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[University of North Carolina at Chapel Hill](#)

UNC, Harvard develop inhaled TB vaccine

CHAPEL HILL · A new tuberculosis vaccine successfully tested at the University of North Carolina at Chapel Hill is easier to administer and store and just as effective as one commonly used worldwide.

Scientists at the UNC School of Pharmacy led by Tony Hickey, Ph.D., vetted a dry powder vaccine provided by Harvard University that is administered using an inhaler. The results of the vaccine test are being published this week in the Proceedings of the National Academy of Sciences.

It is at least as good as the injectable vaccine," said Hickey, a professor in the School's molecular pharmaceuticals division. The real advantage is that this vaccine does not need to be refrigerated. It also doesn't require needles, syringes and water like the injectable vaccine, and administering it is as easy as breathing in, making it ideal for use in developing countries.

The vaccine is spray dried instead of freeze dried. Spray drying is the process of spraying a liquid through a heated gas such as nitrogen to create a powder. Traditional TB vaccines are freeze dried, requiring refrigerated storage and transportation, and a source of clean water to reconstitute the vaccine for injection. Spray dried vaccines do not need refrigeration or water to be used.

Hickey's group specializes in developing drugs and vaccines that can be inhaled as a dry powder. The vaccine used in the study was a Bacillus Calmette-Guerin (BCG) vaccine, which is not common in the United States but is used extensively throughout the world. Given to 100 million infants annually, the current BCG vaccine for TB is the world's most widely administered childhood vaccine.

According to the Centers for Disease Control and Prevention, tuberculosis is one of the deadliest diseases, infecting a third of the world's population. Each year nearly nine million people become sick with TB and almost two million of them die.

Hickey, who is an expert in the delivery of vaccines and medicines via dry aerosol, said that breathing in a TB vaccine is beneficial because inhalation is the way tuberculosis is contracted.

He also believes that the successful test of this vaccine could affect the development of others.

The results of this study are very exciting because there are other bacterial vaccines being developed that might benefit from this technology," he said.

Hickey is a co-founder of Oriel Therapeutics, a company developing dry-powder inhaler products to effectively deliver medicines to the lungs to treat a wide range of respiratory diseases, such as asthma and chronic obstructive pulmonary disease. He is also the founder, president and CEO of Cirrus Pharmaceuticals. Both companies are located in North Carolina's Research Triangle Park.

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Co-authors of the study include UNC School of Pharmacy research assistant professor Lucila Garcia-Contreras, Ph.D., and postdoctoral fellows Pavan Muttill and Danielle Padilla. The other contributors were Barry R. Bloom and Sunali Goonesekera of the Harvard School of Public Health; Jessica DeRousse, David Edwards, Katharina Elbert, and Yun-Ling Wong of the Harvard University School of Engineering and Applied Sciences; Jerry Sadoff of the Aeras Global Tuberculosis Vaccine Foundation; Bernard Fourie and Willem Andreas Germishuizen of Medicine in Need South Africa; and Rich Miller of Manta Devices.

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