Mother–Infant HIV Transmission a review on antibody protection

Despite the intimate relationship between a mother and her fetus only one third of exposed infants acquire HIV in the absence of interventions with the majority of transmission occuring at delivery and through breastfeeding. Given the strong associations between maternal virus levels and transmission, considerable effort has been placed on reducing maternal viral burden through ARV therapy during pregnancy, delivery, and breastfeeding. This approach, combined with providing infants with ARVs as prophylaxis, can reduce transmission levels to only a few percent. Therefore preventing mother-to-child transmission (MTCT) has been one of the success stories in HIV. Providing key insights into the use of treatment for prevention of HIV transmission and the potential of HIV-specific immune responses to provide protection. Studying these immune responses has become central

to HIV vaccine design with most of the focus on neutralizing antibodies (Nabs). Nabs in essence, mimic a vaccine in that they are passively transferred from mother to infant at the time of exposure. Antibodies are transferred across the placenta and reach high levels at the time of birth. Thus, during late gestation and breastfeeding, the infant has HIV-specific antibodies potentially capable of recognizing and neutralizing the maternal virus. The fact that transmission occurs in the face of these passive antibodies suggests that they are not highly effective at blocking transmission. However, more than 60% of untreated HIV-exposed infants do resist transmission, leaving open the possibility that antibodies are effective in some settings. This article therefore explores the possible factors involved. While the current studies suggests that antibody-mediated protection may not be the major factor in determining if an infant acquires HIV from their mother, it is still thought to play a role. In the case of Nabs, several small studies have shown a correlation between Nabs and protection, but results of studies on this topic are variable and would benefit from larger studies focused specifically on the window of transmission. There is perhaps better evidence that antibodies contribute to blocking virus variants that are highly sensitive to neutralization, suggesting that the Nabs elicited in a typical infection may not have adequate breadth and/or potency to prevent transmission of the harder-to-neutralize viruses. This may be a peculiarity of MTCT, where escape variants elicited specifically to maternal antibodies are often present. MTCT could therefore provide insights on the potency of antibody needed for protection if we can understand which subset of maternal variants are blocked by antibodies and if some mothers have antibodies of sufficient breadth and potency to completely prevent infant infection. Understanding how much antibody is needed to block infant infection could be invaluable in helping guide vaccine design.

Overbaugh, J. 2014. Mother–Infant HIV Transmission: Do

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