Where Canada's experts in clinical microbiology and infectious diseases meet
Point de rencontre des experts canadiens en microbiologie médicale et infectiologie
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BACKGROUNDER

The 'Ins and Outs' of Bacterial Interactions with Host Cells

Life Inside the Cell

Many of us have experienced the "creeps" by watching science fiction movies dealing with human infestation by alien creatures. They grow inside human bodies and eventually burst out leaving producing a gruesome spectacle of destruction. In the real world, there are numerous forms of life that have evolved (adapted) to live inside humans. Microbes in particular, due to their small size, may live inside single human cells. From the infected cell's perspective, reality may not be far from the fantastic, yet macabre, alien picture mentioned above. Life as an intracellular pathogen is difficult and involves a lot of preparation. Bacterial pathogens need to overcome the powerful defense mechanisms that host cells have developed to prevent infection.

Researchers, used to growing bacteria on agar, now realize this has very little in common with real life, where pathogens and hosts coexist and compete. To better describe what happens in real life, the study of the interaction between microbes and host cells was developed, taking advantage of technological progress that allowed the tracking of subcellular events in infected cells.

The objective of this talk is to provide an up to date view of the molecular interactions between host cells and bacterial intracellular pathogens. For this I will focus on the mechanisms used by model bacterial pathogens to enter host cells, subvert the host cell's molecular machinery, initiate intracellular replication, and kill the host cell. The implications of these host-pathogen molecular interactions on human disease will be discussed.

Dr. Raphael Garduno, PhD
Canada Research Chair in Food and Waterborne Bacterial Pathogens
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Pathogenic *E. coli*: Contribution of the Pathogen, Host, and Microbiota

Pathogenic *E. coli* cause much morbidity and mortality worldwide. Two types of *E. coli* (enteropathogenic *E. coli* (EPEC) and enterohemorrhagic *E. coli* (EHEC, or O157)) cause severe diarrhea, with EHEC also causing hemolytic uremic syndrome in a subset of cases (as was evident in the Walkerton outbreak).
These pathogens trick host cells into producing elegant structures on their surface on which they sit. These "pedestal" are formed after complex rearrangements with the cell and are triggered by bacterial proteins that the bacteria trick the cell into internalizing. The host response also plays a critical role in the development of diarrheal illnesses. We have exploited a mouse infection model to study host contribution to disease. We have recently begun to examine the impact of diarrheal disease on the normal bowel flora during infection.

By using fundamental knowledge involved in adherence, we have developed the world's first *E. coli* O157 cattle vaccine which has recently been licensed in Canada. Collectively, these three components contribute to disease, and only by studying all three does one fully understand the molecular complexity to bacterial disease.

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About the AMMI Canada – CACMID Annual Conference
The Annual Conference 'Where Canada's experts in Clinical Microbiology and infectious diseases meet ', is a conjoint meeting between the Association of Medical Microbiology and Infectious Disease (AMMI) Canada **(www.ammi.ca)** and the Canadian Association for Clinical Microbiology and Infectious Diseases (CACMID) **(www.cacmid.ca)**. The meeting is also an approved Accredited Group Learning Activity as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada.

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For more information about the AMMI Canada - CACMID Annual Conference 2007, go to **www.ammi.ca/annual_conference.**
The plenary sessions are open to the media. To attend the conference or to request an interview, please contact:

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