

## Structure and Function of Membrane Transporters

Membrane proteins are a supreme example where more effort in structural biology is needed. In spite of their abundance and importance, of over 50,000 protein structures in the Protein Data Bank, only some 190 of these proteins are unique membrane proteins. Membrane transporters form the second largest family among these membrane proteins; it is known that 5-12% of genes in the genomes sequenced to date encode membrane transporters. However, the structure determination of membrane transporters remains extremely challenging; the 3D structures of less than 20 such proteins are known. No structures are known for any mammalian solute carriers, except for the ATP/ADP exchanger from mitochondria. Functional and structural studies of membrane transporters responsible for the uptake and release of various materials including sugars, amino acids, peptides, drugs and ions are essential to our understanding of how the cells and our bodies work.

I will update our effort on structural and functional studies on mammalian solute carriers and their orthologues including lactose permease (1,2) and hydantoin transporter (3) and their molecular transport mechanisms will be discussed based on the crystal structures.