

Is a Herpes vaccine possible? Setting up the road for next generation of herpes vaccines

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A significant portion of the world's population is infected with Herpes simplex virus type 1 and type 2 (HSV-1 and/or HSV-2) without the knowledge of it - even as HSV-1 and HSV-2 continue to spread globally. In the United States, about one in six of the population between fourteen and forty-nine years of age are infected with HSV-2, which is equivalent to approximately sixty million in absolute number, with the highest prevalence among non-Hispanic black individuals and the lowest among those of Asian descent. Globally, over 530 million are affected. The sub-Saharan African populations are most dramatically afflicted, with up to 80% of woman and 50% of men suffering from genital herpes (NHANES-2005-2010). Globally, HSV-1 is much more prevalent than HSV-2 (CDC), causing significant morbidity especially among young adults in western societies, where 53% to 63% are sero-positive in the 2000s. Genital herpes is one of the most common sexually transmitted infections, with a higher prevalence in women. HSV-2, but not HSV-1, appears to be linked with a two- to three-fold increase in risk of HIV-1 infection. In addition to causing painful blisters, the virus can cause death or encephalitis in newborns from vertical transmission. Meanwhile, it has been notoriously difficult to develop effective vaccines against herpes viruses, many of which have complex life cycles and remain dormant in the body for long periods of time. Of note, the recent failure in vaccine strategies involving the employment of an envelope recombinant glycoprotein D (gD) have brought on additional challenges in securing financial endorsement from pharmaceutical companies. Despite these setbacks, we continue to advocate our approach through basic immuno-virology: Understanding the immune mechanisms by which seropositive asymptomatic individuals are protected, the role of T cell system in the mucosa lining the genital tract in preventing HSV-2 acquisition, and the approach to boost effector memory T cell responses through vaccination are all instrumental to gaining new grounds. In a recent herpes vaccine workshop convened in Washington, DC, (October 22-23th 2012), the future of the HSV vaccine was discussed among basic researchers, funding agencies, and pharmaceutical representatives. We will: 1) assess the current status of herpes vaccine research, 2) identify the gaps in our knowledge, and 3) propose our best approach in developing the next generation of herpes vaccine.

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