Assessing the translocation of Cell Penetrating Peptides using model membrane in inverse emulsions

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Cell Penetrating Peptides (CPPs) are known to be able to cross cell membranes with a cargo through two different mechanisms: endocytosis and direct translocation. The molecular mechanism of the translocation is largely unknown. Our aim is to find the intermediate structures formed by CPP and protein, sugar, and lipid partners and measure the kinetics of the steps of the interaction of a CPP with a membrane. To assess the impact of the nature of the lipid on the translocation we use a model membrane in inverse emulsions.

Inverse emulsions are aqueous droplets into oil covered by lipids. At the interface between two adhering droplets a bilayer is formed. We monitor the translocation of fluorescently labeled CPP through this bilayer. The translocation of severals CPPs through negatively charged bilayer within tens of minutes has been detected. Nature of lipids and the asymmetry of the bilayer affect the translocation. We try to control the electrical potential in the droplet to measure the effects on translocation. We are currently improving the formation of the pairs of droplets with microfluidic devices.