Structural studies of chloride intracellular ion channel proteins

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The chloride intracellular channel (CLIC) family of proteins belong to a new class of chloride ion channels. They are generally localised on the nuclear membrane, but are also found in the cytoplasm and on the cell membrane. They have the unique feature of existing in both soluble and membrane associated forms.

The structural conformation of these proteins may be affected by various biological mechanisms including pH, redox and interactions with binding partners. For example, suggestions of CLIC translocation to the nucleus under stress has led to speculation of a direct interaction of CLIC with components of the nuclear import machinery. Furthermore, the location of the conserved cysteine residues in the 3-dimensional structure of the CLIC proteins may also prove crucial to the understanding of the structure-function relationship.

In this study, members of the CLIC family have been examined using various biophysical techniques, including circular dichroism spectroscopy, to reveal possible structural conformational changes that may occur under variations in environmental conditions. The conditions examined include binding partner interactions, oxidation and mutagenesis of the conserved cysteine residues. Results suggest that changes in these conditions, particularly mutation of Cys178 in CLIC1, lead to conformational instability and structural differences.