

Global and local mechanisms sustain axonal proteostasis of transmembrane proteins

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© 2017 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd The control of neuronal protein homeostasis or proteostasis is tightly regulated both spatially and temporally, assuring accurate and integrated responses to external or intrinsic stimuli. Local or autonomous responses in dendritic and axonal compartments are crucial to sustain function during development, physiology and in response to damage or disease. Axons are responsible for generating and propagating electrical impulses in neurons, and the establishment and maintenance of their molecular composition are subject to extreme constraints exerted by length and size. Proteins that require the secretory pathway, such as receptors, transporters, ion channels or cell adhesion molecules, are fundamental for axonal function, but whether axons regulate their abundance autonomously and how they achieve this is not clear. Evidence supports the role of three complementary mechanisms to maintain proteostasis of these axonal proteins, na