

By: Aysan Razmjouy & Dr. John Finke

Increasing IgG Permeability in the Blood Brain Barrier by Isolation and Removal of FC and Fab Glycans to Treat Alzheimer's Disease.

Alzheimer's disease is a type of dementia which progressively impacts memory and other important mental functions through the destruction of brain cell connections. This disease is very common and while treatment can help prevent progression, it is expensive to treat and there is no official cure. Understanding the mechanism behind the development and progression of Alzheimer's disease can aid in finding potential cures, which can improve the lives of millions of families impacted by this disease. Most attempts at finding a cure have not been successful due to drug treatments not penetrating the blood brain barrier (BBB). Some progress has been made on altering the permeability of modified human antibodies through the BBB. Here we sought to use 4G8, a type of mouse monoclonal antibody that consists of IgG antibody with a sialyated Fab glycan, meaning it has a sialic acid on the tip of the molecule. This sialic acid is important to recognizing and binding the amyloid plaque that causes neuronal decay. Previous research shows that glycosylation may improve the possibility of antibody delivery to the brain. We sought to replace the human IgG sialic acid group with that of a 4G8 to get the antibodies to cross the BBB. We found that we were able to successfully replace the sialic acid groups on IgG antibodies, but we were unable to determine whether these antibodies can pass the BBB.