SFB 1078

Protonation Dynamics in Protein Function

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via WebEx

Colloquium

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Structure & Dynamics of Viral Proton and Cation Channels – Influenza M2 and SARS-CoV-2 E

Viroporins are small ion channels that are important for the lifecycle and pathogenicity of many enveloped viruses. Elucidating their structure, dynamics and mechanism of action is important both for a fundamental understanding of ion channels and for designing channel inhibitors as antiviral drugs. In this talk I will present our NMR studies of the proton conduction mechanisms of influenza A and B viruses' M2 proteins, and the structure of the SARS-CoV-2 E cation channel. Using 13C, 15N and 1H NMR, we have obtained detailed information about the proton conduction mechanism, kinetics and equilibria of AM2 and BM2 proteins, the site-specific as well as whole-body motions of the M2 proteins that mediate proton conduction, and the distinct water dynamics in the closed and open BM2 channels. Combining 19F NMR with 13C and 15N NMR, we also determined the first high-resolution structure of SARS-CoV-2 E protein's transmembrane domain in lipid bilayers. This structure indicates the site of drug binding and provides a structural framework for designing more potential E inhibitors.

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