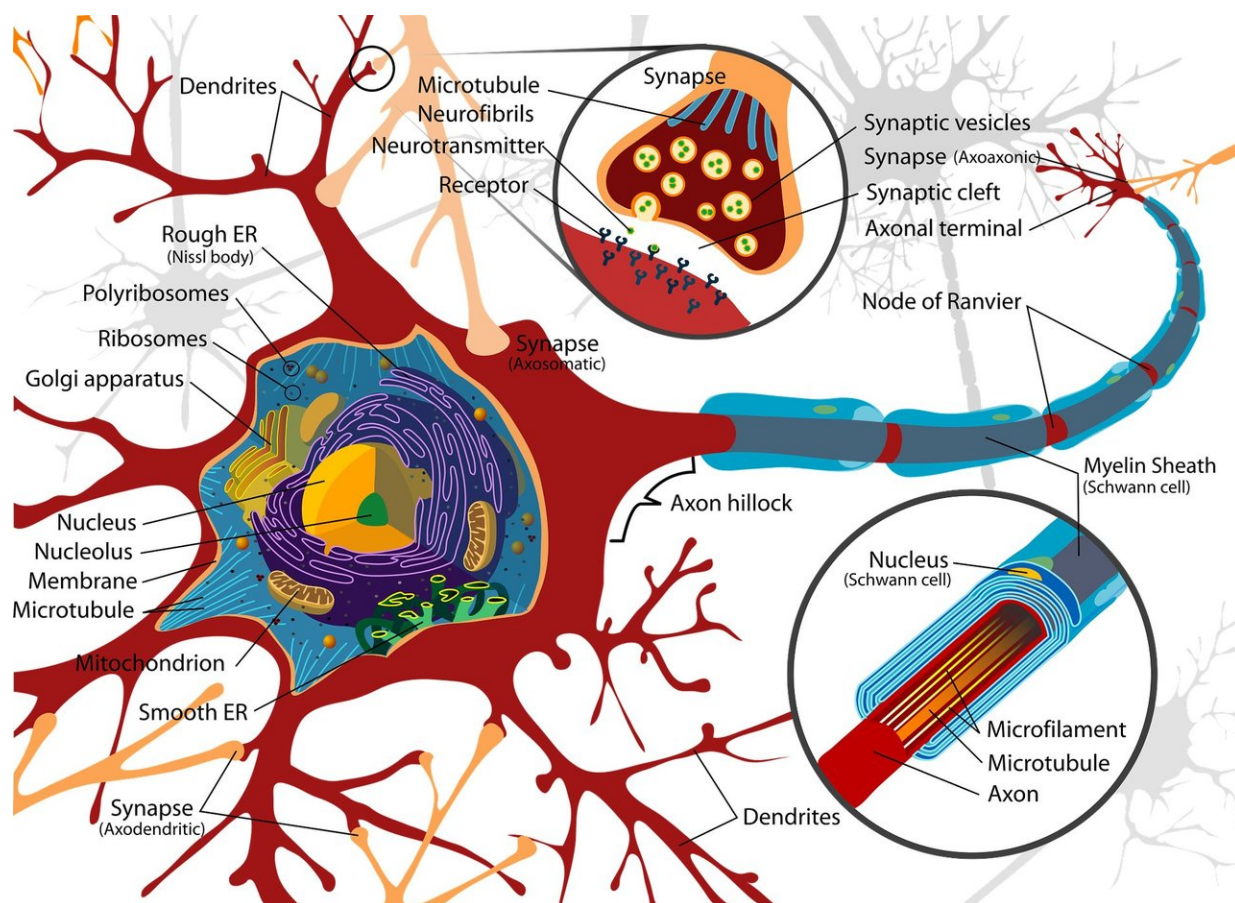


Researchers discover the initial stages of the folding mechanism of membrane proteins

December 20 2018



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An international team including the University of Valencia has proven that the folding of membrane proteins begins before they are inserted

into biological membranes, a fact that has been central to biochemical research for decades. The study, published in *Nature Communications*, was coordinated by Ismael Mingarro, professor of Biochemistry and Molecular Biology.

Since [membrane proteins](#) are the receptors of more than half of the medications currently on the market, it is vital to understand how they fold in order to design more efficient drugs. "Folding begins before the protein has finished synthesising, which is a great discovery to understand how these important pharmacological targets adopt their functional structure," Ismael Mingarro said.

Proteins, formed by amino acids linked by peptide bonds, are the biological macromolecules that carry out most of the biological functions of living beings. The cellular machines responsible for synthesising these links are the ribosomes, which incorporate them according to the order encoded by the RNA ([ribonucleic acid](#)) messenger. This chain of amino acids has to adopt the functional structure of the protein. The objective of the research has been to study the folding mechanism of proteins to know how and when adequate folding occurs.

The ribosome acts as a platform for the selection of sequences that have to adopt a local (helical) structure in the very early stages of protein biosynthesis. This implies that the ribosome is the molecular chaperone that helps the folding of proteins into a helical structure to increase the efficiency of their subsequent integration in the membrane.

"In this work, we have proven that the [helical structure](#) is achieved inside the ribosome, unlike what happens in the case of helical regions of soluble proteins, and that it depends on the helicity and apolarity of the [amino acids](#) as well as on the length of the hydrophobic region," explains Ismael Mingarro, coordinator of the team that has carried out the research. Thus, the study shows that the ribosome recognises the

transmembrane regions and facilitates the proper environment for their folding.

More information: Manuel Bañó-Polo et al. Transmembrane but not soluble helices fold inside the ribosome tunnel, *Nature Communications* (2018). [DOI: 10.1038/s41467-018-07554-7](https://doi.org/10.1038/s41467-018-07554-7)

Provided by Asociacion RUVID

Citation: Researchers discover the initial stages of the folding mechanism of membrane proteins (2018, December 20) retrieved 27 April 2024 from <https://phys.org/news/2018-12-stages-mechanism-membrane-proteins.html>

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