CO2 sensing in fungi: at the heart of metabolic signaling.

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Abstract

Adaptation to the changing environmental CO2 levels is essential for all living cells. In particular, microorganisms colonizing and infecting the human body are exposed to highly variable concentrations, ranging from atmospheric 0.04 to 5% and more in blood and specific host niches. Carbonic anhydrases are highly conserved metalloenzymes that enable fixation of CO2 by its conversion into bicarbonate. This process is not only crucial to ensure the supply of adequate carbon amounts for cellular metabolism, but also contributes to several signaling processes in fungi, including morphology and communication. The fungal specific carbonic anhydrase gene NCE103 is transcribed in response to CO2 availability. As recently shown, this regulation relies on the ATF/CREB transcription factor Cst6 and the AGC family protein kinase Sch9. Here, we review the regulatory mechanisms which control NCE103 expression in the model organism Saccharomyces cerevisiae and the pathogenic yeasts Candida albicans and Candida glabrata and discuss which additional factors might contribute in this novel CO2 sensing cascade.

Involved units

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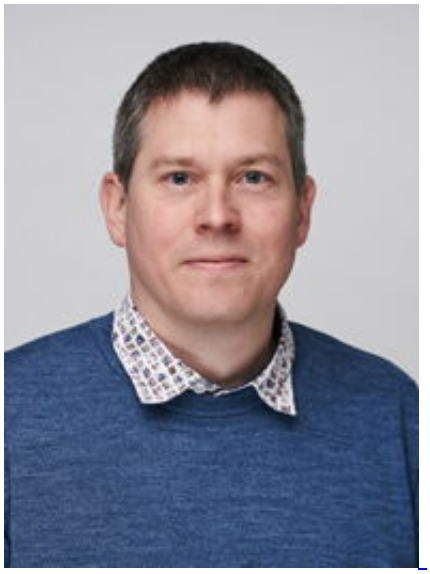

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