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Employing chemical glycobiology for immunotherapeutic approaches directed at cancer

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The overarching goal for our research is to develop a cancer immuno therapeutics that target tumor-associated-carbohydrate-antigens (TACAs) Tn and STn found on malignant cells. In the process of carcinogenesis, certain glycosyltransferases are over-expressed, which lead to different glycosylation patterns than those of normal cells. For example, the Thomsen-nouveau (Tn) and sialyl-Tn (STn) antigens are expressed abundantly on human breast, ovarian and colon cancers. These abnormal glycosylations on tumor cell surfaces provide significant opportunities for researchers to develop carbohydrate-based anticancer therapeutics. The strategy used for most carbohydrate-based cancer vaccines entails immunogenic proteins as carriers to cross over into the cellular arm of the immune system because of the inherent T-cell independent nature of TACSs. There are both advantages and disadvantages for this strategy. We have been working with the unique zwitter ionic capsular polysaccharide PS A1 to find alternative pathways avoiding protein carriers and at same time retain both a cellular and humoral immune response. PS A1 is found on Bacteroides fragilis' cell wall, consisting of a tetra saccharide-core repeating unit carrying an electrostatic charge character on adjacent mono saccharides able to induce a specific and selective immune response similar to that noted for exogenous proteins. This seminar will describe the synthesis of TACA-PS A1 conjugates and their application in glycol-immunology.

Biography

Peter R Andreana received his Hons. BSc in Biochemistry from Brock University in St. Catharines, Ontario, Canada in 1998. He then obtained his PhD in 2002 from Wayne State University, Detroit, MI from Prof. P. G. Wang. In 2002 he moved to Harvard University as an NIH Ruth L. Kirschstein Post Doctoral Fellow for Prof. S. L. Schreiber. In 2005, he returned to his PhD granting institute to begin his independent career as an Assistant Professor and in 2012 relocated with his group to The University of Toledo where he is currently Full Professor.

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