Multi-stimuli controlled release of a transmembrane chloride ion carrier from a sulfonium-linked procarrier

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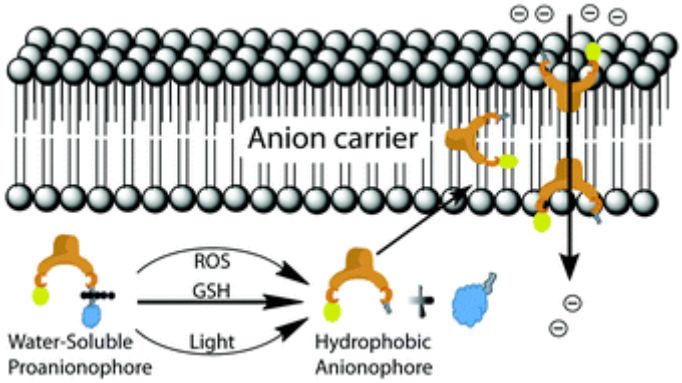
Abstract

In recent times, anion transporters have received substantial consideration due to their ability to disrupt the ionic equilibrium across membrane bilayers. While numerous Cl^- ion transporters were developed for channelopathies, unfortunately, poor aqueous solubility precluded their bioapplicability. Herein, we demonstrate the development of a multi-stimuli activatable anion transport approach to induce regulated transport of Cl^- ions across membranes under specific conditions. The sulfonium-based procarrier was initially inactive, but the transmembrane transport of Cl^- ions was activated in the presence of stimuli such as glutathione (GSH), reactive oxygen species (ROS) and light. The release of the hydrophobic anionophore from the aqueous-soluble procarrier under specific conditions leads to the successful transport of Cl^- ions. Under physiological conditions, these anion carriers follow an antiport exchange mechanism to transport Cl^- ions across lipid bilayers. Such multi-stimuli activatable procarriers have great potential to combat various types of channelopathies, including cancer, cystic fibrosis, kidney stones, myotonia, and others.

Keywords: Cl^- ion transporters, Multi-stimuli (GSH, ROS and light), Channelopathies.



Reference

1. Das, S., Biswas, O., Akhtar, N., Patel, A., & Manna, D. (2020). Multi-stimuli controlled release of a transmembrane chloride ion carrier from a sulfonium-linked procarrier. *Org. Biomol. Chem.*, *18*(45), 9246-9252.