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Immune responses to HPV vaccines: What we have learned

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There are two licensed prophylactic human papillomavirus (HPV) vaccines, quadrivalent that protects primarily against HPV-16, HPV-18, HPV-6 and HPV-11 and a bivalent vaccine that protects primarily against HPV-16 and HPV-18. These L1 VLP vaccines have proven to be very efficacious in preventing infections and pre-cancerous lesions at the cervix caused by HPV-16 and HPV-18. Furthermore, partial protection against phylogenetically-related oncogenic types not included in the vaccine has also been reported. Although correlates of vaccine protection have not been identified, neutralizing antibodies are thought to be the primary mechanism of vaccine induced protection against infection. HPV vaccines induce high titers of anti-L1 IgG antibodies, to the HPV types included in the vaccine, that persist for several years after vaccination at levels considerably higher than those observed in natural infection. These antibodies are detected not only in serum but also at the cervix, where local antibody levels correlate well with serum levels. L1 VLP vaccines also induce neutralizing antibodies to phylogenetically-related types not included in the vaccine. These can also persist for years after vaccination but with titers much lower than those observed for the homologous vaccine types. Antibody avidity increases with each dose of vaccine, with affinity maturation occurring after the 3 doses of vaccine. Interestingly, levels of avidity did not appear to correlate well with antibody titers. Despite all the information on antibody responses to HPV vaccines, future efforts are needed to standardize methods and tools for evaluation of immunogenicity of HPV vaccines and to better identify mechanisms of immunogenicity and correlates of protection against infection.

Biography

Ligia A Pinto completed her PhD in 1995 at the Experimental Immunology Branch, National Institutes of Health, after several years of research on cellular immunology of HIV infection at the University of Lisbon, School of Medicine in Portugal. She continued her Postdoctoral studies at NIH where she focused on investigating immunological alterations induced by HIV as well as host protective immune responses that may control HIV replication and associated immunopathogenesis. In 2001, she became the head of the HPV Immunology Laboratory at the Frederick National Laboratory, where she is a Principal Investigator and leads a team of Scientists, Postdoctoral Fellows, Research Associates and Students. She has worked in the area of immunology of infectious diseases and vaccines for the last 27 years, with over 80 peer-reviewed publications, has many invited international presentations and received a number of distinguished scientific awards.

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