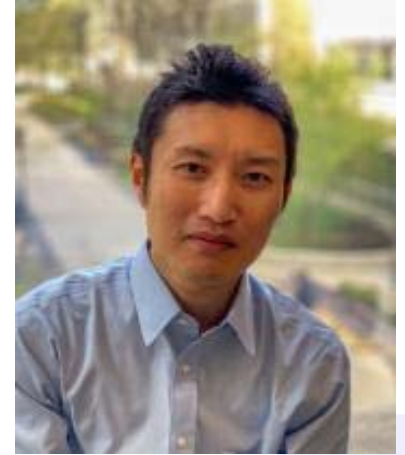


## Hysteresis in age-related and pathological changes in sleep regulation

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### <Abstract>

We study the aging and pathological basis of changes in spontaneous brain activity patterns as a hysteresis-dependent energy loss process of voltage-gated channels and membrane potentials, using *Drosophila* sleep regulation and human iPS cell-derived neurons as models. In the hysteresis-dependent energy loss process of potential-dependent channels and membrane potentials, when the expected internal state is not obtained due to aging-related changes, prediction errors occur, and the accumulation of prediction errors leads to deterioration of brain functions, which in turn exacerbates the functional decline induced by aging, which is a negative cycle. We will discuss the possibility of experimentally proving the hysteresis loss model, thereby approaching the essence of the principles of information processing in the brain.

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