Tuberculosis vaccine passes phase I trial

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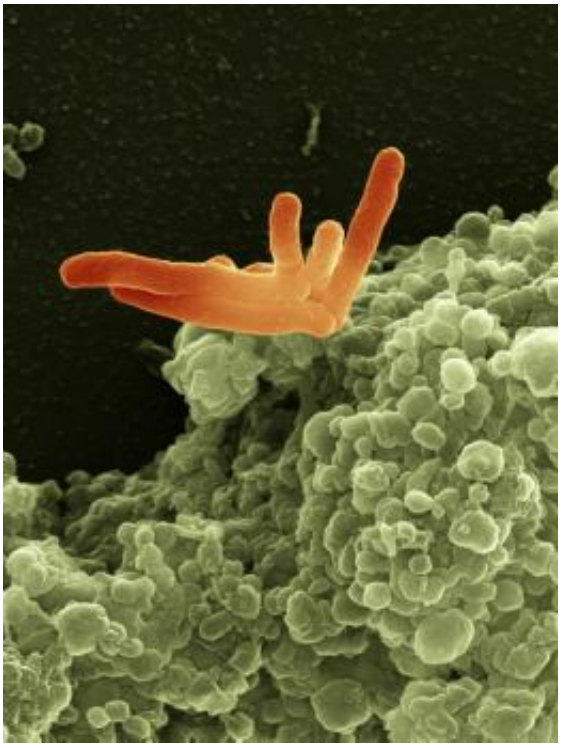

The engulfing of the genetically engineered vaccine bacteria triggers a self-destruct program in the phagocyte known as “programmed cellular death”. As a result, the vaccine antigens are presented to the immune system in an optimal way, generating a stronger immune response and significantly better protection. Credit: Corbis

(PhysOrg.com) -- The currently available tuberculosis vaccine BCG is over 90 years old – and its effectiveness is declining. An increasing number of mycobacterial strains are emerging, against which the current vaccine provides no protection. Scientists at the Max Planck Institute for

Infection Biology in Berlin have developed an improved vaccine that has being undergoing tests on humans in clinical trials since 2008. The results of the phase I trial show that the vaccine candidate fulfils safety requirements. Initial results of the phase Ib trial indicate that the vaccine candidate's active principle is effective.

Scientists have been working on developing an improved vaccine against the tuberculosis (TB) bacterium Mycobacterium tuberculosis for almost 90 years. The vaccine, termed Bacille Calmette-Guérin (BCG), was developed in 1919 and contains weakened M. bovis, the pathogen that causes bovine TB, and that is also transmittable to humans. In most cases, the BCG vaccine protects children against the disease, but not adults. Thus the vaccine has not contributed to reducing the global incidence of TB infection.
The VPM1002 vaccine developed at the Max Planck Institute for Infection Biology is based on the BCG vaccine and contains genetically modified M. bovis. With the help of a built-in gene, the bacteria can be more easily identified by the cells of the immune system. As a result, the organism is protected against developing a disease caused by dangerous TB pathogens.

The vaccination has been licensed to Vakzine Projekt Management (VPM) in Hanover, which tested it clinically on healthy volunteers in Germany in autumn 2008 under the name VPM 1002. "The safety profile of an active substance is tested in a phase I trial. The vaccine easily cleared this hurdle and no side effects arose in the course of this trial," says Stefan Kaufmann from the Max Planck Institute in Berlin. The researchers must now establish whether VPM1002 is also safe for people in regions with a high incidence of TB, and that it works as planned. "In this kind of Ib trial, the vaccine must prove that its active principle functions - meaning that it works as we expect it to," explains Stefan Kaufmann. "VPM1002 also appears to fulfil this criterion," says Bernd Eisele from VPM, which is responsible for the vaccine trials.

Before VPM1002 can be marketed as a vaccine, its effectiveness and safety must be confirmed in further trials on volunteers in areas with a high risk of TB infection. “If all goes well and VPM1002 also proves effective and safe in large international trials, the new vaccine could be ready for use in around five years’ time,” hopes Stefan Kaufmann.

VPM1002 is one of twelve vaccine candidates currently under clinical development. It is one of three genetically modified variants of the current BCG vaccine that offer better protection than the BCG vaccine and could replace it. The rest consist of immune-reactive substances that are intended to boost the effect of BCG; the first of these candidates could be ready for use in 2016 at the earliest. Experts estimate that a vaccine that is better than BCG could prevent almost eight million deaths. A new booster vaccine could reduce the number of TB fatalities by a further 40 percent.

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