

## Abstract

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Title: Studies on glycosphingolipids as immune targets in bioprosthetic heart valves

The treatment of valvular heart disease represents approximately 20% of all cardiac surgery. One alternative of this treatment is replacement of diseased valve with bioprosthetic heart valves (BHV). These BHV are manufactured from divergent human or animal tissues *e.g.* porcine pericardium.

Although this treatment is beneficial for certain groups of patients, it is susceptible to some complications such as rejection of the xenograft or early BHV deterioration. In both of them the immune system is involved and both might result in BHV failure.

This study aims to isolate and characterize important targets of this immune response – glycosphingolipids (GSL). Therefore, 8 non-acidic and 7 acidic GSL from porcine pericardium have been isolated and characterized by mass spectrometry and carbohydrate binding assays.

The acidic GSL from goat erythrocytes have been isolated and characterized. Notable is characterization of a new NeuGc-containing GSL - NeuGc-GT1b ganglioside.

And finally, 60 binding assays examined the presence of antibodies against various GSLs in patient serum collected before, one and six months after BHV treatment surgery. The radioactive iodine-125-labeled anti-human antibodies and autoradiographic visualisation have been used for detection. Results were mostly negative. However, in few samples an increased reactivity Gal $\alpha$ 3 and NeuGc antigens was found.

This knowledge might contribute to explanations of immune response against xenografts. This might help with further research on strategies preventing early BHV deterioration and, therefore, increase final outcome of BHV treatment of valvular heart disease.

Keywords: glycosphingolipids, bioprosthetic, heart valves, xenotransplantation, Gal $\alpha$ 3,  
NeuGc