ABSTRACT

Mitosis is a crucial step in the eukaryotic cell cycle. Due to its importance it is subjected to the tight regulation in accordance with environmental stimuli. Disturbances of lipid metabolism in fission yeast *Schizosaccharomyces pombe* lead to aberrant mitosis. It was shown that this decrease in mitotic fidelity can be improved by providing yeast cells with ammonium as a primary nitrogen source. In this project we concentrated on characterisation of this effect and investigating its mechanism.

We demonstrated that mitotic fidelity in fission yeast can be rescued by other good nitrogen sources, not only ammonium. Surprisingly, ammonium supplementation restored lipid homeostasis neither on the level of gene expression nor on the level of lipid content. Ammonium also did not rescue the insufficient nuclear envelope expansion, which was hypothesised to be a main cause of aberrant mitotic phenotypes. At the same time it normalised timing of mitotic progression and has a positive effect on some mutants unrelated to lipid metabolism disturbances. We showed that this positive effect of nitrogen on mitotic fidelity is likely to be achieved through some unidentified process taking place prior to anaphase, and is modulated by the TOR regulatory network.

Additionally, we demonstrated that major non-sterol lipid metabolism regulators Cbf11 and Mga2 are working in coordination, potentially forming a complex, and that Cbf11 DNA-binding activity is crucial for its functions.

This work revealed new interconnects between lipid metabolism, mitotic fidelity and nitrogen-sensing regulatory pathways.

Keywords: fission yeast, mitotic fidelity, nitrogen source