New Vision Research Focus

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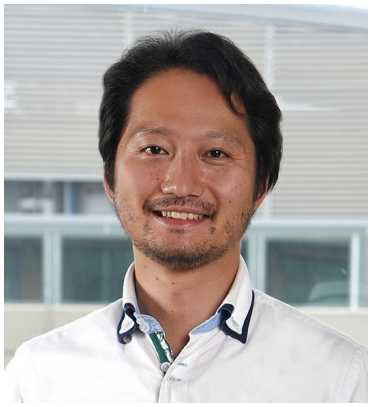

In March 2019, I joined the Charleston Conference on Alzheimer's Disease (CCAD) and had a privilege of receiving the New Vision Award. My research proposal was to enhance brain communication using gamma oscillations in the entorhinal-hippocampal circuit in Alzheimer's disease (AD) mouse models.

I started my career as a basic neuroscientist studying brain circuit mechanisms related to the sense of smell and then memory. While I was studying on basic research during my PhD, my grandmother started to show symptoms of AD. Even though I got my postdoc training in memory research, I again could not do anything for my grandmother – as no cure existed at that time. This frustration drove me to start combating Alzheimer's disease. I started my lab at UC Irvine in 2016, with a focus investigating circuit mechanisms underlying associative memory in the entorhinal cortex. At the same time, I started my AD research from scratch – aiming for a little contribution to AD with my expertise in systems neuroscience. Our initial focus was to test if gamma oscillations, a brain wave mechanism observed in the memory circuit of the entorhinal cortex and hippocampus, can be a target to ameliorate memory performance in AD. After finding that gamma oscillations are impaired in an amyloid-precursor protein knock-in (APP-KI) mouse model (Nakazono et al., Front Sys Neurosci, 2017), I started writing my first NIH R01 application. My CCAD application was a portion of this R01 application. From there, I obtained the New Vision Award, and eventually an R01.

These supports significantly accelerated our work, and with them, we found that a neuronal function that discriminates distinct environment, called "remapping", is impaired in the memory circuit of entorhinal cortex and hippocampus (Jun et al., Neuron 2020). My grandmother once said "I put my purse here, but it's gone! You stole my purse!" Imagine how sad it is when your dearest grandmother starts to doubt you. She was losing her spatial memory and could not remember where she put things. Our finding of the impaired remapping in the hippocampus can be a direct target to ameliorate spatial memory in AD patients. We are currently searching for further underlying mechanism that causes remapping impairment.

My memory of CCAD 2019 is always bright – it was my first ever meeting invited in the US after I came to this country. All applicants and mentors were so nice to each other, even though we scientifically criticize each other during the mock study section. One great memory is of Dr. Peter Davies - Peter was so generous to a newcomer in the field, even suggesting potential collaborators he knew after I had presented my talk. He encouraged all of our projects at the conference, and we will miss him. Let us work together to succeed his will for achieving a world without AD.