Quadrivalent HPV Vaccine Demonstrates Immune Memory in HIV-1-Infected Men

Timothy Wilkin1, Shelly Lensing2, Mark Einstein3, Jeannette Lee4, Stephen Goldstone5, Michael Berry6, Naomi Jay7, Ronald Mitsuyasu8, Joel Palefsky9

1Division of Infectious Diseases, Weill Cornell Medical College, New York, NY, United States, 2Department of Biostatistics, University of Arkansas for Medical Sciences, Little Rock, AR, United States, 3Department of Obstetrics & Gynecology and Women’s Health, Albert Einstein College of Medicine and Montefiore Medical Center, New York, NY, United States, 4University of Arkansas for Medical Sciences, Little Rock, AR, United States, 5Icahn School of Medicine at Mount Sinai, New York, NY, United States, 6Department of Obstetrics and Gynecology, Boston University Medical Center, Boston, MA, United States, 7Department of Medicine, University of California San Francisco, San Francisco, CA, United States, 8University of California San Francisco, San Francisco, CA, United States, 9UCLA CARE Center, University of California Los Angeles, Los Angeles, CA, United States

Background: HIV-1-infected men are at a highly increased risk of HPV-related cancers. Prior studies have shown that HPV vaccination is safe and immunogenic in this population. The duration and quality of the immune response in the setting of HIV is unclear. Immune memory from a vaccine is a vigorous immune response upon re-exposure to the relevant antigen. This confers long-term protection against the pathogen.

Methodology: 103 HIV-1-infected adult men received a standard 3-dose series of the quadrivalent HPV vaccine at weeks 0, 8 and 24. 73 participants consented to an extension protocol and received a 4th vaccine dose at week 128. Serum neutralizing antibody concentrations were measured using a competitive Luminex assay at week 0, week 28 (4 weeks after completing 3-dose series), week 76, week 128 (just prior to 4th dose), week 129 and week 132.

Results: The median age of participants was 45 years (interquartile range [IQR] 37-51). 63% were White, 17% Hispanic, 13% Black, 5% Asian. 84% were receiving ART; 83% had a plasma HIV RNA <200 copies/mL; the median CD4 was 517 cells/mm3 (IQR 423-68). Antibodies to HPV types 6, 11, 16, and 18 were detected in 39%, 30%, 26% and 18% prior to the first HPV vaccine increasing to 97%, 98%, 99%, and 96% at week 28. The seropositivity declined to 95%, 96%, 95% and 63% over the next two years. Four weeks after the 4th vaccine dose, antibodies were detected in 100%, 100%, 100% and 94%, and the geometric mean titers (GMT) were significantly higher than those of week 28 for HPV 16 and 18 (P=.002 and P=.001, respectively) suggesting a strong anamnestic immune response. Anti-HPV GMT titers during study follow-up are shown in Figure 1.

Conclusions: The quadrivalent HPV vaccine induces an anamnestic response in HIV-1-infected men. Antibody concentrations declined for two years after completing vaccination, but responded quickly after a challenge of a repeat vaccination. This suggests the development of immune memory, which often correlates with long-lasting protection for other vaccines.

Figure 1: Anti-HPV GMTs

![Figure 1: Anti-HPV GMTs](image-url)