the researchers. "The data support the concept that infections at remote locations can modulate atherosclerotic events distantly."

(A. Jain, E.L. Batista, Jr., C. Serhan, G.L. Stahl, T.E. Van Dyke. 2003. Role for periodontitis in the progression of lipid deposition in an animal model. Infection and Immunity, 71. 10: 6012-6018.)

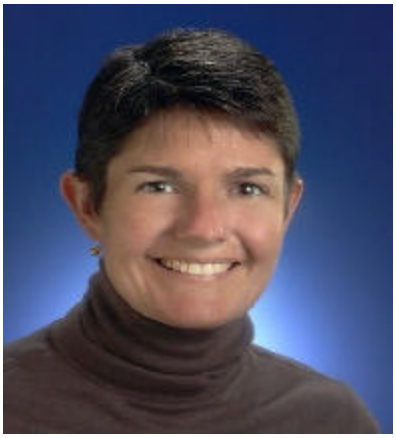
New Faces in the Crowd

Ball State University Biology Department has 3 recently hired tenure-track scientists



Dr. John McKillip will be teaching introductory microbiology (allied health microbiology and majors course) and PCR Methods. DNA and RNA-based methods for pathogen detection in foods are under development in John's lab, and include conventional, multiplex, and real-time PCR approaches to detect Bacillus spp. in dairy products and other foods. DNA fingerprinting (rep-PCR), SYBR Green-based melt curve analyses, fluorescent molecular beacons, and real-time RNA amplification (NASBA - nucleic acid sequence-based amplification) will be used to monitor enterotoxin gene expression in Bacillus cereus within contaminated foods. He brought graduate students Kiev Gracias (Ed.D program) and Robin Cooper (M.S. program) with him from Louisiana Tech University to complete their graduate degrees in the BSU Biotechnology Certificate Program.

Dr. Heather Bruns will be teaching undergraduate and graduate immunology courses as well as introduction to biology at the cellular level. Her research is focused on studying the role of the transcription factor STAT (Signal Transducer and Activator of Transcription) 6 on lymphocyte function in immune responses and regulation of lymphoid organ architecture using transgenic mice that express a mutant (constitutively active) STAT6, called Stat6VT. Heather will also be using cell lines that express Stat6VT to further examine the biochemistry (activation and deactivation) of the protein in response to cytokine stimulation.



Dr. Susan McDowell harbors research interests in mammalian cell signaling and she will be incorporating this into courses she will be teaching in the BSU Biotechnology Program that cover recombinant DNA & RNA technologies, proteomics, and bioinformatics. Through a material transfer agreement with Eli Lilly, Susan has several mutant constructs of a family of kinases known as PI3K that she generated while working on a postdoctoral fellowship within their Cardiovascular Research Division. She will be investigating the specific role of individual family members in the maintenance of cardiovascular health while at the same time, looking into the cardiovascular impact that chemotherapeutic drugs that target this family of proteins for the treatment of cancer might have on cardiovascular tissue.

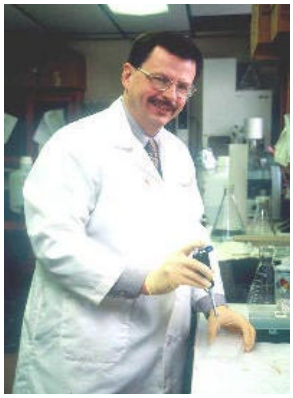
Make sure you introduce yourselves to these individuals at the April meeting in Indianapolis. If there are other new faces in the crowd please forward your pictures and a brief biography to Shivi so that we can print them in future issues of this newsletter.

Congratulations!

Christian Chauret

Three of our compadres were recognized as outstanding teachers recently by their respective institutions. Jeanne Barnett (University of Southern Indiana) received the Faculty of the Year Award presented by the Student Government Association. Christian Chauret (IU Kokomo) received the Indiana University Trustee Teaching Award (I hear this one comes with a nice bonus check!).

Richard Gregory (IU School of Dentistry) received the Outstanding Faculty Member of the Year Award. Teaching, research and service records are all identified as outstanding for these three by their students and peers. We are honored to have such individuals working in the field of microbiology within our state. Please give them a hearty pat on the back the next time you see them!



Richard Gregory

Student Posters

Abstract submission form and additional details will be included in the next newsletter. We will be using the same 4x4 sq.ft. tri-fold styrofoam poster boards used at the last meeting. Tacks will be supplied but it wouldn't hurt to bring some extras in case we run short. Posters (high school, undergraduate and graduate) submitted for competition will be judged in 4 categories:

Scientific thought: Is there a clear hypothesis? Are the goals of the study defined? Were data correctly analyzed? Were statistical analyses done? Did a logical conclusion result? (40 points)

Creativity: Was the topic original? Is there anything new in the approach to answering the question? Were new methods developed? (20 points)

Thoroughness: Was the study as complete as possible? Does the student understand the background material? Was there an introduction? Is the student aware of the drawbacks of the study? (20 points)

Presentation (poster): Were the results/conclusions clearly presented? Was the student's verbal expression clear and concise? Was the student able to answer questions? How well did the poster convey the information? (20 points)

2003-2004 IBASM OFFICERS

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