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Heterochromatin boundaries

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Chromosomes are composed of functionally distinct domains separated by chromatin boundaries. In the August 10 *Science*, Noma *et al.* define the boundaries of the heterochromatin domain at the mating-type locus (*mat*) in fission yeast (*Science* 2001, **293**:1150-1155). They used chromatin immunoprecipitation (ChIP) and PCR analysis to scan the entire *mat* region (about 47 kilobases). Methylation of lysine 9 of histone H3 and the Swi6 protein were both enriched in a 20kb interval that contains the *mat2/3* silent cassettes. The inverted repeats IR-L and IR-R mark the boundaries of this heterochromatin domain. In contrast, methylation of lysine 4 of histone H3 showed an inverse pattern and was excluded from the *mat2/3* region. Noma *et al.* show that deletion of the boundary IR-L and IR-R repeats resulted in spreading of both H3-Lys9 methylation and Swi6 beyond the normal heterochromatin domain (up to 8 kilobases). Thus, distinct H3 methylation patterns define euchromatic (H3-Lys4-Methyl) and heterochromatic (H3-Lys9-Methyl) domains. The boundaries of these domains are dictated by the presence of insulating elements.

References

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