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Journal Title: Molecular Biology of the Cell
Volume: Volume 23, Number 11
Publisher: American Society for Cell Biology | 2012-06-01, Pages 2015-2015
Type of Work: Article | Final Publisher PDF
Publisher DOI: 10.1091/mbc.E12-02-0154
Permanent URL: http://pid.emory.edu/ark:/25593/f814n

Final published version: http://www.molbiolcell.org/content/23/11/2015

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Accessed June 6, 2018 4:27 AM EDT
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In celebration of MBc’s first 20 years, members of the Editorial Board, members of the ASCB Council, and others comment on their favorite MBc papers from the past two decades.

Neuronal cell bodies supply the axon and nerve terminal with organelle precursors, such as synaptic vesicle precursors, by means of membrane-bound carriers propelled by motors mounted on cytoskeletal tracks. Several neurodegenerative diseases, such as Charcot-Marie-Tooth type 2 disease and hereditary spastic paraplegia, involve the defective delivery of organelles from the cell body and impaired bidirectional trafficking in long axons. The diversity of causative genetic mutations affecting, for example, endosome traffic proteins, such as the WASH complex, molecular motors and their cargo adaptors, and the shared clinical features of axonal degeneration suggest a corresponding diversity of precursor organelles that traffic in axons. In 2000, Kaether et al. were among the first to show that more than one type of precursor organelle is delivered to nerve terminals (Kaether et al., 2000). This seminal study directly demonstrated the sorting and bidirectional transport of two fluorescent-tagged axonal membrane proteins, amyloid precursor protein and synaptophysin, into different membrane-bound carriers in hippocampal neurons. These carriers possess morphological features and transport speeds that clearly differentiate them. Thus, diverse precursor carriers share a common function of providing axonal and synaptic compartments with their constituents.

REFERENCE