

**SECRETARIAT**

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## BACKGROUND

**What's New with Vaccines?****Development of Novel Vaccines and Delivery Systems**

Even though the era of vaccinology begun over 200 years ago, some of the early advances continue to form the foundation of our most successful vaccines. For example, when Jenner introduced the concept of vaccination using a live virus vaccine to protect people from smallpox, the concept of vaccinating with live agents continues to be one of the mainstays of modern vaccine technology. Indeed, some of the most effective vaccines are live attenuated vaccines. Such vaccines have been successful in eliminating diseases such as smallpox or dramatically reducing the economic impact of diseases such as measles, polio, and many childhood diseases.

Approximately 100 years after Jenner, Pasteur introduced a new approach to vaccination by killing the infectious agent and introducing the killed agent into the body as a non-replicating vaccine. Similar to the original live vaccines, killed vaccines continue to be used for many infectious agents and are an integral component of our current armamentarium for disease control.

A century after Pasteur, we embarked on a new era of vaccination, primarily driven by advances in molecular biology and biotechnology as well as a much deeper understanding of the host immune responses and specific antigens of each pathogen that are involved in providing protection from infection. These advances are the underpinning of the era of vaccinology employing genetic engineering. This resulted in the development of vaccines such as hepatitis B and human papilloma virus, which not only prevent infection, but reduce the long-term consequences of such infections leading to cancer.

These vaccines are genetically engineered to contain all of the critical epitopes involved in inducing protective immunity. However, they do not contain any nucleic acids, there by, martunately, these genetically engineered vaccines as well as all killed vacking them relatively safe and they are considered to be killed vaccines. Unfocines require adjuvants to induce adequate immunity.

Currently, the number of licensed adjuvants is extremely low and they generally induce a skewed Th2-like systemic immune response. Another limitation of killed vaccines is they are given intramuscularly or intradermally.

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This results in the induction of systemic immunity, thereby protecting individuals from disease. However, since most pathogens enter via mucosal surfaces, these systemically injected vaccines do not prevent infection and do not induce mucosal immunity.

Secondly, because of the fear of needles, compliance is not always as good as one would hope for with these killed vaccines. Current knowledge of the requirements for adjuvants to stimulate a cytokine micro-environment at the site of vaccination, combined with tools to rapidly screen molecular adjuvants, a new family of adjuvants are being developed which not only increase the magnitude of the immune response, but also modulate the balance between Th1 and Th2-like responses (CMI vs. antibody). Novel adjuvants and their mechanisms of action will be discussed.

Finally, formulating these adjuvants in novel delivery vehicles is allowing us to deliver the vaccine intranasally leading to induction of mucosal immunity. This form of vaccination not only reduces the level of infection of the individual, but also reduces the shedding of infectious agent into the environment, thereby, protecting the community from infections.

The current presentation will describe a number of different novel adjuvants and formulation systems that induce immunity in young individuals, as well as provide a balanced mucosal immune response.

Speaker: Dr. Lorne Babiuk, PhD OC  
Director and CEO, Vaccine and Infectious Diseases Organization (VIDO)  
Canada Research Chair in Vaccinology and biotechnology, University of Saskatchewan,  
Saskatoon, SK

## **The Anti-Vaccination Movement – What Do You Mean You Won't Vaccinate Your Child?**

Vaccination concerns have reemerged as an important public health issue in several countries. In the UK and US concerns about the MMR vaccine and thimerosal preservatives respectively, have threatened confidence in vaccination programs despite public health reassurances about their safety.

While Canada has not experienced similar levels of widespread vaccine concern, focal episodes of vaccine refusal have taken place and there is also evidence to suggest that some erosion of public trust is occurring. A key message that emerges from other countries' experiences is that once trust in vaccines or public health is lost it is difficult to regain. A primary goal of public health in Canada, therefore, is to ensure that confidence is maintained in the safety and efficacy of vaccines.

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Establishing and maintaining trust in the safety of vaccination, however, poses several challenges. Complicating the issue has been the polarization of the debate, which has limited effective dialogue between the contrasting viewpoints. This polarization exists at both the level of the physician-parent encounter as well as at the level of policy making. At the clinical level physicians must be able to present a strong case for the importance of vaccines without offending belief systems of parents which could lead to them dropping out of the practice. At the policy level public health officials must be careful to ensure that while they reinforce to the public the safety of vaccines, they don't overlook or underplay a potential threat.

This presentation will present an overview of this debate and strategies that could assist in bridging the divide between those who support vaccination and those who are concerned about vaccination. These strategies will focus on an area of commonality between the two viewpoints, concern about the health of children.

Speaker: Dr. Kumanan Wilson, MD  
Toronto General Hospital  
University Of Toronto

#### **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](http://www.ammi.ca)) and the Canadian Association for Clinical Microbiology and Infectious Diseases (CACMID) ([www.cacmid.ca](http://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.

For more information about the AMMI Canada - CACMID Annual Conference 2007, go to [www.ammi.ca/annual\\_conference](http://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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