

Autophagy of the Nervous System

Cellular Self-Digestion in Neurons and Neurological Diseases

What is autophagy? Why would neurons digest parts of themselves through autophagy? How can autophagy save the lives of cells under some conditions, but act as an accomplice to cell death in others? By what mechanisms are autophagy-related processes dysregulated in neurological diseases, and are there therapeutic strategies to compensate for their dysfunction? This book provides an expert view of major concepts in autophagy research with a focus on autophagy in neurons. Experimental evidence for evolutionarily conserved and specialized regulatory mechanisms for autophagy in the mammalian nervous system will be presented, including recent data on braking mechanisms. Areas of intersection with cell death, the ubiquitin-proteasome system, chaperone-mediated autophagy, and the endocytic pathway will be reviewed, along with emerging areas of mitochondrial autophagy (mitophagy) and the autophagic regulation of neuritic/synaptic processes. Advances in delineating mechanisms by which autophagy is involved in the pathophysiology of neurological disorders, including Alzheimer's, Parkinson's, Huntington's, amyotrophic lateral sclerosis, ischemia/hypoxia and lysosomal storage diseases, will be discussed along with current drug development strategies targeting autophagy.

