Tau-BiFC platform to investigate pathological tau aggregation *in vitro* and *in vivo*

Yun Kyung Kim
Korea Institute of Science and Technology, Korea

Abnormal tau aggregation is a pathological hallmark in multiple neurodegenerative diseases collectively called tauopathies. Mounting evidences suggest that tau aggregates are not only neurotoxic, but also propagate in neurons acting as a seed for native tau aggregation. Accordingly, prevention of prion-like tau aggregation becomes an important therapeutic strategy to cure the disease. However, progress has been slow due to the lack of reliable methods to investigate tau pathology. In this regard, we developed a cell-based sensor that could monitor and quantify tau aggregation in neurons. By introducing bimolecular fluorescence complementation (BiFC) technique to tau, we could achieve spatial and temporal resolution of tau-tau interactions in a range of states, from soluble dimers to large aggregates. Furthermore, by generating tau-BiFC mouse model that expresses neuron-specific tau-BiFC expression in the brain, we could visualize tau aggregation occurs in the diverse brain regions in the brain. Our tau-BiFC mouse started to present increased BiFC fluorescence indicating abnormal tau aggregation in the hippocampus from 6-month-old, and in the cortices from 12-month-old. Tau-BiFC responses were significantly increased in diverse brain regions in an age-dependent manner, demonstrating progression of tau pathology in the brain.

e: yunkyungkim@chembiol.re.kr