

Dr. William H. Frey II, Director of the Alzheimer's Research Center at the non-profit Regions Hospital Foundation in St. Paul, MN spoke about his discovery of a new non-invasive intranasal method for bypassing the blood-brain barrier to treat brain disorders including traumatic brain injury, hemorrhage, stroke, Alzheimer's disease, Parkinson's, etc. Dr. Frey found that if drugs or therapeutic stem cells are given intranasally, they rapidly travel along the olfactory and trigeminal nerves from the nose to the brain.

Collaborating with Dr. Suzanne Craft at the University of Washington in Seattle, WA, a clinical trial was conducted that showed improved memory in only 20 minutes after a single intranasal insulin treatment in patients with Alzheimer's disease without altering blood levels of insulin or glucose. Subsequently, Dr. Craft and colleagues showed that intranasal insulin (bid) improved memory, attention and cognitive function in Alzheimer's disease patients over a 21-day period. Most recently, Dr. Craft has shown improved memory in Alzheimer's patients treated in a four-month clinical trial as well. Researchers in Germany have independently shown that Dr. Frey's intranasal insulin treatment improves memory in normal adults in four separate clinical trials as well.

It is not surprising that intranasal insulin is an effective treatment for Alzheimer's since it has been known for many years that glucose uptake and utilization is dramatically decreased in Alzheimer's patients. Glucose is the only source of energy for brain cells, and the brain cells of Alzheimer's patients are starved for energy. Alzheimer's disease has been shown to involve an insulin deficiency in the brain by Eric Steen, Suzanne de la Monte and colleagues in 2005. Dr. De la Monte has referred to Alzheimer's as Type 3 Diabetes.

Intranasal insulin is far more than simply a treatment for Alzheimer's symptoms. When intranasal insulin reaches the brain, it stimulates the formation of insulin degrading enzyme (IDE) which is capable of degrading beta amyloid, one of the principal abnormal proteins known to accumulate in the brains of Alzheimer's patients. Further, the activity of glycogen-synthase kinase-3-beta, the enzyme that phosphorylates tau to create Alzheimer's neurofibrillary tangles, has been reported to be down-regulated in response to insulin through the activation of the phosphatidylinositol 3-kinase pathway.

There is also reason to think that intranasal insulin can benefit individuals following either head injury or stroke since traumatic brain injury can also lead to abnormal tau phosphorylation and loss of memory function. Further, following an injury, the brain needs energy to repair the damage.

In addition, Dr. Frey has developed intranasal deferoxamine to treat stroke, head injury, Alzheimer's and Parkinson's disease, since deferoxamine is able to bind the excess iron in the brain that accumulates after brain damage. He recently published work showing that intranasal deferoxamine reduces brain damage after stroke by 55% and can even protect the brain in advance against brain damage that may occur in the future. This same drug has been shown by others to reduce brain edema and improve recovery after traumatic brain injury in animals and also to reduce brain damage following intracerebral hemorrhage.

Finally, Dr. Frey reported that he and his collaborator, Lusine Danielyan MD in Germany, have now shown that therapeutic stem cells can be rapidly delivered from the nose to the brain non-invasively and that such a treatment can target these cells to the damaged areas of the brain to reduce inflammation and improve recovery of function.

Dr. Frey stated that there is a need now to work together to raise the funds necessary to further develop and test these new methods of prevention and treatment of brain damage following head injury and to make them available so that our athletes can more safely pursue their sports, careers and lives.