

Golgi bypass for local delivery of axonal proteins, fact or fiction?

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© 2018 Although translation of cytosolic proteins is well described in axons, much less is known about the synthesis, processing and trafficking of transmembrane and secreted proteins. A canonical rough endoplasmic reticulum or a stacked Golgi apparatus has not been detected in axons, generating doubts about the functionality of a local route. However, axons contain mRNAs for membrane and secreted proteins, translation factors, ribosomal components, smooth endoplasmic reticulum and post-endoplasmic reticulum elements that may contribute to local biosynthesis and plasma membrane delivery. Here we consider the evidence supporting a local secretory system in axons. We discuss exocytic elements and examples of autonomous axonal trafficking that impact development and maintenance. We also examine whether unconventional post-endoplasmic reticulum pathways may replace the canonical Golgi apparatus.