

# The interaction of IQGAPs with calmodulin-like

## Proteins

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### Abstract

Since their identification over 15 years ago, the IQGAP (IQ-motif-containing GTPase-activating protein) family of proteins have been implicated in a wide range of cellular processes, including cytoskeletal reorganization, cell–cell adhesion, cytokinesis and apoptosis. These processes rely on protein–protein interactions, and understanding these (and how they influence one another) is critical in determining how the IQGAPs function. A key group of interactions is with calmodulin and the structurally related proteins myosin essential light chain and S100B. These interactions occur primarily through a series of IQ motifs, which are  $\alpha$ -helical segments of the protein located towards the middle of the primary sequence. The three human IQGAP isoforms (IQGAP1, IQGAP2 and IQGAP3) all have four IQ motifs. However, these have different affinities for calmodulin, myosin light chain and S100B. Whereas all four IQ motifs of IQGAP1 interact with calmodulin in the presence of calcium, only the last two do so in the absence of calcium. IQ1 (the first IQ motif) interacts with the myosin essential light chain Mlc1sa and the first two undergo a calcium-dependent interaction with S100B. The significance of the interaction between Mlc1sa and IQGAP1 in mammals is unknown. However, a similar interaction involving the *Saccharomyces cerevisiae* IQGAP-like protein Iqg1p is involved in cytokinesis, leading to speculation that there may be a similar role in mammals.