Novel Live Recombinant Booster Vaccine against Tuberculosis
Tech ID: 22262 / UC Case 2010-657-0

SUMMARY
Researchers at UCLA have developed a novel vaccination strategy against tuberculosis in humans and animals. The invention also details the generation of a vaccine against leprosy and other mycobacterial diseases in humans and animals.

BACKGROUND
Tuberculosis (TB) infection remains highly prevalent worldwide. The WHO estimates 1.7 million deaths from TB annually. Africa and Southeast Asia have the highest burden of TB mortality. The persistence of TB infection has promoted the emergence of multi- and extensively drug-resistant (M/XDR) strains, which pose an imminent threat to industrialized nations. The vaccine currently used for TB, BCG, has been widely administered but lacks optimal protection.

In fact, a large, carefully conducted meta-analysis by Colditz et al. (1994) estimates the potency of BCG protection to be approximately 50%. Therefore, new vaccines or booster strategies are necessary to combat TB infection. Improvements in the potency of TB vaccination will represent a significant advancement in global health and a step towards eradication of TB.

INNOVATION
In an effort to improve the potency of BCG protection, researchers at UCLA developed a novel vaccine vector system for delivery of TB proteins. This system exploits a live, attenuated bacterial vector to deliver immunizing proteins. The novel booster vaccine can be administered after BCG or similar vaccination.

In animal models, use of the novel vaccine induced greater protective immunity than either boosting with purified protein in adjuvant or boosting with recombinant viruses containing the same protein.

APPLICATIONS
Vaccination for TB.

ADVANTAGES
▶ The new vaccine and strategy are more potent than currently commercially available vaccines in protecting against pulmonary tuberculosis.
▶ The bacteria-based booster vaccine invention provides more potent protection against TB infection than protein in adjuvant vaccinations or adenovirus-based vaccines.
▶ The bacteria-based vaccine does not require purification from cell culture and is therefore easier and cheaper to manufacture than virus-vectored vaccines.

STATE OF DEVELOPMENT
Researchers have genetically modified the bacterial vaccination vector to optimize the expression of immunoprotective proteins and eliminate any vector-mediated toxicity. In animal studies, administration of the novel booster vaccine induced lymphocyte proliferation and TB protection above BCG alone and above BCG plus a viral-based boost.

PATENT STATUS

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ADDITIONAL TECHNOLOGIES BY THESE INVENTORS
▶ Novel Vaccines Against Tularemia
▶ Safe and Potent Vaccines against Tularemia
▶ Method of Producing Novel Unmarked Recombinant Vaccine Vector for Tuberculosis
▶ Recombinant Tuberculosis BCG Vaccine Elicits a Highly Protective Host Immune Response
▶ Live Recombinant Tuberculosis Vaccine
▶ Safe Potent Single Platform Vaccine Against Tier 1 Select Agents and Other Pathogens
▶ Nanoparticles For Specific Detection And Killing of Pathogenic Bacteria