PREVENTING STRAINS A, Y AND W-135

Advanced vaccine guards against lethal meningitis

On April 24, 2007, 15-year-old Brodie Campbell's flu-like symptoms worsened during the night, and his parents took him to the hospital. One thing they weren't worried about, though, was meningitis. "We were under the impression that he was protected," says his father, Colin Campbell.

Although Brodie was up to date on all his immunization program shots, it didn't include the one that could have saved his life. He had been immunized against strain C meningitis; he died of meningococcal meningitis caused by strain Y.

"We arrived at emergency about 2:30 a.m., and he was dead by 5:30 in the morning," says Mr. Campbell.

Meningococcal bacteria is the most common cause of meningitis today, says pediatrician Dr. Taj Jadavji, a professor in the Department of Microbiology and Infectious Diseases at the University of Calgary.

Fifteen-year-old Brodie Campbell died of meningitis caused by meningococcal strain Y, a disease that is now vaccine-preventable. PHOTO: SUPPLIED

"In Canada, in almost all the provinces, infants are given the meningococcal C vaccine, which has markedly decreased the infection rate," he says. "But parents need to understand that there are other strains that can cause exactly the same disease. It is very important for them to know that even if their children have received the strain C vaccine, there are gaps in protection. Their children may still be at risk."

As meningitis moves so quickly, prevention is vital, says Dr. Jadavji. "Early diagnosis is very difficult, because the disease can mimic a viral infection. It presents very suddenly and can be fatal. Children die of this disease, but four of the five most common types are now 100 per cent preventable."

In June 2009 the government of Ontario announced that "In the school-based program, Menactra, which provides protection against four strains of IMD (A, C, W-135 and Y), replaces the current vaccine which guards against only the C strain." New Brunswick, Newfoundland, Prince Edward Island and the Northwest Territories have also implemented adolescent immunization programs with the vaccine.

The Ontario decision followed a recommendation by the National Advisory Committee on Immunization that meningococcal conjugate vaccine be offered in early adolescence to all children, including those previously vaccinated for strain C.

But there is still a lot of confusion, says Mr. Campbell. "Even in the aftermath of our son's death, when I talk to the parents of his friends, they say they haven't talked to their doctor about the Menactra vaccine, because their children were vaccinated in school. That is not true here in B.C."

Kathryn Blain, who founded the Meningitis Research Foundation to raise awareness about meningitis after losing her son Michael Longo to the disease 15 years ago, says, "No child should suffer from a disease that is vaccine-preventable.

According to The Meningitis Research Foundation of Canada, statistics show that the vaccine which protects against all four vaccine-preventable strains of IMD, has the potential to prevent an additional 71 per cent more cases of meningococcal disease in adolescents, the population at highest risk.

"When I talk to other parents who have lost a child to meningitis, they tell me how much they would have welcomed this vaccine. It's essential that parents be aware of the risks of this disease and speak to their family physicians. This vaccine offers so much hope – when you consider the decreased infection rate following the implementation of the strain C vaccine, it is very exciting to think about what this vaccine can do."

"In Canada, infants are given the meningococcal C vaccine, which has markedly decreased the infection rate.

But parents need to understand that there are other strains that can cause exactly the same disease." ■

"In Canada, infants are given the meningococcal C vaccine, which has markedly decreased the infection rate. But parents need to understand that there are other strains that can cause exactly the same disease."

Defending against IMD

Invasive meningococcal disease (IMD) is an aggressive, often fatal disease that strikes about 200 Canadians – mostly healthy children and teens – each year. One out of 10 people infected will die. Of those who survive, one in five will be permanently disabled. Knowing the facts can help you ensure your loved ones are protected.

- The symptoms of meningococcal meningitis often mimic those of the flu until it is too late.

Seek medical attention immediately if babies or toddlers demonstrate any of these symptoms: fever with cold hands and feet; refusal of food when normally hungry; vomiting; fretfulness without wanting to be held; pale, blotchy skin; blank, staring expression; drowsy, difficult to wake; stiff neck and arched back; and high pitched cry.

Seek medical attention immediately if children or adults have some or all of these symptoms: vomiting; fever with cold hands and feet; headache, especially combined with stiff neck; joint stiffness and muscle pain; aversion to bright lights or noise; drowsy, difficulty waking, confusion or delirium.

- IMD is contagious, and can be spread from one person to another through close contact involving secretions from the nose or throat, such as sharing drinks, water bottles or eating utensils, or by kissing.

- Children who have received meningococcal conjugate C vaccine are still vulnerable to the other vaccine-pre ventable strains until they receive the vaccine that pro tects against all four vaccine-preventable strains.

- Parents of children and teens who have not received the vaccine that protects against the four vaccine-preventable strains, should to talk their child's doctor about broad protection against IMD.

To learn more, visit the Meningitis Research Foundation at meningitis.ca.

VACCINE TECHNOLOGY

Advances in adjuvant technology adding fuel to vaccine efficacy

Most Canadians likely hadn't heard about adjuvanted vaccines until mass public immunizations began last fall against the H1N1 influenza virus.

Those who were paying attention, however, learned an important lesson during the rollout of the Arepanrix vaccine to combat H1N1: that the adjuvant component of the pandemic flu vaccine improved its effectiveness.

An adjuvant is a compound added to a vaccine to increase the immune response against the antigen – the target molecule that triggers protection against a specific disease. The term comes from the Latin word adjuvare, meaning "to help."

Despite a lack of public awareness of adjuvants, these substances have been boosting the power of vaccines for more than 80 years. Recent advances in molecular science, however, have led to development of a new generation of more powerful and targeted adjuvants, as well as adjuvant systems that combine two or more adjuvants.

These innovations are pushing the frontiers of vaccination – opening the door to preventing and even treating difficult diseases that couldn't previously be targeted by vaccines.

GlaxoSmithKline (GSK), developer of Arepanrix, has been working to break new ground in adjuvant technology for many years, says Dr. Thomas Breuer, head of global clinical development and chief medical officer of GSK Biological. Its adjuvanted vaccine products also include Cervarix, recently approved in Canada as a vaccine against viruses causing cervical cancer.

"Traditional adjuvants are made of aluminum salts and these compounds are sufficient for a number of vaccines, but there are limitations," says Dr. Breuer. "GSK has been researching innovative adjuvants and adjuvant systems for close to 20 years, and we are now in the forefront of using these new adjuvants in our vaccines."

As head of GSK's adjuvant program, Dr. Natalie Garçon has been leading this intensive research and development over the past two decades. While the role of conventional adjuvants has been to boost the immune response, some of GSK's new adjuvant systems are accomplishing much more, she explains.

"These newer systems are giving vaccines the power to induce a stronger immune response, to increase protection for a longer period and to broaden the immune response for people who have weakened immune systems," says Dr. Garçon, adding that extensive clinical trials have demonstrated the safety of these new adjuvants.

"These newer adjuvants are also allowing us to develop and make available vaccines that address unmet medical needs, diseases that we weren't able to target before," she says. For example, the GSK team is in the final stages of confirming the efficacy of a new vaccine to protect against malaria – a goal that has previously eluded vaccine developers.

Innovative adjuvant systems are also leading to groundbreaking therapeutic vaccines – vaccines that treat disease. GSK has two such vaccines under development, for lung cancer and for melanoma.

"These vaccines are designed to slow the progression of cancer," says Dr. Breuer. "There is potential to open up a completely new pathway in the treatment of cancer. Clearly, adjuvants are taking the old technology of vaccination to a new level, where we can target diseases we couldn't have imagined just a few years ago." ■