November 27, 2023

Notice Concerning Commencement of Research on Alzheimer's Disease Vaccine: Development of anti-phosphorylated tau antibody-inducing peptide

FunPep Co., Ltd. (“FunPep”) is pleased to announce that we have started research on Alzheimer's disease (target: phosphorylated tau protein) as a part of our joint research on antibody-inducing peptides (peptide therapeutic vaccine) with the Department of Clinical Gene Therapy, Osaka University Graduate School of Medicine.

With the aging of society worldwide, the global number of dementia patients is expected to increase from 55 million in 2019 to 139 million in 2050[i], and from 4.62 million in 2012 to approximately 7 million in 2025[ii] in Japan. In addition, since dementia is the leading reason (23.6%)[iii] for needing long-term care in Japan, the increase in the number of dementia patients is having an impact not only on the patients themselves, but also increasing the burden on their families and others involved in their care.

Although drugs (cholinesterase inhibitors and NMDA receptor antagonists) have been used to treat the symptoms of Alzheimer's disease, the most common form of dementia in Japan, there have been no disease-modifying drugs that act on the cause of the disease to inhibit disease progression. As such, numerous pharmaceutical companies and biotechs around the world are working to develop disease-modifying therapies that target amyloid-β and tau, two proteins that accumulate in the brains of Alzheimer's disease patients and damage nerve cells.

Under these circumstances, significant progress has been made in the development of therapeutic drugs targeting amyloid-β over the past several years, and antibody drugs received regulatory approval in the United States and Japan in 2023. In conjunction with this, there has been an increased focus on the development of new therapeutic agents that focus on tau.

A research group led by Associate Professor Shuko Takeda in the Department of Clinical Gene Therapy, Osaka University Graduate School of Medicine, is working to elucidate the pathophysiology of Alzheimer's disease and to develop a disease-modifying therapy.

It is known that in the brains of Alzheimer's disease patients, aggregates of over-phosphorylated tau (which damages neurons) gradually spread from specific regions within the brain to the entire brain. The "tau propagation hypothesis" has been proposed to explain this pathology, in which tau with pathological structures moves between neurons. The research group has been the first in the world to identify and biochemically characterize a tau molecular species (high molecular weight phosphorylated tau) that exists in the brain of patients and mediates tau propagation.[iv-vi] Based on this knowledge, they are investigating an Alzheimer's disease peptide vaccine that inhibits tau propagation.

Against this background and based on our knowledge of drug development using antibody-inducing peptide technology (peptide therapeutic vaccines), FunPep aims to develop a new disease-modifying therapy for Alzheimer’s disease and will conduct research and development of an anti-phosphorylated tau antibody-inducing peptide that inhibits tau propagation in collaboration with the Department of Clinical Gene Therapy, Osaka University Graduate School of Medicine.

References

[i] Alzheimer's Disease International. World Alzheimer Report 2023.

[ii] Ministry of Health, Labour and Welfare, "Comprehensive Strategy for Dementia Policy Promotion (New Orange Plan)" (January 27, 2009)

[iii] Ministry of Health, Labour and Welfare, "Comprehensive Survey of Living Conditions (2022)."

[iv] Shuko Takeda. Tau Propagation as a Diagnostic and Therapeutic Target for Dementia: Potentials and Unanswered Questions. Frontiers in Neuroscience. 2019 Dec 13:13:1274.

[v] Shuko Takeda, et al. Neuronal uptake and propagation of a rare phosphorylated high-molecular-weight tau derived from Alzheimer's disease brain. Nature Communications 2015,6:8490.

[vi] H. Wesseling, et al. Tau PTM Profiles Identify Patient Heterogeneity and Stages of Alzheimer's Disease. cell 2020 Dec 10;183(6):1699-1713. e13.