A Novel Approach for Vaccination Against SIV: Prime/Boost Mucosal (Oronasal) Antigen Delivery

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Abstract

Background. Thus far, systemic vaccines have failed to provide protective immunity against HIV. As HIV infects primarily through the mucosa, a mucosal vaccine is a logical approach to fight this infection. The abundant lymphoid tissue in the oral and nasal cavities can be used as inductive sites for immunity against HIV. We have shown that oral and nasal (oronasal) antigen delivery to the tonsils ensures both a mucosal and a systemic immune response and provides an easily accessible immunization route, which can be exploited as a strategy for a vaccine against HIV.

Methods. Adult female baboons were immunized 3 times at 1-2 month intervals by applying 0.5-1 mL of vaccine solution to the 4 tonsil sets in the oronasal cavity. On the first immunization: 1. Group 1 (n=4), received 100 µg of SIV-virus like particles (VLP) and the mucosal adjuvant LT(R192G). 2. Group 2 (n=4), received 1000 µg of VLPs and the mucosal adjuvant LT(R192G). 3. Group 3 (n=2) was not immunized (control). On the 2nd and 3rd immunizations, groups 1 and 2 received 10⁸ pfu of MVA expressing homologous SIV. Serum, vaginal washes, nasal washes, and stool samples were collected biweekly. Samples were analyzed by ELISA.

Results. Oronasal immunization induces: 1) SIV-specific IgG in the serum by ELISA 2) SIV-specific SIgA in the vagina by ELISA 3) SIV-specific SIgA in the stool by ELISA 4) SIV-specific SIgA in the nasal cavity by ELISA

Conclusion. Our data demonstrate that a mucosal prime/boost oronasal vaccination approach with SIV-VLPs/SIV-MVA in baboons induces specific humoral responses in the blood, vagina, stool, and nasal cavity illustrating the potential efficacy of this immunization route as an alternative for a vaccine against HIV.

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