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Linking Oral Health with HIV/AIDS

Paper 6: Oral, prophylactic, mucosal HIV vaccines

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A recombinant attenuated Mycobacterium tuberculosis vaccine strain is safe in immunosuppressed SIV-infected infant macaques.

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Source

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Abstract

Many resource-poor countries are faced with concurrent epidemics of AIDS and tuberculosis (TB), caused by HIV and Mycobacterium tuberculosis, respectively. Dual infections with HIV and M. tuberculosis are especially severe in infants. There is, however, no effective HIV vaccine and the only licensed TB vaccine, the Bacille Calmette-Guérin (BCG) vaccine, can cause disseminated mycobacterial disease in HIV-infected children. Thus, a pediatric vaccine to prevent HIV and M. tuberculosis infections is urgently needed. We hypothesized that a highly attenuated M. tuberculosis strain (AMtb) containing HIV antigens could be safely administered at birth and induce mucosal and systemic immune responses to protect against HIV and TB infection, and we rationalized that vaccine safety could be most rigorously assessed in immunocompromised hosts. Among three vaccine candidates tested, the recombinant AMtb strain mc(2)6435 encoding an SIV Gag expression plasmid and harboring attenuations in genes critical for replication (panCD and leuCD) and immune evasion (secA2), was found to be safe after oral or intradermal administration in SIV-uninfected and SIV-infected infant macaques. Safety was defined as absence of clinical symptoms, lack of histopathological changes indicative of M. tuberculosis infection, and lack of mycobacterial dissemination. These data represent an important step in the development of novel TB vaccines and suggest that a combination rAMtb-HIV vaccine could be a safe alternative to BCG for the pediatric population as a whole, and more importantly for the extreme at-risk group of HIV-infected infants.

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