

P035 Control of cytokinesis through regulation of gene expression

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We are interested in understanding the role that gene expression plays in controlling entry into cytokinesis, using fission yeast as a model organism. In fission yeast, the expression of several genes during M-G1 required for cytokinesis is controlled by the PBF (PCB Binding Factor) transcription factor complex binding to PCB (Pombe Cell cycle Box) DNA motifs present in the genes' promoters. Three components of PBF have been identified including two forkhead-like proteins, Sep1p and Fkh2p, and a MADS box-like protein, Mbx1p. PBF activity and M-G1 transcription is controlled by the Polo kinase, Plo1p. Plo1p binds to and directly phosphorylates Mbx1p, and Plo1p contacts PCB promoters *in vivo*. However, strikingly, both Plo1p and Fkh2p bind to PCB promoters only when PCB-controlled genes are not expressed during S-phase and G2, whereas in contrast Sep1p contacts PCBs coincident with M-G1 transcription. Thus, Plo1p, Mbx1p, Fkh2p and Sep1p control M-G1 gene transcription and consequent cytokinesis through a combination of phosphorylation and cell cycle specific DNA binding to PCBs.