IN BRIEF

GENOME INSTABILITY

Proliferation of aneuploid human cells is limited by a p53-dependent mechanism

Thompson, S. L. & Compton, D. A. *J. Cell Biol.* **188**, 369–381 (2010)

Chromosome missegregation leading to aneuploidy is frequently seen in solid tumours, but normal cells that have undergone chromosome missegregation stop dividing. This study now shows that in addition to chromosome missegregation, cells need to acquire a tolerance to an aneuploid genome to continue proliferating, and this is achieved through the loss of p53. Specifically, cells with missegregated chromosomes had increased levels of p53 and its downstream target p21, and their progression through the cell cycle was delayed. Consistently, cells that lacked p53 and had missegregated chromosomes could proliferate as efficiently as diploid cells. Both chromosome missegregation and loss of p53 were required to maintain tolerance to the aneuploid genome, as cells with each defect alone failed to propagate. So, this study reveals an integral role for p53 in limiting the proliferation of aneuploid cells.

CHROMOSOME BIOLOGY

Yeast telomerase subunit Est1p has guanine quadruplex-promoting activity that is required for telomere elongation

Zhang, M.-L. *et al. Nature Struct. Mol. Biol.* **17**, 202–209 (2010)

Telomeres — the ends of eukaryotic chromosomes — are essential for maintaining genome integrity. Telomeric DNA is made up of simple repetitive sequences and a protruding G-rich 3′ overhang that forms higher-order structures (G-quartets) with four guanines arranged in a square-planar unit. Several G-quartets (from the same DNA molecule or different ones) can stack together and form G-quadruplexes. The yeast telomerase subunit Est1 is known to recruit the telomerase complex (which elongates telomeric DNA) to telomeres. Zhang *et al.* now find that Est1 also converts single-stranded telomeric DNA into G-quadruplexes *in vitro*. Importantly, yeast strains with mutated Est1, which can bind DNA but fail to produce G-quadruplexes, undergo cellular senescence as a result of telomere shortening. Thus, G-quadruplexes are important for telomere length maintenance *in vivo*, possibly by activating telomerase activity.

STEM CELLS

Systemic signals regulate ageing and rejuvenation of blood stem cell niches

Mayack, S. R. *et al. Nature* **463,** 495–500 (2010)

This study reveals an essential role for the stem cell niche in the age-related dysfunction of haematopoietic stem cells (HSCs). The authors found that exposure of aged mouse HSCs to a young stem cell niche (specifically to osteoblasts), either through *in vivo* parabiosis experiments (in which the mice share a common circulation) or *in vitro*, reversed age-related HSC dysfunction, including impaired haematopoietic engraftment, haematopoietic stem and progenitor cell accumulation in the bone marrow and differentiation bias towards myeloid over lymphoid cells. By contrast, exposure of young HSCs to old osteoblastic niche cells induced the ageing phenotype. The age-related defects of the stem cell niche could be reversed by exposure to the circulation of young mice or through the localized neutralization of insulin-like growth factor 1 in the bone marrow, highlighting a role for both local and systemic factors in signalling age-related haematopoietic decline.