

How protein droplets phase separate on lipid membranes

Ferdinand Fandrei a, Emma Sparr a,

a Lund University,

ferdinand.fandrei@chem.lu.se

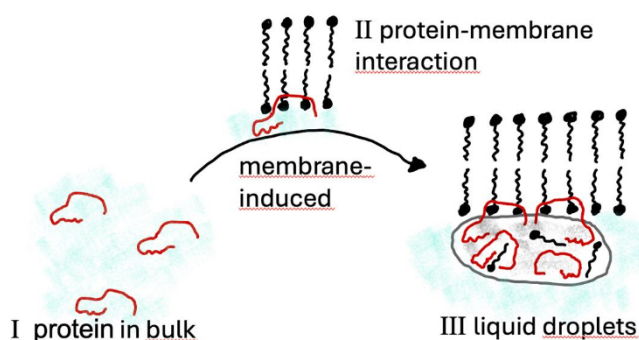
Membrane-induced liquid-liquid phase separation (MI-LLPS) of proteins is a process, where cellularly dissolved proteins interact with lipid membranes to form liquid-like protein microdroplets.

While LLPS is a relevant process to understand the physiological functions of the proteins, by maturation and rigidification these liquid microdroplets can also transition into cytotoxic oligomers and amyloid fibrils, which are directly linked to the pathogenesis of diseases like Parkinson or Alzheimer.

Therefore, phase boundaries of model proteins between the one phase and the two phase region were determined using turbidity measurements. Next these proteins were studied in the presence of lipid model membranes to observe under which experimental conditions membrane-induced LLPS takes place. Using these experimental conditions the model proteins were further investigated using fluorescent labelled protein and confocal microscopy as well as QCM-D.

Keywords:

Liquid-liquid phase separation, protein membrane interactions, prewetting, wetting,



Membrane-Induced Liquid-Liquid Phase Separation