The interrelationship between neuronal endosomal-lysosomal and mitochondrial dysfunctions and secretion of extracellular vesicles

November 12

Tuesday, 12:30 pm

Billings Building—Rosedale Room

SPEAKER:

Efrat Levy, Ph.D.

Professor of Psychiatry, Biochemistry & Molecular Pharmacology, and Neuroscience

New York University Grossman School of Medicine

Center for Dementia Research, Nathan S. Kline Institute for Psychiatric Research

NYU Langone, Orangeburg, NY

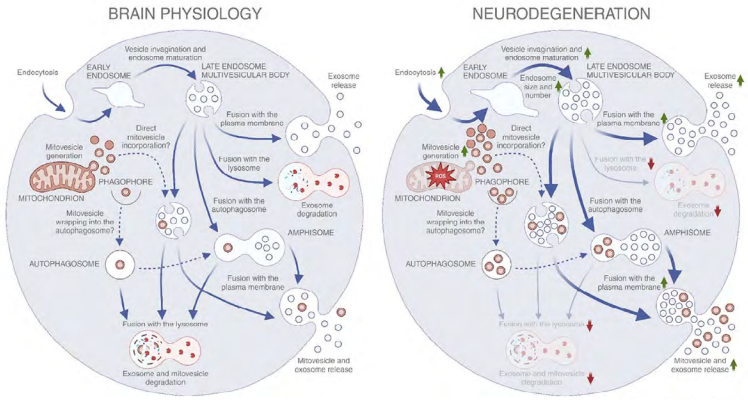
Host: Gary E. Gibson, Ph.D.

For more information contact
Darlene White
daw9085@med.cornell.edu

Abstract

Endosomal-lysosomal and mitochondrial dysfunctions are hallmarks of aging, neurodegenerative, and neurodevelopmental disorders, including Alzheimer's disease and Down syndrome, causing the build-up of both endosomes and mitochondria. The Levy's lab has been studying the neuroprotection and pathogenic roles of various types of extracellular vesicles (EVs) in brains with these abnormalities. The data show that under basal conditions secretion of late endosome-derived exosomes and mitochondria-derived mitovesicles is beneficial, acting as a scavenger system for the disposal of neurotoxic material. In aging and in neurodegenerative disorders, increased exosome and mitovesicle release is an endogenous mechanism to mitigate endosomal abnormalities and to maintain mitochondrial function.

Exosome and mitovesicle biogenesis and secretion are altered in brains with endosomal-lysosomal and mitochondrial dysfunction



Publications:

1. Mathews PM, Levy E. Exosome production is key to neuronal endosomal pathway integrity in neurodegenerative diseases. In: eds, Central Nervous System Extracellular Vesicles (EVs), in Frontiers in Neuroscience, section Neurodegeneration. 2019;13:1347.

2. D'Acunzo P, Pérez-González R, Kim Y, Hargash T, Miller C, Alldred MJ, Erdjument-Bromage H, Penikalapati SC, Pawlik M, Saito M, Saito M, Ginsberg SD, Neubert TA, Goulbourne CN, Levy E. Mitovesicles are a novel population of extracellular vesicles of mitochondrial origin altered in Down syndrome. Science Advances. 2021;7(7).

3. D'Acunzo P, Argyrousi EK, Ungania JM, Kim Y, DeRosa S, Pawlik M, Goulbourne CN, Arancio O, Levy E. Mitovesicles secreted into the extracellular space of brains with mitochondrial dysfunction impair synaptic plasticity. Molecular Neurodegeneration. 2024; 19(1):34.

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