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Adjuvanted SHIV Virus-like particles (VLPs) Vaccination Induces Strong Immune Responses against HIV-specific Antigens in Mice and Rhesus Macaques Models

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Using HIV virus-like particles (VLPs), we evaluated sub-cheek as a novel route of vaccination when combined with other conventional routes of immunization. Of five different combination regimen, we found that intranasal prime and sub-cheek boost (IN+SC) resulted in HIV-specific IgG titers that were higher than those of all other groups. We further tested the immunogenicity of VLP + VesiVax® Conjugatable Adjuvant Lipid Vesicles (CALV) + monophosphoryl lipid A (MPLA) at different MPLA concentrations. We found that VLPs adjuvanted with optimal MPLA can induce high Env-specific Ab responses with high percentage of lymph node germinal center B cells. These mice also had significantly more IL-2 and less IL-4 Env-specific CD8+ T cells that correlates with enhanced percentage of Env-specific central memory CD4+ and CD8+ T cells than those controls. To further evaluate the protection efficacy of our VLP vaccines, SHIV VLPs incorporated with CD40L and adjuvanted with CALV and MPLA were used. We immunized four rhesus macaques using IN+SC regimen and compared their immune parameters to those in five unimmunized control macaques. Increased plasma antibody titers to SIV Gag were observed in all four immunized macaques and increased sf162 gp140 titers were observed in three of the four with one macaque (10-195) maintaining sustained anti-Env antibody levels. Compared to controls, a significant increase in memory B cells and CD4+ central memory T cells was detected in the immunized group. Among these, elevated Gag-specific CD107a membrane localization in the CD8+ central memory T cells was detected in one macaque (10-195). Our VLPs vaccine strategy represents a promising immunogenic conformationally intact HIV vaccine that may lead to possible prevention and control of HIV infection.

Biography

Dr. Yao is currently a professor of surgery in the Michael E. DeBakey Department of Surgery, Molecular Virology and Microbiology, Pathology and Immunology, Pharmacology at Baylor College of Medicine. She has been actively involved in vaccine development for cancer and infectious disease for more than 20 years. She is one of the pioneer researchers in developing chimeric virus-like particles for HIV mucosal vaccine and pancreatic cancer immunotherapy. Dr. Yao is currently the Principal Investigator on several major NIH grants, VA merit grant and several other pilot project grants. She has more than 200 scientific publications in the fields of Virology, Immunology, and Oncology in high impact journals and has served on editorial board and invited reviewers in several professional journals. She has also served on grants review study sections nationally and internationally. Dr. Yao's research programs include HIV vaccine development, pancreatic cancer pathogenesis and novel therapeutics development in pre-clinical models.

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