Mitochondrial Bioenergetics and Fission in Neurodegeneration

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Neurons require mitochondrial fission to maintain synaptic function and survive, and both increases and decreases in the extent of mitochondrial fission may contribute to the pathophysiology of neurodegenerative diseases. Mitochondrial fission may be required to produce smaller mitochondria that can be degraded, and loss of mitochondrial fission can lead to the accumulation of dysfunctional mitochondria. However, the normal functions of mitochondrial fission in neurons and how changes in fission contribute to neurodegeneration remain poorly understood. In this seminar, I’ll discuss our recent work on mitochondrial fission and how it influences mitochondrial turnover and bioenergetics in neurons, including in models of Parkinson’s disease. I’ll then focus on new approaches to define genetic pathways that regulate energy levels, with the goal of learning how to therapeutically target energy failure in neurodegenerative diseases.