William H. Frey, Pharm Anal Acta 3:1
doi: http://dx.doi.org/10.4172/2153-2435.S1.07

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Pharmaceutics & Novel Drug Delivery Systems

20-22 February 2012 San Francisco Airport Marriott Waterfront, USA

TITLE

Intranasal Therapeutics (drugs, biopharmaceuticals and stem cells) bypass the Blood-brain Barrier to Treat Alzheimer's, stroke, Parkinson's, Brain Tumors and other Neurological and Psychiatric Disorders

William H. Frey

Alzheimer's Research Center, USA

Intranasal delivery provides a practical, noninvasive, method of bypassing the blood-brain barrier to deliver therapeutic agents to the brain and spinal cord [Dhuria et al. (2010) J Pharm Sci 99(4): 1654-1673]. This method allows drugs that do not cross the blood-brain barrier to be delivered to the central nervous system (CNS) within minutes. It also directly targets drugs that do cross the blood-brain barrier to the CNS, eliminating the need for systemic delivery and thereby reducing unwanted systemic side effects. This is possible because of the unique connection that the olfactory and trigeminal nerves provide between the brain and external environment. Intranasal delivery does not require any modification of therapeutic agents. A wide variety of therapeutics, including both small molecules and macromolecules are rapidly delivered intranasally to the brain. Intranasal delivery can also target gene therapy and noninvasively deliver stem cells to the CNS.

Using this intranasal delivery method, which I first introduced in 1989, researchers in Italy have reversed neurodegeneration and rescued memory loss in a transgenic mouse model of Alzheimer's disease. Both treatment of and protection against stroke in animals have been demonstrated with intranasal IGF-I, deferoxamine and erythropoeitin. Intranasal FGF-2 and EGF have been shown to stimulate neurogenesis in the brains of adult animals. Intranasal GRN163 doubles the lifespan of animals with brain tumors etc.

Intranasal insulin improves memory and mood in healthy adults and improves memory, attention and functioning in patients with Alzheimer's disease without altering blood levels of insulin or glucose. This is not surprising as Alzheimer's patients have a brain deficiency of insulin, and without insulin, key brain areas are starved for energy and degenerate.

We have demonstrated that intranasally administered stem cells bypass the blood-brain barrier by migrating from the nasal mucosa through the cribriform plate along the olfactory neural pathway into the brain and spinal cord. Intranasal delivery provides a new non-invasive method for therapeutic cell delivery to the CNS to treat neurological disorders (Parkinson's and neonatal ischemia) in animal models.

Biography

Dr. William H. Frey II is Director of the Alzheimer's Research Center at Regions Hospital in St. Paul, MN, Adjunct Professor of Pharmaceutics and faculty member in Neurology, Oral Biology and Neuroscience at the University of Minnesota and consultant to the pharmaceutical and biotechnology industry. His patents, owned by Novartis, Stanford University, the HealthPartners Research Foundation and others, target noninvasive delivery of therapeutic agents, including stem cells, to the brain and spinal cord for treating neurological disorders, psychiatric disorders and obesity. Dr. Frey's non-invasive intranasal method for bypassing the blood-brain barrier to target CNS therapeutic agents to the brain while reducing systemic exposure and unwanted side effects has captured the interest of both pharmaceutical companies and neuroscientists. With over 90 publications in scientific and medical journals such as Journal of Biological Chemistry, Proceedings of the National Academy of Sciences, Brain Research, etc., Dr. Frey has been interviewed on Good Morning America, The Today Show, 20/20, All Things Considered and numerous other television and radio shows in the U.S., Europe and Asia. Articles about Dr. Frey's research have appeared in the Wall Street Journal, The New York Times, U.S. News and World Report, the New Scientist and other magazines and newspapers around the world. Dr. Frey earned his BA in Chemistry at Washington University in 1969 and Ph.D. in Biochemistry at Case Western Reserve University in 1975.