Chemo-enzymatic synthesis of a-gal epitope conjugated with polymer support to inhibit HAR upon xenotransplantation

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a-gal epitopes expressed on the surface of non-simian mammal cells are mainly responsible for hyperacute rejection(HAR) after pig-to-primate xenotransplantation since they are interacted with anti-Gal antibodies in human serum. To inhibit the immune response in human body through natural antibodies, the synthetic a-gal antigens are required. We synthesized a-gal - polystyrene(PS) bead complex as potential inhitors of HAR. For the synthesis, both chemical and enzymatic methods are developed in this study. First, chemically modified mono or disaccharide was synthesized. And then, a-galactosyl oligosaccharides was sequentially synthesized by recombinant galactosyltransferases in engineered *E.coli*. Finally, the a-gal oligosaccharide was coupled with the polymer support which will be used for packing materials on-colum. The glycosyltransferases used to synthesize oligosaccharides are a truncated bovine a1,3-GalT (80-368) and β1,4-GalT originated from *Helicobacter pylori*. Moreover, we introduced the sugar-nucleotide production system previously developed method in our lab.

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