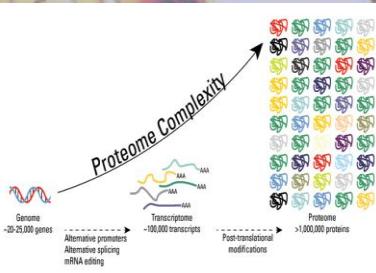


Introduction:

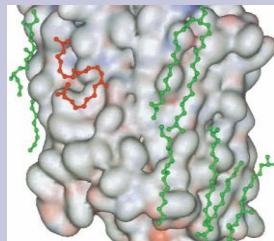
In the cellular environment, lipids and proteins share microenvironments and are located close to each other in the different cell compartments. This close vicinity allows the interactions between them and the modulation of protein structure and function by the lipid molecules.

Objectives:

- 1- Define interactions and its effects from structural point of view.
- 2- Consider different types of interactions.
- 3- Identify changes on function caused by structural changes.
- 4- Identify physiological roles and pathological alterations of the interactions.

1. lipid interactions as a cause of the protein function diversity

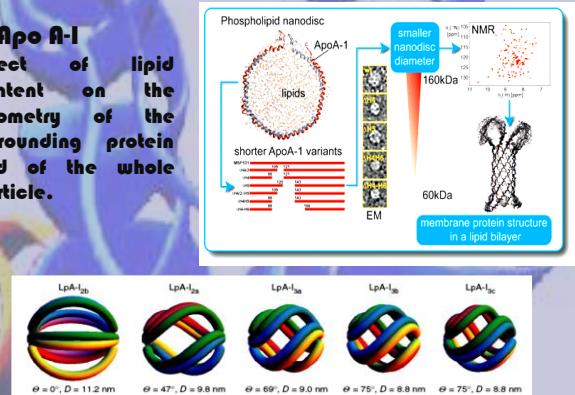
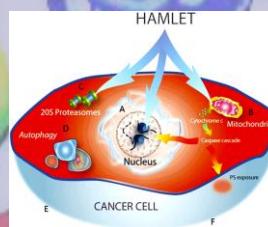
Interactions with lipid as post-translational modifications that can help to justify the diversity of protein function from a reduced number of genes, from 20.000 genes to 1.000.000 proteins functions.

2. lipids as dynamic and permanent elements of protein native structure.

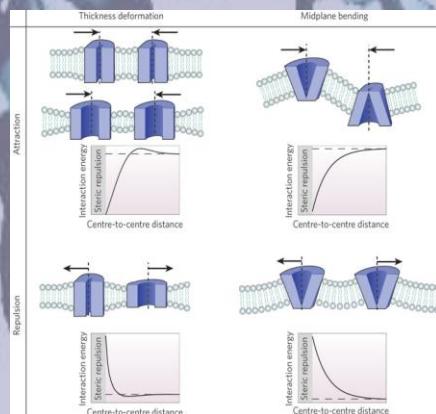
Annular and non-annular lipids as examples of lipids acting as solvents and as co-factors. Both examples are present in the crystal structure of bacteriorhodopsin

4. Apo A-I

Effect of lipid content on the geometry of the surrounding protein and of the whole particle.

**5. To be or not to be?**

Lipid interaction with lactalbumin may eventually trigger the formation of this Shakespearean antitumorigenic macromolecular complex: HAMLET (Human Alpha-lactalbumin Made LETHal to cancer cells).

3. Physical interactions in the membrane

Solvation interactions are established between lipid molecules and protein domains. Tensions in the surface do alter activity of membrane proteins such as these mechanosensitive channels.

6. General overview of the project:

At the ending of this project some conclusions can be extracted from the bibliographical information about the issue:

- 1- Lipid-protein interactions as a real factor on the modulating of protein structure and function.
- 2- High diversity exists regarding the ways in which lipids can affect protein function.
- 3- Relevant 'in vivo' role of the novel functions acquired by interactions.
- 4- Pathological processes may arise from interactions alteration.

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