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Design, Optimization and Efficacy of Viral Vector Vaccine strategies against HIV

Takis Athanasopoulos
University of Wolverhampton, UK

Our Collaboration for AIDS Vaccine Discovery project aims to develop a CD8 T cell vaccine that will induce responses against multiple epitopes and overcome the problem of virus immune escape. The vaccine will be delivered to the skin, a tissue rich in dendritic cells and essential for the initiation of a T cell response, by sugar micro-needles patches containing the embedded vaccine via two promising strategies which may facilitate future HIV vaccine development. We have shown that the adenovirus vaccine vector in a dried sugar formulation maintains viability at high temperatures for several months and demonstrated in the mouse that the sugar patch delivery system generates good immune responses. More recently we have shown in the mouse that skin vaccination with patches induces antigen-specific CD8 responses in the genital tract that can kill target cells. We have tested two strategies to stimulate a broad cytotoxic CD8 T cell response. In the first strategy HIV gag genes have been fused with ubiquitin to more efficiently target the proteasome and increase MHC peptide complexes on the cell surface. The second strategy designed to broaden the response is to fragment the vaccine gene and clone segments into separate vectors. The aim is to express all the potential epitopes but reduce the number of different epitopes expressed on individual dendritic cells and overcome competition between T cells recognising different epitopes, a factor thought to limit the breadth of the response. During my talk, I will also briefly cover other novel vector vaccine strategies as part of work conducted in the UK HIV Vaccine consortium and the Grand Challenge Explorations (GCE) programs.

Biography

I am currently serving as a HEFCE funded, Lecturer in Molecular Biotechnology, in the Faculty of Science and Engineering, at the University of Wolverhampton (UoW), UK (www.wlv.ac.uk). I am also acting as a Research Consultant and Academic Visitor for the Gene Therapy Group, School of Biological Sciences, Royal Holloway University of London (RHUL) (www.rhul.ac.uk) and other companies. My research interests in the field of Biomedical Sciences are 'focused' on viral vectors as gene therapeutics and genetic vaccines against a range of disorders including Duchenne muscular dystrophy (DMD), atherosclerosis, HIV, and cancer. Part of my research is being conducted in the field of HIV vaccines and in particular in the design, production and functional/immunological characterization of novel HIV vaccine vectors (Adenoviral, AAV and lenti-VLP based). This work was part of my involvement in multinational consortiums. I have served as a member of the Collaboration for AIDS Vaccine Discovery (CAVD <http://www.cavd.org/>) initiative a (project funded by Bill & Melinda Gates Foundation). I have also collaborated with scientists from: 1) the UK HIV Vaccine consortium and 2) the Grand Challenge Explorations (GCE) programs. So far, I have co-authored 28 peer reviewed research articles (with some appearing in Nature Communications, PNAS, Molecular Therapy), co filed 3 patents on AAV vector technologies, published 1 book and contributed to 2 book chapters. I hold a BSc in Biochemistry from University of Patras, Greece, and a PhD in Biomedical Sciences from University of London, UK

p.athanasopoulos@rhul.ac.uk

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