Revealing the mechanism of interaction between viral fusion peptides and membranes

Fausto Stauffer[1], Andrea T. Da Poian[2] and Fabiana A. Carneiro[2]

[1] Faculdade UnB Ceilândia (FCE), Universidade de Brasília
[2] Programa de Biologia Estrutural, Instituto de Bioquímica Médica, Universidade Federal do Rio de Janeiro.

Membrane fusion is an essential step of the internalization process of enveloped animal viruses into their host cells. The fusion reaction is catalyzed by viral surface glycoproteins, which undergo conformational changes triggered by either their interaction with a cellular receptor or by the acidification of the endosomal pH. These conformational changes result in the exposure of hydrophobic peptides, loops or patches (the so-called “fusion peptides”), which then interact with and destabilize the target membrane. In this work, we evaluated the interactions between lipid vesicles and the peptides believed to be the fusion peptides of vesicular stomatitis virus and dengue virus, using physical-chemistry methodologies. Moreover, we demonstrated the crucial role of histidine protonation for the low-pH mediated structural transitions of viral glycoproteins. These data will be discussed in the context of the most recent information about viral fusion peptides.

Key words: membrane fusion, viral fusion peptide and histidine protonation.