

Seminar

Development of Artificial Ion Channels for Targeting Cancer

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The ion transport process across the cell membrane is facilitated by a specific class of membrane-embedded proteins such as channels, carriers etc. This process is essential for diverse biological functions such as the maintenance of ion homeostasis of cells, sensory transduction, cell proliferation, osmotic stress response, etc. The perturbation of cellular ion homeostasis induces apoptosis, which cancer cells evade and proliferate uncontrollably. Therefore, synthetic ion carriers were used to perturb the chloride homeostasis of cancer cells and kill them via the induction of apoptosis. We have applied artificial ion channels to destroy cancer cells by perturbing the chloride ion homeostasis. We have developed artificial fluorescent channels that cotransport KCl to kill cancer cells. Our studies revealed that the induced ion transport by these systems leads to either cellular apoptosis or inhibition of autophagy or both. We have also developed various protransporter molecules that get activated by a specific stimulus, such as intracellular glutathione, enzymes, pH, etc., to form active ion channels. Such stimuli-activated ion transport facilitates the perturbation of ionic homeostasis of cancer cells leading to cell death. These approaches present new strategies for combating cancer.

Wednesday, June 7th 2023

4:00 PM (Tea / Coffee 03.45 PM)

Auditorium, TIFR-H