MedicalXpress

New tuberculosis vaccine boosts impacts of old counterpart

October 2 2013

A tuberculosis vaccine developed at McMaster University offers new hopes for the global fight against tuberculosis.

"We are the first to have developed such a vaccine for tuberculosis," said Dr. Fiona Smaill, professor and chair of the Department of Pathology and Molecular Medicine of the Michael G. DeGroote School of Medicine at McMaster. She led the phase one clinical study published today in the journal *Science Translational Medicine*.

The vaccine, based on a genetically modified cold virus, was developed in the lab of Zhou Xing, professor of pathology and molecular medicine and the McMaster Immunology Research Centre, who co-led the phase one study. Both are also members of the Michael G. DeGroote Institute for Infectious Disease Research.

"Tuberculosis is a serious public health threat," Smaill said. "One-third of world's population is infected with the organism that causes tuberculosis, and it remains the top infectious killer of people only secondary to HIV; yet, the current vaccine used to prevent it is ineffective."

The control of tuberculosis (TB) has met with further challenge from high incidence of multi-drug resistant tuberculosis, she added.

The new vaccine was developed to act as a booster to Bacille Calmette Guerin (BCG), currently the only TB vaccine available. BCG was

developed in the 1920s and has been used worldwide. The new "booster" would reactivate immune elements that over time diminish following BCG vaccination.

Currently the BCG vaccine is part of the World Health Organization's immunization program in Asia, Africa, Eastern Europe and South America, as well as Nunavut, the only Canadian jurisdiction where the BCG vaccine is routinely given because of the high rate of tuberculosis in the territory. It is typically given in the first year of life.

The McMaster vaccine has been more than a decade in the making. McMaster researchers began the first human clinical trial in 2009 with 24 healthy human volunteers, including 12 who were previously BCG-immunized.

"The primary goal was to look at the safety of a single dose vaccine injection," said Xing, "as well as its potency to engage the immune system."

By 2012 they established that the vaccine was safe and observed a robust immune response in most trial participants. More clinical trials are needed to measure the vaccine's real potential, Xing added.

Smaill added: "As a doctor who looks after patients who have tuberculosis, including those who are HIV infected, I realize how important it is going to be to control this infection with a good vaccine.

"We are probably one of a few groups in the world who are actually doing bench-to-human tuberculosis vaccine work, and we are excited to be part of this and thrilled that it started at McMaster."

More information: "A Human Type 5 Adenovirus-Based Tuberculosis Vaccine Induces Robust T Cell Responses in Humans Despite

Preexisting Anti-Adenovirus Immunity," by F. Smaill et al. *Science Translational Medicine*, 2013.

Provided by McMaster University