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Inter-Organ Crosstalk in Neurodegenerative Diseases: Insights from Brain-Body Interactions.

The vagus nerve, a critical component of the peripheral nervous system, is essential for regulating various physiological functions, including heart rate, immune responses, and digestive processes. In neurodegenerative diseases such as Parkinson's disease (PD) and Alzheimer's disease (AD), increasing evidence suggests that dysfunction in the vagus nerve contributes to early non-motor symptoms, particularly those affecting the digestive system. Gastrointestinal disturbances, including constipation and delayed gastric emptying, are frequently observed in Parkinson's disease, often preceding the onset of motor symptoms. Similarly, early-stage Alzheimer's patients may exhibit gastrointestinal abnormalities linked to impaired vagal signaling. This presentation will explore the intricate crosstalk between the vagus nerve and the central nervous system, focusing on how these interactions affect brain health and disease progression. Emphasis will be placed on the vagus nerve's role in modulating inflammatory pathways, gut-brain communication, and metabolic regulation, revealing potential therapeutic targets for neurodegenerative conditions. Understanding the connection between vagal dysfunction and digestive system disorders could pave the way for early diagnostic markers and novel interventions aimed at mitigating disease progression through the regulation of systemic inflammation and gut microbiota.

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Biography

I earned my Doctoral degreefrom Hallym University in 2014 with a dissertation titled “Neuroprotective Effects of Cell-Permeable Proteins for Parkinson’s Disease.”Following my doctoral studies, I conducted research as a Postdoctoral Fellow at the Department of Neurology, Harvard Medical School, where I studied Huntington’s diseaseuntil 2016.After that, I joined the Department of Neuropathology, Emory University School of Medicine, where I actively pursued research on dementia and Parkinson’s diseaseas both a Postdoctoral Fellow and later as an Instructor.To date, I have published a total of 61 research papers, including 10 articles as the first or corresponding author in journals ranked within the top 5% of the Journal Citation Reports (JCR)over the past five years.

Since 2021, I have been serving as a faculty memberin the Department of Physiology at Hallym University College of Medicine, where I focus on identifying pathogenic factors and developing early diagnostic tools for neurodegenerative diseases, including Alzheimer’s and Parkinson’s disease. Moreover, I am actively involved in educating medical students.

My recent research primarily explores the brain-multi-organ communication mechanisms mediated by the vagus nerve, aiming to identify potential therapeutic candidates for early intervention in the progression of neurodegenerative diseases.

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