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Viral vectored genetic vaccines: Current status and future perspectives

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The past successes of vaccines were based on the protective action of antibodies. However, for some infectious diseases and cancer, vaccines exclusively based on the humoral response are largely ineffective. Thus, a large untapped source of protective immunity lies in cellular arm of the immunological response. Adenovirus is one of the most potent vectors for the induction of CD8 T-cell responses in humans, while also inducing antibody responses. Its effectiveness as a vaccine requires in addition to high immunological potency, high productivity and low seroprevalence. We have isolated and characterized a large number of Adenovirus strains from chimpanzees (ChAd). New highly potent ChAd vectors have thereby been developed that are not neutralized by antibodies present in humans and can be easily produced in cell lines. The most potent ChAd vectors were selected to generate vaccines for different pathogens including malaria, hepatitis C virus, Ebola and RSV. Solid preclinical data on the safety, immunogenicity and efficacy of these ChAd based vaccines used alone or in heterologous prime/boost regimens with other viral vectors, were generated in relevant animal models of infection. In our optimized vaccine regimens, two vectors are used, each encoding the same antigen: A ChAd vector for priming and a MVA (Modified Vaccinia Ankara) poxvirus for boosting. This protocol yields a dramatically increased cellular immune response as well as a higher antibody titer. ChAds have now reached the clinical stage and were shown to be safe, highly immunogenic and easy to be manufactured on a large scale basis. Phase-II studies are ongoing to evaluate efficacy of these novel genetic vaccines.

Biography

Antonella Folgori has received her degree in Biology and PhD in Molecular and Cellular Biology from the University of Rome "La Sapienza". After completing her Postdoctoral studies at IGBMC in Strasbourg, France she started working at IRBM in Pomezia, Italy. In 2007, she Co-Founded Okairos and led the Immunology Department till 2013. Presently she is a Co-Founder and Director of Immunology Department of Reithera and NOUSCOM, two companies dedicated to the development of novel platform technologies for the prevention and cure of cancer and chronic diseases. She has authored several scientific publications on subjects including immunology, viral infections and vaccines.

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