Abstract

Phosphate homeostasis is essential for cell metabolism and cell cycle regulation. The regulation of phosphate metabolism depends mainly on the transcription factor Pho4, which stimulates the expression of some genes for high-affinity and low-affinity transporters under low phosphate conditions. It has only recently been discovered that intracellular phosphate availability is detected by means of inositol pyrophosphates, the ratio of which affects the activity or stability of regulatory and structural proteins that are part of the PHO regulon, and indirectly also the activity of the Pho4 protein. These proteins are characterized by the presence of SPX domain that mediates the interaction of a specific inositol pyrophosphate isomer and the protein.

This thesis describes the main principles applied in the control of the level and activity of selected proteins of the PHO regulon in the model organism *Saccharomyces cerevisiae*. This complex control exploits transcriptional, posttranscriptional and posttranslational levels of gene expression regulation, few examples are presented in this thesis.

It has only recently been found that disruption of phosphate homeostasis can inhibit the virulence phenotype in the pathogenic yeasts *C. albicans* and *C. neoformans*. More detailed studies have revealed some differences in the phosphate regulatory circuits of various yeast species. Detailed knowledge of the interactions of PHO regulon proteins with virulence factors can be used in the development of fungicides.

Key words: High-affinity and low-affinity transporters, transcription factor Pho4, SPX domain, inositolpyrophosphates, S*accharomyces cerevisiae*