Exploration of engineered sugar molecules as vaccine candidates for *Streptococcus pyogenes*

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Abstract (300 word limit)

In 2005, the World Health Organisation released a statement calling top ten human pathogens affecting human mortality due to bacterial infection. One of the virulent organisms is *Streptococcus pyogenes* also known as Group A Streptococcus [GAS] is a Gram-positive bacterium causing mild strep throat to toxic shock syndrome upon prolonged infection. Annually 250,000 deaths worldwide have been reported and currently there is no licensed human vaccine available. Funded by Tenovus Scotland the aim of this project is to use the components present in GAS such as Group A Carbohydrate [GAC] specifically polyrhamnose [pRha] as a vaccine candidate. Our aim is to develop and explore the role of pRha as an immunogen by purifying pRha, which is decorated in the outer membrane vesicles of *E. coli* [*E. coli*-pRha]. The vaccine candidate was administered to C57Bl/6 models subcutaneously and analysed for the immunogenicity and protective immune response. Our data shows that OMV-pRha triggers the production of specific antibodies [IgG] and the antibodies recognise the clinical GAS isolates from GAS infected patients isolated from the ninewells hospital, Dundee. The protection of mice correlated with the amount of IgG serum antibodies to pRha was determined by Luminex, FACS and opsonophagocytosis assays. Besides animal models, whole human blood and primary cell lines were used to document the level of inflammatory mediators. Future study will be discussing the implementation of high throughput screening methods to explore OMV-pRha as a promising vaccine candidate.

Publications from Dr Sowmya Ajay Castro

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Publications from Dr Helge DorfmÜeller lab

Zorzoli A, Meyer BH, Adair E, Torgov VI, Veselovsky VV, Danilov LL, Uhrin D**, Dorfmueller HC*** Group A, B, C, and G Streptococcus Lancefield antigen biosynthesis is initiated by a conserved α-D-GlcNAc-β-1,4-L-rhamnosyltransferas. J Biol Chem. 2019 Sept 10.

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Biography (150 word limit)

Sowmya Ajay Castro is currently working as a postdoctoral researcher at Dr Helge DorfmÜeller laboratory at the Molecular Microbiology department at the University of Dundee. She did her doctoral training on Biomedical Science at Aston University, Birmingham, UK. Her current project is funded by the medical research charity Tenovus Scotland.

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