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Towards a vaccine for human rhinoviruses

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Human rhinovirus (RV) infections are the principle cause of common colds and precipitate asthma and chronic obstructive pulmonary disease exacerbations. Currently there is no vaccine for RV which is most likely due to the existence of ~150 serotypes/strains and little or no cross-protective immunity generated from natural infections. Highly conserved regions of the RV polyprotein, when used as an immunogen, are hypothesized to generate broadly cross-reactive protective immunity to RV. A bioinformatic approach to define highly conserved areas of the RV proteome was performed. Recombinant protein was produced and tested for usefulness as candidate immunogen for a broadly cross-reactive vaccine using a mouse RV infection model. Regions of the VP0 (VP4+VP2) capsid protein were identified as having high homology across RVs. Immunization with a recombinant VP0 combined with a Th1 promoting adjuvant induced systemic, antigen specific, cross-serotype, immune responses. Similar cross-reactive responses were observed in the lungs of immunized mice after challenge with heterologous RV strains. Immunization enhanced the generation of heterosubtypic neutralizing antibodies, specific T cells and caused more rapid virus clearance. In conclusion, conserved domains of the RV capsid are immunogenic in mice, inducing cross-reactive immune responses that neutralize RV in vitro and are protective in vivo. This approach has identified a candidate for the continued development of a broadly reactive subunit RV vaccine.

Biography

Gary R McLean completed his PhD from the University of Otago in New Zealand and performed Postdoctoral studies at the University of British Columbia (Canada) and Albert Einstein College of Medicine (USA). He then joined the Faculty at the University of Texas Health Science Centre Houston before relocating to London, UK where he is a Reader in Molecular Immunology. He has published 25 papers in peer-reviewed scientific journals in serves as an editorial board member and reviewer of numerous reputed journals in immunology.

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