IN BRIEF

TRANSCRIPTION

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

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

Plant development adapts to temperature variations. The *actin-related 6-10 (arp6-10)* mutant of *Arabidopsis thaliana* displays a constitutive warm-temperature developmental programme. Genes that are normally upregulated or downregulated by a switch from 12°C to 27°C are constitutively misexpressed in *arp6-10* mutants, suggesting that *ARP6* coordinates the transcriptome in response to temperature. *ARP6* encodes a subunit of the SWR1 complex, which mediates the substitution of H2A with the histone variant H2A.Z. In temperature-regulated genes, H2A.Z-containing nucleosomes are enriched at the first nucleosomal position following the transcriptional start site, and H2A.Z occupancy decreases with increasing temperature. H2A.Z-containing nucleosomes wrap DNA more tightly than canonical nucleosomes. This might block RNA polymerase II passage or prevent the binding of activating or repressing (for genes expressed at low temperatures) factors, and these obstacles are released at high temperatures. Temperature-dependent transcription thus depends on H2A.Z.

CELL CYCLE

Cohesin cleavage and Cdk inhibition trigger formation of daughter nuclei

Oliveira, R. A. *et al. Nature Cell Biol.* 17 Jan 2010 (doi:10.1038/ncb2018)

This study identifies two events that are required to drive proper chromosome segregation, an important component of metaphase to anaphase progression. Cells were artificially arrested in metaphase and injected with a protease that cleaves cohesin (which holds sister chromatids together), mimicking anaphase onset. This led to chromatid disjunction, but chromatid movement towards the poles was abnormal. Abnormal movement was caused by destabilization of the chromosome kinetochore–microtubule interaction after cohesin cleavage, which could depend on mitotic cyclins, the degradation of which is required for mitotic exit. Indeed, inhibition of the mitotic cyclin target cyclin-dependent kinase 1 (CDK1) together with cohesin cleavage in metaphase-arrested cells led to chromatid disjunction and normal migration to the poles. So, cohesin cleavage and CDK1 inactivation by cyclin degradation seem to be sufficient to drive chromosome segregation and chromatid movement towards the poles during anaphase.

MOLECULAR MOTORS

Opposite-polarity motors activate one another to trigger cargo transport in live cells

Ally, S. *et al. J. Cell Biol.* **187**, 1071–1082 (2009)

Molecular motors have different polarities, such that they move towards microtubule plus or minus ends and that intracellular transport is bidirectional. Previous studies have shown that minus end-directed dynein-driven transport is abolished by inhibiting or deleting the plus end-directed motor, kinesin 1. To investigate this further, Ally *et al.* studied peroxisome transport in *Drosophila melanogaster* S2 cells when endogenous kinesin 1 or dynein were replaced by alternative motors with peroxisome-targeting signals. Any motor that could successfully move along microtubules activated a motor of opposite polarity, suggesting that motors of opposite polarity activate each other to drive bidirectional transport along microtubules.