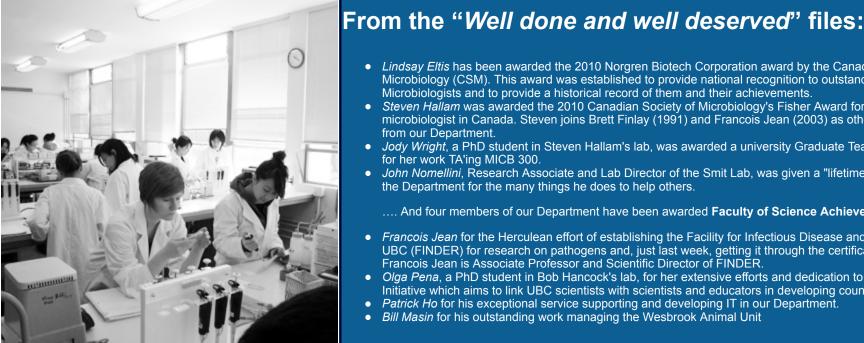


THROUGH THE PETRI DISH Department of Microbiology & Immunology newsletter May 2010





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Events

2010 GRADUATION TEA

All members of our 2010 graduating class and their guests, as well as all our alumni, are invited to the 2010 graduation tea hosted by Department Head Dr. Mike Gold. What could be more uplifting than this?

Save the date: 31 May 2010 Where: Life Science Centre, West Atrium When: 1:30 pm - 3:30 pm

Come celebrate with us!

Competition

Name this newsletter! Please send your suggestions to:

ugmicb@interchange.ubc.ca

The winner will be announced (in big letters) in the next newsletter

Contact Us

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email us

- Lindsay Eltis has been awarded the 2010 Norgren Biotech Corporation award by the Canadian Society for Microbiology (CSM). This award was established to provide national recognition to outstanding Canadian Microbiologists and to provide a historical record of them and their achievements. • Steven Hallam was awarded the 2010 Canadian Society of Microbiology's Fisher Award for top young
- microbiologist in Canada. Steven joins Brett Finlay (1991) and Francois Jean (2003) as other winners of this award from our Department. Jody Wright, a PhD student in Steven Hallam's lab, was awarded a university Graduate Teaching Assistant award for her work TA'ing MICB 300.
- John Nomellini, Research Associate and Lab Director of the Smit Lab, was given a "lifetime contribution" award by the Department for the many things he does to help others.
- . And four members of our Department have been awarded Faculty of Science Achievement Awards this year: • Francois Jean for the Herculean effort of establishing the Facility for Infectious Disease and Epidemic Research at
- UBC (FINDER) for research on pathogens and, just last week, getting it through the certification process. Dr. Francois Jean is Associate Professor and Scientific Director of FINDER.
- Olga Pena, a PhD student in Bob Hancock's lab, for her extensive efforts and dedication to the Accessible Science Initiative which aims to link UBC scientists with scientists and educators in developing countries. Patrick Ho for his exceptional service supporting and developing IT in our Department.
- *Bill Masin* for his outstanding work managing the Wesbrook Animal Unit

A MESSAGE FROM THE DEPARTMENT HEAD

by Mike Gold

Welcome to the first edition of the new Department of Microbiology and Immunology electronic newsletter! Our goal is to reach out to both present department members and our alumni with news about the people, research, and activities in our department.

Since taking over as department Head in July 2009, one of my goals has been to reconnect with our alumni. One of the wonderful things about our department is the feeling that we are a family, a group of people that support and nurture each other, and we want to create opportunities for our alumni to continue to be an active part of our family. Whenever I pass through the Wesbrook building, I take time to look at the pictures of the graduating classes. In addition to smiling at out of date hairstyles, I'm pleasantly surprised by all the people that I remember from the classes that I taught and by the number of people who are still involved with UBC. It would be even better to see you all again in person!



Left to Right: Michelle Buckner, Mike Gold, Shannon Russell, and Ellen Arena, Not in picture: Julian Davies

Our outreach/alumni coordinator, Dr. Jülyet Benbasat is busy planning activities to make that a reality. Over the next year we are hoping to have several open house events so that you can visit your old haunts, see your old classmates, and meet today's students. Much will be the same but you will also notice some big changes. This summer, some of the Wesbrook teaching labs in which you worked will undergo a \$500,000 renovation process. You will also notice that the research labs have moved to the Life Sciences Centre, and we invite you to tour those labs. We also hope to organize events where our present students can benefit from your experience and advice by hearing about your career paths. We will also highlight some of the great things our alumni have done in this newsletter.

The people in our department continue to do great things and we hope to keep you up to date with the latest developments. In each issue of the newsletter we will have short summaries of exciting new research projects in our department.

Our department members are also involved in many public outreach activities, which we invite you to participate in. Ramon Santiago-Garcia, a post-doctoral fellow, along with Dr. Lindsay Eltis, organized a World TB Day symposium on March 24. Similarly, the department has worked together with the Microbiology and Immunology Student Association (MISA) to sponsor symposia for World AIDS Awareness Day, which is December 1. MISA plays an integral part in connecting the department to our undergraduates and has sponsored career nights as well as the recent Hot Dogs for Haiti fundraiser. With MISA member Kevin Tsai madly making tikka masala dogs and his own version of a Japadog, we raised over \$1200 for the earthquake victims.

An upcoming department activity to look out for is another fundraising activity for an important cause, the Multiple Sclerosis Society Vancouver Scenic City Bike Tour on August 8. Last year, we had an intrepid team of 5 UBC SpeedyBugs who came out in the rain (see the photo) to raise money for research and treatment of this autoimmune disease. This year we hope to have sunny weather and a much larger team of SpeedyBugs. Log onto www.msbiketours.com if you'd like to join us.

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VIRAL INFECTIONS MAY TRIGGER THE ONSET OF MULTIPLE SCLEROSIS

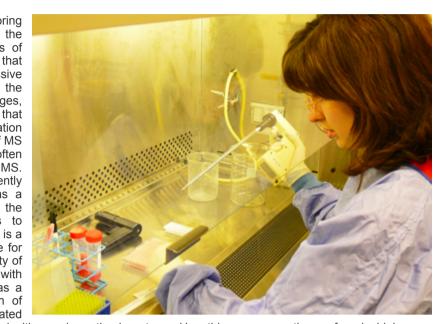
by Costanza Casiraghi and Marc Horwitz

Costanza Casiraghi is a PhD candidate in Dr. Marc Horwitz' laboratory. This work was initially funded by a pilot project grant from the Multiple Sclerosis Scientific Research Foundation of Canada (MSSRF). Currently funding is being sought from CIHR and Multiple Sclerosis Society of Canada.

The Horwitz lab is located on the third floor of the Life Sciences Institute, in the department of Microbiology and Immunology at the University of British Columbia. The principal investigator is Dr. Marc Horwitz and the lab is currently

composed of two PhD students (Maya Poffenberger and Costanza Casiraghi), one postdoctoral fellow (Dr. Martin Richer), one research technician (Iryna Shanina) and several undergraduate students. Our lab is interested in unravelling how viral infections are involved in the development of autoimmune diseases such as type 1 diabetes, myocarditis and multiple sclerosis (MS). To address this question, we use both mouse models and in vitro systems with human cell lines to study these complex diseases.

In particular, Costanza has been exploring the link between viral infections and the onset of MS. MS affects thousands of Canadians and is a chronic disease that attacks the brain leading to progressive disability. During MS components of the immune system, T cells and macrophages, attack and destroy the myelin sheath that covers neurons damaging the propagation of nervous signals. While the cause of MS is still not known, viruses have quite often been implicated in the development of MS. Several lines of evidence have recently identified Epstein-Barr virus (EBV) as a potential trigger of the disease, but the mechanism exploited by this virus to trigger MS is still not understood. EBV is a fairly common virus that is responsible for infectious mononucleosis and a majority of the population has been infected with EBV. Once infected, EBV remains as a latent infection in a small population of cells in our body. It can be re-activated



later in life, but has not been associated with any dramatic phenotype. How this common pathogen found widely spread across the population could be responsible for mediating MS in a much smaller group of people is of immediate interest and likely due in part to our genetic make-up, the environmental stresses that could lead to re-activation of the virus and a bit of bad luck.

Our lab is proposing a new hypothesis to explain the link between EBV infection and MS. Our aim is to study whether EBV is able to infect the blood vessels that form the blood brain barrier (BBB). BBB blood vessels are composed of a specialized type of endothelial cells that protect the brain. If the BBB is damaged, it can become more permeable and allow the passage of inflammatory T cells that can start to react and destroy the myelin sheath. An increase in permeability of the BBB is one of the primary stages in the development of MS. We hypothesize that, as a consequence of EBV infection either initially or following re-activation, the cells become inflamed and this inflammation damages the BBB and allows the passage of immune cells that destroy the myelin sheath. In collaboration with Dr. Katerina Dorovini-Zis at Vancouver General Hospital, an international expert in brain endothelial cells, we have infected brain endothelial cells with EBV and are currently examining the consequences of infection. These results could shed light not only on the cause of MS but also help in the identification of new targets for the development of novel therapies.

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WESBROOK LAB RENEWAL: PUTTING THE LIFE BACK IN LIFE SCIENCES

by Karen Smith (lab instructor extraordinaire :)



If you drop by the Wesbrook building this summer, you will notice a makeover in progress. This make over is for an old friend. Lately, it has been obvious that this old friend could use a boosting in self-esteem and moral. This old friend is tired and worn, lacking in style. Yet everyday this old friend comes through by offering the best they can be in spite of the long hours, adverse climate and stampede of students they encounter. This old friend is our third year teaching laboratories

Although, this particular make over will not be accompanied by Stacey and Clinton from TLC 's "What Not To Wear" it is clear that our labs will benefit immensely in the same renewal and rejuvenation process. Just like the show, the project required a re-assessment of what was working and what was not. I wouldn't place any one problem area on the top of the list - it could have been the peeling laminated countertops, the bulging plaster on the window sills, the leaky sinks or the decaying wooden cupboards. Or it really could have been the electrical outlets that trip off when more than one item is plugged in the same circuit. Whatever it was, at some point the labs turned from charmingly post-modernistic to just plain old.

And so, with the support of the Faculty of Science and the Department of Microbiology, came forth the makeover gurus of architects, campus planners, IT personnel and contractors. All necessary to whip this baby into shape! Beginning on May 3rd, rooms 109 and 111 will be completely gutted so that new floors, lighting and custom bench tops can be installed. A wash of modern woods, soft greys and burgundy will replace the cold sterile whiteness that currently blends into the usual UBC beige walls and fluorescent lighting. Out with the old white boards and in with sleek plasma screens!

Goodbye old White bench tops Goodbye years of bacteria growing in the cracks! MiheGold

Sentimentally, this morning, Julyet and I were contemplating the changes that were to come. Characteristically of any change, part of us felt sadness. Maybe even a reluctance to let go. I realized that I, alone, must have spent over 4,000 hours in those rooms that provided a microbiology experience for at least 7,000 students. That is equivalent to 500 nights of sleep!

But then, I thought, it isn't the cracked flooring or the lack of storage space that defined the lab experience of all those students. It was the students themselves who made microbiology what it is today - one of the most engaging, tiring, amusing and challenging experiences they will encounter in their undergraduate careers. Some might even suggest us instructors and TA's added to that too!

Although our sleek, new rooms will be more inviting and modern, they will provide the same promise - a promise of the future. The promise that microbiology will always be exciting, dynamic and still one of the most popular programs

in life sciences. And that is what puts L-I-F-E back in the life sciences!

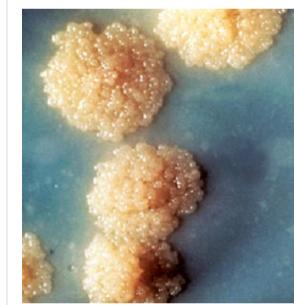
Gaoolbye my food of Bady You send me well and I wish your well -:

UBC WORLD TB DAY 2010

by Santiago Ramón-García

Wednesday, March 24 was World Tuberculosis Day (WTBD), and for the first time UBC marked the occasion with several events designed to raise awareness of tuberculosis (TB) and the impact it continues to have, both globally and locally.

In developed countries, TB is largely thought to be a disease of the past and no longer a public threat. However, it remains an epidemic in much of the world, causing the deaths of almost 2 million people each year. A third of the global population is infected with the bacterium that causes the disease. In Canada, the incidence of TB is particularly high among First Nations people, and in Vancouver, TB is a growing concern in the Downtown East side (DTES). Moreover, with the emergence of extensively drug resistant strains (XDR-TB), current anti-TB therapy is becoming increasingly ineffective and XDR-TB almost impossible to cure. In a modern global world, this is a first priority in public health strategies.



The 2010 UBC WTBD was the brainchild of Dr. Santiago Ramón-García, a postdoctoral fellow in Dr. Charles Thompson's Lab in the Life Sciences Institute (LSI). Santi is actively working in the TB field, developing new therapeutic interventions for TB treatment. As a member of the Centre for Tuberculosis Research (CTBR) and the outreach committee of the Department of Microbiology & Immunology, Santiago felt that little had been done to create TB awareness in our community. His WTBD proposal was wholeheartedly support by Dr. Michael Gold, Head of the Department of Microbiology & Immunology, and by Dr. Lindsay Eltis, CTBR's Director who, together with Santi, spearheaded this initiative.

The Department of Microbiology & Immunology and CTBR partnered with the British Columbia Centre for Disease Control (BC CDC), the UBC Centre for Lung Health, the TB Vets Charitable Foundation, and the Humanities 101 Program to assemble a twoday program of events highlighting local accomplishments in the fight against TB and raising awareness of TB. The events were held in two different venues: the DTES and the UBC campus at the LSI.

In the DTES, an area with the highest incidence of TB in BC, TB doctors and nurses from the BC CDC hosted an informational

session about TB symptoms, testing, and treatment options. This was held in conjunction with a community lunch at the First United Church. This successful event reached more than 200 people, educating residents about how diagnosis and treatment are the first critical steps in reducing incidence rates. A second information session geared towards DTES health care workers was held at the Vancouver Native Health Clinic and discussed the use of a new type of test for latent TB infection in the DTES community.

At UBC, the World TB Day programme included a poster session, a research symposium and a keynote address held at the LSI. These events were open to the general public and were well attended by the student community. The poster session and the research symposium brought together for the first time local researchers, clinicians, and health care workers to discuss different aspects of the TB problem. Finally, world-renowned TB specialist Dr. Peter Donald, Professor Emeritus in Pediatrics and Child Health at the Stellenbosch University, Cape Town, South Africa, delivered a keynote address for the general audience, entitled "The natural history of tuberculosis and what it teaches us". Dr. Donald walked the audience through the available information on TB during the pre-antibiotic era, analyzing the importance of the host background for the final outcome of the disease.

In summary, Vancouver's first WTBD was a resounding success from both the community and scientific perspectives. It provided a framework for the interaction of local TB researchers and clinicians. Indeed, several collaborations among local groups were initiated thanks to the event. Moreover, this event increased TB awareness among people in the DTES community. Thanks to all the co-organizers, the success of this initiative forms the basis for future WTBD events and further interactions aimed at TB research, diagnosis, and treatment.

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GENOMIC RESEARCH WILL ENABLE GREENER CLEANUP OF MILITARY EXPLOSIVE TEST SITES

by Lindsay Eltis

Dr. Lindsay Eltis is Professor of Microbiology and Immunology at UBC and is the founding Director of the Centre for Tuberculosis Research at UBC.

The main focus of the Eltis lab is to investigate bacterial enzymes and pathways that degrade aromatic compounds. steroids and pollutants. These enzymes and pathways have tremendous biotechnological potential in bioremediation and biocatalysts and are also important in certain diseases such as TB.

Lowly bacteria, it turns out, hold the power to help militaries and munitions manufacturing plants around the world clean up toxic waste on test sites.

Compounds known as nitramines, specifically RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), were invented back in World War II and have been used in military munitions for decades. These high-energy compounds are often used to propel tank shells and act like a more powerful version of TNT. But RDX and other nitramines can contaminate the surface or subsoils of surrounding military sites at low but toxic levels. With increased knowledge of their environmentally harmful effects, Canadian and US militaries, along with others around the world are looking for ways to clean up their contaminated test sites.

diation using RDX-degrading microorganisms is a potential strategy to cleanup these contaminated sites, On-site biorem but is currently ineffective due to a lack of understanding about the biochemical and genetic pathways of nitraminedegrading bacteria.



Genomic Studies of Explosive Biodegration



Dr. Lindsay Eltis, together with Drs. Steven Hallam and Bill Mohn, also of the Department of Microbiology and Immunology, is conducting a Genome BC-funded project entitled, Genomic Studies of Explosives Biodegradation. The \$3.45 million project will study how bacteria degrade RDX and determine how to maximize its potential for bioremediation.

RDX is a rich source of nitrogen, and certain bacteria including *Rhodococcus* and *Gordonia*, have evolved to thrive on the contaminants this explosive leaves behind. With a voracious appetite for toxic chemical compounds and a near indestructibility (some can survive even high levels of nuclear radiation), these bacteria are the "ultimate garbage incinerators".

This research, which is also supported by the US Military, presents a welcome alternative to the current option for cleanup at test sites: a costly and invasive process which involves removing the top layer of soil, carting it away by dump truck and burning it in an incinerator.

Researchers will develop and use genomic technologies such as metagenomics and transcriptome data to determine which genes are functionally relevant to the degradation of nitramine-containing chemicals. Collaborations with the US military and the Canadian Department of National Defence will allow rapid implementation of methods and tools developed by this research.

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ACCESSIBLE SCIENCE INITIATIVE

by Olga Peña



In developing countries, students have poor access to information and education regarding advanced science and biotechnology. To address this, Olga Pena, a PhD Candidate in the Department of Microbiology and Immunology established the Accessible Science Initiative (ASI) at UBC and is currently the Student Leader, Founder and Director, for this project. The pilot project in Tolima, Colombia, which is described below is running under her leadership. Olga has recruited ~35 graduate students from many different disciplines at UBC, as well as five UBC professors, to assist with this initiative.

For information on the Accessible Science Initiative in Colombia please see the UBC Centre for International Health website at: http://www.cih.ubc.ca/666/3837/

The Accessible Science Initiative (ASI) is a new student led organization currently working under the umbrella of the Center for International Health (CIH) at UBC. The main goal of this capacity building initiative is to promote and improve science education and scientific research in low and middle income (developing) countries through education, technical support and exchange of Knowledge.

This year, ASI is running a pilot project in Tolima, Colombia in partnership with the University of Tolima (UT) and local high schools. With the help of faculty members and volunteer students from the University of Tolima and UBC, ASI is organizing educational science weeks for elementary and high school students and creating a science manual for high school teachers and students, which contains hands-on activities requiring only easily accessible materials and based on culturally relevant topics. The main focus of this manual is to make science more interactive, fun and easy to learn, thus promoting early engagement towards science career paths that will accelerate the future development of the region.

These activities are already creating bridges between scientists at UT and UBC and have generated fundraising activities that will provide material and equipment for different research groups in Colombia. The long-term goal of this project is to build institutional capacity, by providing the University of Tolima with the necessary training and materials required for a sustainable science education and research program. With ASI's help, the hope is that the University of Tolima can become a model for many public universities in other low-income regions of Colombia and Latin America and a paradigm for future projects in other developing regions such as Southeast Asia, the Middle East, and Africa.

Go, Olga :)

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ALUMNI SPOTLIGHT: DR. HELEN TING

Dr. Helen Ting is one of our alumni. She was the first directed research student (Micb 448) in Dr. Mike Gold's lab.

Helen Ting graduated from UBC Microbiology in 1996. Her undergraduate degree gave her a solid background in basic science and prepared her for the next step in her academic journey in the Faculty of Medicine. After she completed her UBC medical degree, she travelled to Toronto for a two-year residency program in Family Medicine and a one-month locum in rural Ontario. Back in Vancouver, she set up practice in the Broadway corridor. One of the things she finds most rewarding is taking care of young families and maternity care. It allows her to work with her hands and provide care to people during a special and exciting time in their lives.

In 2005, Helen travelled to Nepal and Tibet on a medical mission trip. It was a dream come true to use her medical knowledge in a place that was so different from what she was used to. There were many challenges (no flush toilets, drinking Tibetan tea, high altitude), but she felt extremely privileged to have been allowed to offer care to people who live in one of the harshest environments on Earth. Helen hopes that she'll have more opportunity in the future to do international medicine.



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FROM THE FRONT LINES IN M&I

by Julian Davies



Dr. Julian Davies is Professor Emeritus at the University of British Columbia, Fellow of the Royal Society, and a former President of the American Society for Microbiology.

Click here to read more about Julian. Nature Biotechnology 26, 727 (2008) And, yes, Julian is still in his lab every day :)

When Mike asked me to write a short commentary on things "microbiologic", I agreed readily. However, now it is time to actually put pen to paper, as it were, and I do not know what to write! Anyway, here goes.

As you all know microbiology is not rocket science...it is much more difficult! But the field has changed enormously in the past decade, mainly due to the development of new technologies. The new methodology is leading us into areas that we were not ready (or able) to consider in the past.

Foremost among the technical advances is next generation sequencing (NGS). This new instrumentation can provide complete genome sequences of all the bacteria in a given community, such as the human gut, a soil or a sediment. We end up getting the genome sequences of organisms that we did not even know were present!

It seems that there is a race going on at the moment, between all the countries that have invested heavily in NGS to sequence the microbiomes (microbial populations) of as many people as possible (this excludes Canada for obvious reasons). Information on the gut microbiomes of 124 Europeans has just been released. Interestingly, they included healthy individuals as well as those suffering from inflammatory bowel disease; the latter had significant variations. The conclusion from the publication was that the studies will lead to a much more complete understanding of human biology than one we presently have.

As microbiologists and immunologists we welcome statements like this, since we are now at the beginning of an era when our different disciplines will have much clearer overlaps. Of course, this applies to all host-microbe interactions in any environment. Does this mean that petri plate-based microbiology might become a thing of the past? Not a bit of it, as Salvador Luria (the Nobel-winning virologist) is purported to have said "if you can't grow 'em, you don't know em".

The bottom line is that microbiology has regained its place as the pre-eminent life science and, Steven Harper willing, this will benefit us at UBC.

Remember, bugs are us!

Cordially,

