

## Brazil Sequences Bacteria Used for Tuberculosis Vaccine

Contributed by Bernardo Esteves  
Monday, 04 December 2006

Brazilian researchers have sequenced the bacteria used in the Brazilian strain of the BCG vaccine against tuberculosis, and will develop a test for vaccine quality during production.

The BCG vaccine protects people against both tuberculosis (TB) and leprosy, as the diseases are caused by similar bacteria - *Mycobacterium tuberculosis* and *Mycobacterium leprae*.

Researchers from the Oswaldo Cruz Foundation (Fiocruz) in Rio de Janeiro, Brazil, announced November 23 that they have identified the genetic sequence of the Brazilian strain of the bovine TB bacterium *Mycobacterium bovis* contained in the BCG vaccine.

Various weakened strains of the *Mycobacterium bovis* are used worldwide to prepare the BCG vaccine, which is 80% effective at protecting people against TB.

Testing vaccine quality, however, takes about three weeks, and involves growing and counting the number of bacteria colonies; too few colonies might not trigger the required immune response.

"We are developing vaccine quality control kits from the genome sequence, to be released next year," Leila Mendonça de Lima, a researcher at Fiocruz and coordinator of the study, told reporters.

These kits will show how much protein the bacteria in the vaccine are producing, which stimulates an immune response once the vaccine is injected.

"This is a much better technique for measuring the viability of the vaccine and will result in a more precise control of the vaccine's quality," says Wim Degraeve, one of the research team, adding "constant production quality is a most important issue".

The kits will be used to test every batch of vaccine during different stages of the production process, reducing analysis time to less than one day.

It is also an important research issue, as there is little data about how specific proteins that stimulate an immune response affect the vaccine's efficacy.

TB is a highly contagious disease with 87,000 new cases in Brazil each year.

Although leprosy is on the decline worldwide, pockets still remain in areas of Angola, Brazil, Central African Republic, the Democratic Republic of the Congo, India, Madagascar, Mozambique, Nepal and Tanzania.

In the long term, the researchers hope to use genetic engineering techniques to insert genetic sequences from other bacteria into the *M. bovis* genome to make the vaccine effective against other diseases.

"In the future we may use it to produce a recombinant DNA vaccine that would provide immunization against other diseases as well, such as leishmaniasis or tetanus," says de Lima.

The researchers plan to publish their work following further analysis. The work is funded by Fiocruz and the Ataulpho de Paiva Foundation, which produces the BCG vaccine in Brazil.

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