Fission yeast Whi5 regulates the G1/S transition in nitrogen-poor media

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Cell cycle progression requires the periodic activation of transcription factors. At G1/S, the MluI cell-cycle box binding factor (MBF) regulates the expression of genes required for S-phase. Previous results have shown that low MBF-dependent gene expression generates genome instability in cells growing in a nitrogen-poor medium (minimal medium with phenylalanine, MMF) [1,2].

Here, we describe Whi5/Mug54 (meiotically up-regulated gene 54), a protein predicted to function as a cell cycle transcriptional repressor at the G1/S transition ([3]; Pombase). Cells deleted for whi5+ show a slightly accelerated entry into S phase in nitrogen-poor medium (MMF) and minimal media without nitrogen. We have found that whi5+ deletion suppresses the DNA damage phenotype of cells lacking the MBF activator rep2+ in a nitrogen-poor medium (MMF). By contrast, overexpression of whi5+ delays the G1/S transition and increases the cell size in MMF. Moreover, cells overexpressing whi5+ show increased DNA-damage in MMF. Together, our findings support a role for Whi5 as a cell cycle repressor in nitrogen-poor medium and underscore the importance of proper G1/S regulation to maintain genome stability. We are currently investigating how Whi5 is regulated and preliminary data will be presented.

References