How MNR Can Assist Us in Understanding Disease

Stephen C. Meredith, MD, PhD
Professor of Pathology and Biochemistry and Molecular Biology; Professor of Neurology, The University of Chicago

Needs: This talk will consist of one larger and one smaller vignette. The larger vignette will focus on self-association of β-amyloid, and how solid-state and solution NMR has helped to elucidate this process and its role in Alzheimer’s disease, with implications for other neurodegenerative diseases. The smaller vignette will focus on the tight junction protein, Occludin, which is important in the pathogenesis of inflammatory bowel disease and other disorders of the intestinal barrier function. This talk will consider how a molecular switch regulates the structure and function of the occludin α-helical bundle, as elucidated by NMR, and thereby regulates barrier function in the intestines. Despite the huge differences in these vignettes, both will illustrate the value of NMR in helping to elucidate disease pathogenesis.

Objectives: Understand how NMR elucidates the process of β-amyloid self-association; Understand polymorphism of β-amyloid fibrillar aggregates; Understand how a molecular switch in Occludin regulates the structure and function of the occludin α-helical bundle; Understand how NMR can help elucidate pathogenesis.