How does the C-terminus of Iqg1 work in cytokinesis?
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Abstract
During cytokinesis, the division of the cytoplasm between cells is controlled by the contraction of an actomyosin ring. Iqg1, a crucial regulator of cytokinesis in Saccharomyces cerevisiae, is needed for the assembly and contraction of this ring. Already, it has been found that a domain in the Iqg1 C-terminus is crucial for S. cerevisiae survival.

In this study, a regulated Iqg1 allele is introduced to yeast. This will allow researchers to turn off the wild-type allele of the Iqg1 gene under specified conditions, which allows for the study of the effects of the C-terminal Iqg1 deletion. Progress towards making the desired yeast strain is monitored by making protein extracts to examine Iqg1 expression. This research into Iqg1 could potentially provide insight into public health, as IQGAP proteins, a family in which Iqg1 is a member, have implications in human cancer.

Background
Despite learning more about cytokinesis over the past few decades, much is still unknown about it: the proteins and mechanisms responsible for positioning the furrow, assembly, disassembly, and contraction of the actomyosin ring, separating daughter cells, and more.

It has been previously found that Iqg1 is required for cytokinesis regulation in budding yeast. In cytokinesis, an actomyosin ring contracts to separate daughter cells. Iqg1 regulates this process, as it is required for the assembly and contraction of this ring. Despite this knowledge, the function of the Iqg1 C-terminal domain is unknown.

Iqg1

Diagram of Iqg1 and its Cdk consensus sites

Diagram of IQGAP members and their domains

Iqg1 is an IQGAP member, a protein family associated with cytoskeletal rearrangement, intercellular interaction, and various pathways. High expression of IQGAP has been observed in several cancer types. By studying Iqg1 in budding yeast, we hope to learn more about how this functions in humans and how cytokinetic defects can contribute to cancer.

Iqg1 phosphorylation mutants cause defects in cytokinesis

Wildtype (left) vs. chain phenotype mutant (right), which is illustrative of cytokinetic defects

Iqg1 mutations preventing phosphorylation cause actin ring formation early

Diagram of chain phenotype

Analysis of chain phenotype

References