

“Membranes and their Proteins: An Example of How Function is Achieved”

Membrane proteins exist in a heterogeneous environment that significantly influences their structure, dynamics and function. The tetrameric M2 protein from Influenza A virus is among other functional activities, a proton channel or more accurately a transporter. The unique mechanism involves a histidine tetrad, short hydrogen bonds and kinetics that include hydronium attack on these hydrogen bonds. As is typical of viral proteins, M2 has multiple functions. In addition to being a proton channel M2 also facilitates viral budding by inducing membrane curvature, a capability facilitated by cholesterol binding to the protein. These characterizations have been primarily achieved by solid state NMR in liquid crystalline lipid bilayers.