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Institute of Psychiatry and Neuroscience of Paris

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(Host MC Angulo)

University of Liege, Belgium

Regulation of cerebral cortex morphogenesis by migrating cells

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Laurent Nguyen's laboratory (Laboratory for Molecular Regulation of Neurogenesis, GIGA-Stem Cells and GIGA-Neurosciences) has been studying the role of the Elongator complex in the nervous system for many years. Loss of Elongator's activity has been associated with various neurological diseases, including familial dysautonomia. These researchers have just identified the mechanism by which Elongator controls axonal transport in projection neurons. Neurons possess a molecular network made up of microtubules that allow proteins and specialized structures (cargos) to be transported within the axon. This process, known as axonal transport, is necessary for the functioning and survival of neurons and is impaired in many neurodegenerative diseases. In order to better understand these diseases, it is important to determine the mechanisms underlying this process in neuronal axons. For optimal axonal transport, microtubules are acetylated by the enzyme ATAT1. This modification controls the recruitment of cargos and adapt their speed of transport along microtubules. Team showed that loss of Elongator complex in the brain leads to defect in migration and differentiation of cortical neurons, further characterized by a reduced acetylation of their microtubules. They discovered that motile vesicles that are transported along axonal microtubules in these neurons are enriched for ATAT1 enzymes, thereby regulating the acetylation of their microtubule tracks. In the context of axonal transport, this new work reveals a link between the activity of ATAT1 and that of the Elongator complex, both of which are enriched on motile vesicles that move along axonal microtubules. They show in that the absence of Elongator at motile vesicles reduces the stability of ACLY, the enzyme responsible for the synthesis of Acetyl-CoA, substrate necessary for the acetylation of microtubules by ATAT1.

Keywords:

Neurobiology and Brain Physiology | Neuron | Neuroscience | Brain Diseases | Cell Migration | Stem Cell Biology | Neurobiology | Immunohistochemistry | Genetics | Biomedical Science

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