

CRAC Calcium Channels: A New Therapeutic for Environment-Based Disease

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A rise in cytosolic Ca^{2+} is used as a key intracellular messenger in virtually every cell throughout the phylogenetic tree. The rise in Ca^{2+} activates a remarkable range of physiological responses, from the heartbeat and neurotransmission to cell growth and proliferation and even cell death. Aberrant cytosolic Ca^{2+} is linked to a growing list of human disorders including cardiovascular disease, neurodegeneration and various cancers. Targeting proteins that control Ca^{2+} is proving an effective strategy in treating these diseases. One such protein is the Ca^{2+} Release-Activated Ca^{2+} (**CRAC**) channel that is expressed in the cell surface membrane.

CRAC channels are a major route for raising cytosolic Ca^{2+} in eukaryotic cells. These channels are robustly expressed in immune cells, where they are indispensable for proper functioning of the immune system. Loss-of-function and gain-of-function mutants have revealed important roles for the channel in numerous human diseases, making the channel a clinically relevant target. In this talk, I will briefly summarize why cytosolic Ca^{2+} is important and then describe the role of CRAC channels in air-borne allergen-induced asthma as well as the skin disease psoriasis. I will also discuss briefly efforts to develop selective CRAC channel blockers for therapeutic use