Appli Micro, 3:3 (Suppl)
DOI: 10.4172/2471-9315-C1-009

Investigating the role of histone acetylation in the regulation of flocculation in *Saccharomyces cerevisiae*

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Flocculation is a stress response whereby yeast cells adhere to each other to form an aggregation which offers protection to those cells within the 'floc' against the outside environment. The flocculation phenotype is important in biofilm formation and in industries such as brewing. Flocculation is mediated by the expression of cell wall proteins known as flocculins. These are lectin-like proteins which bind to the mannose residues in the cell walls of neighboring yeast cells. The dominant flocculin gene in yeast is *FLO1*, which is regulated by the Tup1-Cyc8 co-repressor and the Swi-Snf co-activator. Although the mechanism of *FLO1* repression has been well characterized, the mechanism of *FLO1* de-repression is poorly understood. We show *FLO1* de-repression in a cyc8 deletion strain is accompanied by Sas3 and Ada2-dependent histone H3 lysine-14 acetylation at the *FLO1* promoter and ORF, together with Swi-Snf recruitment and histone eviction at the promoter. In the absence of Ada2 and Sas3-dependent H3 lysine-14 acetylation, Swi-Snf recruitment and histone eviction proceed at the de-repressed *FLO1* promoter, but *FLO1* transcription is reduced. Following the conditional depletion of Cyc8 *via* anchor-away, we show RNA polymerase II (RNAP II) is recruited to the de-repressed *FLO1* promoter in a bi-phasic manner concomitant with a similar pattern of histone acetylation. In the absence of Sas3 and Ada2-dependent H3 acetylation, histone eviction and RNAP II recruitment at the *FLO1* promoter still occur, however RNAP II is absent from the gene coding region. This suggests that in the absence of Cyc8, Sas3 and Ada2-dependent histone H3K14 acetylation is not required for histone eviction and RNAP II recruitment at the *FLO1* promoter, but is required to enable transcription elongation to occur.

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