



Cell-penetrating peptides and cell-specific penetrating peptides: how different?

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Membranes are present at all levels of organization of living organisms. Long presented as a passive barrier separating the cell from its environment, the plasma membrane plays a major role in cellular homeostasis by providing crucial dynamic functions of control and processing/transduction of information in response to numerous external stimuli. Despite its simple molecular composition (lipids, proteins, polysaccharides), its complex spatio-temporal organization provides the plasma membrane with very dynamic deformation, curvature and elasticity properties. Sophisticated active transport protein systems control the exchange across the membrane to import essential nutrients. Since about thirty years, it is known that large polar nanoobjects such as peptides and proteins are able to cross the plasma membrane without using the existing active transport systems. I will illustrate the physicochemical aspects which make it possible to apprehend and unveil these mechanisms of passage of the plasma membrane, in particular for Arg- and Trp-rich cell-penetrating peptides derived from homeoproteins, according to their interactions with cell membrane components.

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