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IN BRIEF

EPIGENETICS

RNA interference guides histone modification during the S phase of chromosomal replication.

Kloc, A. *et al. Curr. Biol.* 8 April 2008 (doi:10.1016/j.cub.2008.03.016)

How heterochromatin is inherited during the cell cycle is unknown. To examine this mechanism, Kloc *et al.* analysed the levels of modified histones associated with centromeric heterochromatin in fission yeast. Histone H3 Ser10 phosphorylation (H3S10ph) peaks during mitosis, leading to decreased levels of the heterochromatin protein Swi6 (which is necessary for transcriptional silencing) during S phase — H3S10ph next to H3K9me2 (dimethylated H3 Lys9) ejects Swi6 from chromatin. Loss of Swi6 allows the accumulation of transcripts during S phase and their subsequent processing into small interfering RNAs. RNA interference guides the modification of H3K9me2, which increases during S phase and peaks during G2, recruiting Swi6 and restoring heterochromatic DNA.

GENE EXPRESSION

Nuclear receptor-enhanced transcription requires motor- and LSD1-dependent gene networking in interchromatin granules.

Nunez, E. *et al. Cell* **132**, 996–1010 (2008)

It is unclear how transcriptional responses are integrated in the nucleus. Nunez *et al.* now show that 17β-estradiol ligand induces interchromosomal interactions among oestrogen receptor-α-bound transcriptional units. These interchromosomal interactions depend on a subset of coactivators and chromatin remodelling complexes, as well as on the nuclear actin and myosin motor machineries. The histone lysine demethylase LSD1 is required for directing the specific interchromosomal interaction loci to distinct interchromatin granules, also known as nuclear speckles, that are thought to store factors for transcriptional elongation and pre-mRNA splicing. These ligand-induced intranuclear interactions provide evidence for a dynamic nuclear architecture that may be required for the integration of regulated gene transcription and RNA-processing events.

AGEING

Nuclear envelope defects cause stem cell dysfunction in premature-aging mice.

Espada, J. *et al. J. Cell Biol.* 31 March 2008 (doi:10.1083/jcb.200801096)

Lamin A-dependent misregulation of adult stem cells associated with accelerated ageing.

Scaffidi, P. & Misteli, T. *Nature Cell Biol.* **10**, 452–459 (2008)

Two studies show strikingly diverse effects of premature ageing models on stem-cell function. Espada *et al.* observed that *Zmpste24*$^{-/-}$ progeroid mice, which show nuclear lamina defects, have increased numbers of hair follicle stem cells with decreased proliferative capacity and altered nuclear architecture. ZMPSTE24 deficiency is also associated with reduced Wnt signalling, which is important for stem-cell maintenance. Scaffidi and Misteli produced cell lines that expressed progerin, which is a mutant form of lamin A. Progerin induced Notch signalling — an important regulator of stem-cell maintenance and fate. Induction of progerin in mesenchymal stem cells (the main tissues affected in progeria are of mesenchymal origin) affected their molecular identity and their differentiation potential. These studies suggest that accelerated ageing may be the result of adult stem-cell dysfunction and resulting tissue deterioration.