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IN BRIEF

DNA REPLICATION

DNA replication timing of the human β-globin domain is controlled by histone modification at the origin.

Goren, A. *et al. Genes Dev.* 28 April 2008 (doi:10.1101/gad.468308)

Genes of the human β-globin domain replicate early in S phase in erythroid cells, but late in non-erythroid cells. Goren *et al.* show a large enrichment of histone H3 and H4 acetylation over the β-globin origin of replication in erythroid cells, whereas the origin region is deacetylated in non-erythroid cells. Tethering histone acetylases to the β-globin region causes local histone acetylation in non-erythroid cells and brings about a shift to early replication. Conversely, tethering of a histone deacetylase in erythrocytes causes a shift to late replication. Histone modification at the origin region might thus control replication timing.

DNA REPAIR

HP1-β mobilization promotes chromatin changes that initiate the DNA damage response.

Ayoub, N. *et al. Nature* 27 April 2008 (doi:10.1038/nature06875)

Phosphorylation of the histone variant H2AX is the earliest known marker of DNA breakage. Ayoub *et al.* now report an upstream signalling cascade: DNA breaks mobilize heterochromatin protein-1 (HP1)-β, which is bound to histone H3 that is methylated on Lys9 (H3K9me). Phosphorylation of HP1-β on Thr51 accompanies its mobilization by disrupting the HP1-β–H3K9me interaction. Inhibiting casein kinase-2, an enzyme implicated in DNA damage sensing and repair, suppresses Thr51 phosphorylation and HP1-β mobilization and diminishes H2AX phosphorylation. So, alterations in the chromatin structure that are triggered by HP1-β mobilization promote H2AX phosphorylation and initiate the DNA damage response.

NUCLEAR ENVELOPE

Otefin, a nuclear membrane protein, determines the fate of germline stem cells in *Drosophila* via interaction with Smad complexes.

Jiang, X. *et al. Dev. Cell* **14**, 494–506 (2008)

The highly conserved nuclear lamin Ig-fold binds to PCNA: its role in DNA replication.

Shumaker, D. K. *et al. J. Cell Biol.***181**, 269–280 (2008)

The physiological roles of nuclear lamins have been elusive. Jiang *et al.* now show that the *Drosophila melanogaster* nuclear lamin Otefin (OTE) is essential for germline stem cell (GSC) maintenance. OTE silences *bam* transcription in a Decapentaplegic (a TGFβ homologue)-dependent manner, which is required for repressing GSC differentiation. Localization of OTE at the nuclear membrane is crucial for the direct interaction between OTE and Medea (a SMAD4 homologue), which might recruit the *bam* locus to the nuclear envelope. In a second study, the authors demonstrate that the immunoglobulin (Ig)-fold in the C terminus of lamins binds directly to proliferating cell nuclear antigen (PCNA), which is required for DNA replication. A mutant in the Ig fold that causes muscular dystrophy inhibits PCNA binding. Addition of the lamin domain containing the wild-type Ig-fold inhibits DNA replication, whereas the inhibitory effect is diminished when replicating nuclei are exposed to the mutant Ig-fold.
The interaction between lamins and PCNA occurs early in nuclear assembly, although the precise mechanisms that link the replication machinery to lamins remain unknown.

CORRIGENDUM

In Brief: Nuclear envelope

Nature Rev. Mol. Cell Biol. **9**, 425 (2008)

In this In Brief article, we incorrectly stated that Otefin is a lamin. It has since been brought to our attention that Otefin is in fact a LEM-domain protein that binds lamin.