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Development of Pro-transporters with Enzyme-cleavable Anion Transport Activity

Avisikta Upadhyay
Indian Institute of Science Education and Research, India

Abstract

Biological membranes are primarily self-assembled phospholipid structures, which play crucial role in the survival of living cells by protecting these from the extreme external environments.1 Although, hydrophobic species such gases, small organic molecules can pass through the lipid membranes, the permeation of hydrophilic entities e.g. inorganic cations, inorganic anions, amino acids, ATP, proteins etc. are prevented completely.2-4 Therefore, nature has developed membrane proteins, which allow the selective transport of ions to regulate the cellular pH, osmotic pressure, and also help in the cellular signalling process.5 The transport of ions across biological membranes is facilitated by molecules that act either as carriers or channels (Figure 1A-B). Channels are usually membrane-bound proteins, while carriers may or may not be membrane-associated. Carriers that shuttle their guests from one side of the membrane to the other side of the membrane need to be lipophilic enough to diffuse through the hydrophobic part of the bilayer. Channels, on the other hand, typically traverse the width of the bilayer membrane and provide a hydrophilic pathway for ions to move across the phospholipid barrier.

Biography:

Avisikta Upadhyay is currently working on synthesizing small molecules as potential drug delivery systems and using external stimuli mediated approach to form biofunctional molecules and study their anion transport properties. She is working as a Senior Research Fellow(SRF) in Prof. Pinaki Talukdar's group in IISER Pune. Chemical biology and biochemistry are my fields of interest.

Speaker Publications:

1. "Enzyme-mediated cleavage of indole compounds to yield active drugs that can transport chloride"; Project
2. "Development of bio-functional molecules as anion transporters"; - Project
3. "Development of bio-functional small molecules as anion transporters – Project .

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