IBS Center for Molecular Spectroscopy and Dynamics

COLLOQUIUM

- SPEAKER

  Prof. Hae Chul Park (Department of Biomedical Sciences, Korea University)

- TITLE

  Non-autonomous mechanism for motoneuron degeneration by oligodendrocyte dysfunction in ALS

- ABSTRACT

  Myelin is a specialized membrane that wraps nerve fibers and it is essential for the normal function of neurons. In the central nervous system, oligodendrocytes form myelin and they have recently been implicated in the pathogenesis of amyotrophic lateral sclerosis (ALS). Here, we determined a novel mechanism of ALS pathogenesis induced by oligodendrocyte pathology. In transgenic zebrafish that expressed G93A human mutant superoxide dismutase 1 (mtSOD1) in mature oligodendrocytes, we found that mtSOD1 was toxic and induced oligodendrocyte degeneration by disrupting the myelin sheath and downregulating MCT1, thereby causing motor neuron degeneration in the spinal cord of adult zebrafish. Interestingly, the oligodendrocyte dysfunction induced by mtSOD1 caused a variety of behavioral disorders such as thigmotaxis, freezing, seizure-like symptoms, and motor defects in the early symptomatic stage. We also found that treatment with a potassium blocker, 4-aminopyridine and its derivative restored behavioral abnormalities but without the rescue of MCT1 expression, thereby suggesting that the disruption of myelin induces behavioral abnormalities independently of MCT1. These results support a new non-autonomous mechanism for motor neuron degeneration caused by oligodendrocytes as well as suggesting a new therapeutic strategy targeted at oligodendrocytes in ALS.

- DATE AND VENUE

  Apr. 27, 2017 (Thursday, 4:00-5:00 p.m.)
  Seminar Room 116, KU R&D Center

- LANGUAGE

  Korean