

Adult Tuberculosis Vaccines: An Update

Attapon Cheepsattayakorn^{1,2*} and Ruangrong Cheepsattayakorn³

¹10th Zonal Tuberculosis and Chest Disease Center, Chiang Mai, Thailand

²5th Office of Disease Prevention and Control, Department of Disease Control, Ministry of Public Health, Thailand

³Department of Pathology, Faculty of Medicine, Chiang Mai University, Thailand

***Corresponding Author:** Attapon Cheepsattayakorn, 10th Zonal Tuberculosis and Chest Disease Center, 143 Sridornchai Road, Changklan Muang, Chiang Mai, 50100, Thailand.

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For reaching a 90% detection in tuberculosis (TB) cases and 95% reduction in tuberculosis deaths by 2035, new all effective vaccines are needed, including improved diagnosis and treatment. Currently, Bacille Calmette-Gue'rin (BCG) remains the only available vaccine against TB. It provides partial protection against severe forms of childhood TB, and is unreliable against adult pulmonary TB. Globally, adult and adolescent latent disease accounts for the majority of the disease burden and transmission. Multiple TB vaccine development strategies

- a) For preventing initial infection and disease,
- b) Vaccines can be administered after *Mycobacterial tuberculosis (M.tb.)* disease, and
- c) Vaccines can be administered after infection and *M.tb.* treatment.

The current TB vaccine candidates are designed to be either:

- a) A better prime vaccine with more efficacy, including longer period of time,
- b) Can prevent TB infection and disease in infants without *M.tb.* infection before, and
- c) A booster vaccine that is most likely delivered during adolescence to protect infection and/or progression to active disease among those with latent infection, as BCG immunity wane.

For adult TB vaccines, high-coverage population-wide vaccination is importantly more challenging. A vaccine efficacy of at least 60% is desirable that is preferentially delivered to at least 80% of adults in the TB hotspots. The degree of vaccine augmentation is depended strongly on the mixing between the hotspots and general population and the extent of spatial heterogeneity that are critically identified with accurate estimation of the value of targeted intervention strategies.

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