Diabetes drug shows promise in reducing Alzheimer's disease in an experimental model

March 24 2014

Researchers from Boston University School of Medicine (BUSM) have found that the diabetic drug, pramlintide, reduces amyloid-beta peptides, a major component of Alzheimer's disease (AD) in the brain and improves learning and memory in two experimental AD models. These findings, which appear online in *Molecular Psychiatry*, also found AD patients have a lower level of amylin in blood compared to those without this disease. These results may provide a new avenue for both treatment and diagnosis of AD.

AD is a degenerative brain disease associated with severe functional decline and has no effective treatment. Currently there are 5 million people with Alzheimer's disease in the U.S. alone, and the cost of caring for these patients exceeds $100 billion per year. If no effective treatments are developed, the number of Alzheimer's patients is expected to grow to 14-16 million by the year 2050.

There are multiple reasons for the high costs and high failure rates associated with developing potential new drugs for AD. One factor is that most drugs do not penetrate into the brain making them ineffective for treating AD; another is that it usually takes 10-15 years to develop a new target drug to prove the safety and efficacy. According to senior author Wendy Qiu, MD, PhD, associate professor of psychiatry and pharmacology & experimental therapeutics at BUSM, in contrast, some existing drugs for other diseases may penetrate into brain and may be effective for Alzheimer's disease. "Unfortunately most pharmaceuticals are reluctant to support this type of repurposing research because of

limited financial benefit and some patent limitation, even though the cost is much less expensive and the development time is much shortened," she added.

Using AD models, the BUSM researchers investigated the effects of amylin on the pathogenesis of the disease. "Surprisingly, injections of amylin or pramlintide into the AD models reduced the amyloid burden as well as lowered the concentrations of amyloid-beta peptides (Aβ), a major component of AD in the brain," explained Qiu. Pramlintide is an analog of a natural occurring peptide, amylin, produced by the pancreas. "It can easily cross the blood/brain barrier and has shown favorable safety profile for diabetes patients," she added.

According to the researchers, including lead author Haihao Zhu, MD, PhD, also from the department of pharmacology & experimental therapeutics at BUSM, these results argue for a therapeutic application of amylin-class peptides for AD. "There is broad agreement that more therapeutic avenues need to be explored in addition to targeting Aβ for the treatment of AD. Amylin-class drugs not only remove Aβ from the brain, as demonstrated by our study, but also can improve glucose metabolism and cerebrovasculature in the AD brain," said Qiu. Based on their findings the researchers propose that amylin-class peptides have potential to become a new avenue as a challenge test for diagnosis of AD and as well as a therapeutic for the disease. If the clinical trial proves the effect of pramlintide for Alzheimer's disease, Qiu believes this drug can be applied to Alzheimer's patients in only three to five years.

Provided by Boston University Medical Center