

The SNARE Sec22b has a non-fusogenic function in plasma membrane expansion

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Abstract

Development of the nervous system requires extensive axonal and dendritic growth during which neurons massively increase their surface area. Here we report that the endoplasmic reticulum (ER)-resident SNARE Sec22b has a conserved non-fusogenic function in plasma membrane expansion. Sec22b is closely apposed to the plasma membrane SNARE syntaxin1. Sec22b forms a *trans*-SNARE complex with syntaxin1 that does not include SNAP23/25/29, and does not mediate fusion. Insertion of a long rigid linker between the SNARE and transmembrane domains of Sec22b extends the distance between the ER and plasma membrane, and impairs neurite growth but not the secretion of VSV-G. In yeast, Sec22 interacts with lipid transfer proteins, and inhibition of Sec22 leads to defects in lipid metabolism at contact sites between the ER and plasma membrane. These results suggest that close apposition of the ER and plasma membrane mediated by Sec22 and plasma membrane syntaxins generates a non-fusogenic SNARE bridge contributing to plasma membrane expansion, probably through non-vesicular lipid transfer.

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