

Publication

A system of counteracting feedback loops regulates Cdc42p activity during spontaneous cell polarization

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 961802**Author(s)** Ozbudak, Ertugrul M.; Becskei, Attila; van Oudenaarden, Alexander**Author(s) at UniBasel** [Becskei, Attila](#) ;**Year** 2005**Title** A system of counteracting feedback loops regulates Cdc42p activity during spontaneous cell polarization**Journal** Developmental Cell**Volume** 9**Number** 4**Pages / Article-Number** 565-71**Mesh terms** Cell Polarity; Enzyme Activation; Feedback, Physiological, physiology; Models, Biological; Recombinant Fusion Proteins, metabolism; Saccharomyces cerevisiae, enzymology; cdc42 GTP-Binding Protein, Saccharomyces cerevisiae, metabolism

Cellular polarization is often a response to distinct extracellular or intracellular cues, such as nutrient gradients or cortical landmarks. However, in the absence of such cues, some cells can still select a polarization axis at random. Positive feedback loops promoting localized activation of the GTPase Cdc42p are central to this process in budding yeast. Here, we explore spontaneous polarization during bud site selection in mutant yeast cells that lack functional landmarks. We find that these cells do not select a single random polarization axis, but continuously change this axis during the G1 phase of the cell cycle. This is reflected in traveling waves of activated Cdc42p which randomly explore the cell periphery. Our integrated computational and in vivo analyses of these waves reveal a negative feedback loop that competes with the aforementioned positive feedback loops to regulate Cdc42p activity and confer dynamic responsiveness on the robust initiation of cell polarization.

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