

IN BRIEF

EPIGENETICS**Essential role of the histone methyltransferase G9a in cocaine-induced plasticity**

Maze, I. *et al. Science* **327**, 213–216 (2009)

Changes in neuronal morphology as a result of repeated exposure to cocaine are thought to underlie addiction to this drug. This paper shows that administration of cocaine to mice causes downregulation of the histone methyltransferase G9a, which leads to a decrease in the repressive chromatin mark histone H3 lysine 9 dimethylation in the region of the brain associated with reward. These epigenetic changes correlate with increased gene expression, including the upregulation of genes that are known to affect neuronal plasticity, which might cause the morphological changes associated with addiction.

EVOLUTION**Hsp90 prevents phenotypic variation by suppressing the mutagenic activity of transposons**

Specchia, V. *et al. Nature* 10 Jan 2009 (doi:10.1038/nature08739)

In plants and flies, the heritable phenotypic abnormalities caused by mutations in heat-shock protein 90 (HSP90) have been attributed to the unmasking of hidden genetic variation. Based on the molecular and phenotypic consequences of HSP90 mutations in *Drosophila melanogaster*, the authors propose a further explanation, according to which HSP90 variants induce their effects by disrupting the silencing effect of piwi-interacting RNAs on transposon mobility. The variation induced by HSP90 mutations might therefore be caused by 'canonical', transposon-induced mutations.

PLANT GENETICS**H2A.Z-containing nucleosomes mediate the thermosensory response in *Arabidopsis***

Kumar, S. V. & Wigge, P. A. *Cell* **140**, 136–147 (2010)

New insights into the mechanism through which plants sense temperature and alter their development in response have been provided by a genetic screen in *Arabidopsis thaliana*. The authors found that the alternative histone H2A.Z is necessary for the plants' temperature response. H2A.Z-containing nucleosomes wrap DNA more tightly than H2A, and the degree of DNA unwrapping is temperature sensitive. This loosening of the DNA structure affects RNA polymerase II-mediated transcription. These findings may have important implications for the development of crops that can tolerate climate change.

DISEASE MODELS***Drosophila* genome-wide obesity screen reveals hedgehog as a determinant of brown versus white adipose cell fate**

Pospisilik, J. A. *et al. Cell* **140**, 148–160 (2010)

This study highlights genome-wide transgenic RNAi screens in fruitflies as a powerful way to identify pathways that are relevant to human disease. The authors carried out such a screen for genes that influence fat content in adult flies and identified Hedgehog signalling as a key determinant. Further studies in mice revealed a role for the Hedgehog pathway in the regulation of adipocyte cell fate, a process that has been proposed as a therapeutic target for human obesity.