Increasing IgG permeability in the Blood Brain Barrier through the isolation and removal of glycans to successfully treat Alzheimer's disease.

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Alzheimer's disease, similar to dementia, is a neurological disorder that affects thinking, memory, and behavior that can get progressively worse. Alzheimer's disease affects millions of families and can be very labor-intensive and expensive to treat. There have been attempts to find a cure, but unfortunately, most have been unsuccessful due to various drug treatments not penetrating the blood-brain barrier (BBB). Fortunately, some progress has been made on researching the permeability of modified human antibodies through the BBB. 4G8 is a type of mouse monoclonal antibody that consists of an IgG antibody with a sialylated Fab glycan, meaning it has a sialic acid on the tip of the molecule. This sialic acid directly recognizes and binds the amyloid plaque that causes neuronal decay. Previous research has shown that specific glycosylation may improve the possibility of antibody delivery to the brain. We hypothesized that replacing the human IgG sialic acid group with that of 4G8 would be an effective way to get these antibodies to cross the BBB as a possible treatment for Alzheimer's disease.We were able to successfully replace the sialic acid groups on IgG antibodies, but we were unable to determine whether these antibodies can pass through the blood-brain barrier.