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Poster presentation

In vitro SIV replication kinetics correlate with vaccine induced cellular immune responses and predict post-challenge outcome in immunized rhesus macaques

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Strong and sustained immune response is central in AIDS vaccine research. Here, we use an in vitro model to describe correlation kinetics of virus replication and T-cell responses. Eighteen rhesus monkeys were recruited into Group-1 (controls) and groups 2 and 3 which were DNA-primed followed by adenovirus-vaccine boost via different routes. All animals were challenged with SIVmac239 after 44 weeks. During immunization, ex-vivo interferon gamma (IFN-γ) responses and in vitro SIV suppressor activities (VSA) in cell-culture were determined respectively using ELISPOT and a non-cytotoxic antiviral activity assay. Virus replication efficiency in vitro (VVR) and after challenge was measured using real-time PCR. At baseline, VVR was comparable in all groups and remained constant in controls. However, VVR declined significantly ($p = 0.001$) in vaccines, correlated with increased IFN-γ responses ($p = 0.019$) and VSA ($p = 0.05$). Peak viremia post-challenge was significantly lowered in vaccinnes ($p = 0.006$) and correlated with in vitro kinetics for control animals. Acute-phase set point correlated with VSA ($p = 0.001$) but not IFN-γ levels. Our in vitro model predicts post-challenge outcome and implicates multifactorial cellular immune factors in controlling viral replication. Optimizing these immune components in candidate vaccine designs may improve potency and outcome.