

**S011** The role of recombination in telomere length maintenance.  
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Human telomeres shorten during each cell division, predominantly because of incomplete DNA replication. This eventually results in short uncapped telomeres that illicit a DNA damage response leading to cellular senescence. However, evasion of senescence results in continued cell division and telomere erosion in the end resulting in genome instability. In the long term this genome instability is not sustainable and cancer cells activate a telomere maintenance mechanism (TMM), either expression of telomerase or activation of the Alternative Lengthening of Telomeres (ALT) pathway. Telomere lengthening in ALT+ cell lines and tumours is driven by recombination-like processes between telomeres or between telomeres and extra-chromosomal telomeric sequences. However, ALT activation also results in deregulation of other recombination-based activities as ALT+ cells show elevated telomere sister-chromatid exchange and mis-processing of t-loops that cap chromosomes, both of which contribute to the chaotic telomere length dynamics seen in ALT+ cells lines. Furthermore ALT activation is associated with destabilisation of a minisatellite, MS32, though the connection to the ALT mechanism remains elusive. It is known that telomere length maintenance in ALT+ cells is dependent on the Mre11/Rad50/NBS1 (MRN) complex but evidence for the roles of other genes are only just emerging. The potential role of some other genes, including BLM and WRN RecQ helicases, in ALT will be discussed.