IN BRIEF

DNA REPAIR

A mediator for DNA repair

Continuing mRNA transcription by polymerase II (Pol II) requires prompt correction of DNA lesions by nucleotide excision repair (NER). Here, the authors find that the multiprotein Mediator complex, known to regulate Pol II-mediated transcription, is also linked to the NER machinery through interaction with the 3′ endonuclease Rad2 (also known as XPG in humans). They show that the Med17 subunit of Mediator binds to Rad2 and that Rad2 associates with Pol II-transcribed genes throughout the genome by chromatin immunoprecipitation (ChIP), in a manner that depends on transcription. ChIP–sequencing analysis showed a strong correlation between the presence of Rad2 and Mediator subunits at the promoters of Pol II-transcribed genes. Although Rad2 did not seem to affect transcription, mutants in Med17 showed increased ultraviolet light sensitivity, which increased further on Rad2 loss. This correlated with disrupted Rad2 recruitment and reduced interaction between the two proteins, suggesting that Med17 promotes NER by recruiting Rad2.

ORIGINAL RESEARCH PAPER Eyboulet, F. *et al.* Mediator links transcription and DNA repair by facilitating Rad2/XPG recruitment. *Genes Dev.* **27**, 2549–2562 (2013)

CYTOKINESIS

Ringfenced from damage

The condensin complex forms a ring around chromosomes during mitosis and meiosis, which is important for their proper segregation. Here, the authors investigate how these defects arise, and show that induced cleavage of the condensin ring causes cells to arrest in metaphase of the next cell cycle, owing to the induction of a DNA damage-dependent checkpoint. Fluorescent microscopy imaging of chromosomes showed that experimentally induced cleavage of the condensin ring led to accumulation of DNA double-strand breaks during cytokinesis, but this did not prevent completion of cell division. Remarkably, induction of condensin ring re-closure shortly before anaphase was sufficient to rescue chromosome arm segregation. Thus, the condensin ring protects chromosome arms against damage induction during cytokinesis, and thereby ensures proper chromosome segregation.

ORIGINAL RESEARCH PAPER Cuylen, S. *et al.* Entrapment of chromosomes by condensin rings prevents their breakage during cytokinesis. *Dev. Cell* **27**, 469–478 (2013)

PROTEIN FOLDING

A late need for oxygen

The folding and maturation of most secreted proteins requires the formation of disulphide bonds, which are introduced co- and post-translationally in the endoplasmic reticulum. Disulphide bonds form by a redox relay that involves protein disulphide isomerases (PDIs) and oxidases, and a terminal electron acceptor, which, *in vitro*, has been shown to be oxygen. Koritzinsky *et al.* now find that disulphide bond formation in mammalian cells occurs in two phases — a first phase that does not require oxygen, and a second (post-translational) phase that does require oxygen. This suggests that early co-translational disulphide bond formation uses different PDIs and oxidases, which remain to be identified, as well as their alternative electron acceptor. Furthermore, it indicates that post-translational oxygen-dependent disulphide bond formation is the underlying cause for hypoxia being a trigger of the unfolded protein response.

ORIGINAL RESEARCH PAPER Koritzinsky, M. *et al.* Two phases of disulfide bond formation have differing requirements for oxygen. *J. Cell Biol.* **203**, 615–627 (2013)