

21. **Chromosome Structure: Centromeres** 1 unit, John Maciejowski, September 29, 2025

Centromeres

The epigenetic nature of the centromere

Regulation of CENP-A deposition

Centromere specification

Neocentromeres

Human artificial chromosomes

Kinetochores direct chromosome segregation during mitosis

Recruitment of the outer kinetochore

Protein subunits of the kinetochore

Establishment of kinetochore-microtubule interactions

The spindle assembly checkpoint

The “wait anaphase” signal

Chromosomal instability in cancer

Cancer karyotypes

Dicentric chromosomes & micronuclei

DNA damage from errors in cell division

Chromosome rearrangement

Innate Immunity and inflammation

Extrachromosomal DNA

Discussion Paper:

Engel JL, Zhang X, Wu M, Wang Y, Espejo Valle-Inclán J, Hu Q, Woldehawariat KS, Sanders MA, Smogorzewska A, Chen J, Cortés-Ciriano I, Lo RS, Ly P. The Fanconi anemia pathway induces chromothripsis and ecDNA-driven cancer drug resistance. *Cell*. 2024 Oct 17;187(21):6055-6070.e22. doi: 10.1016/j.cell.2024.08.001. Epub 2024 Aug 23. PMID: 39181133; PMCID: PMC11490392.

Background Paper:

Mendiburo MJ, Padeken J, Fülöp S, Schepers A, Heun P. *Drosophila* CENH3 is sufficient for centromere formation. *Science*. 2011 Nov 4;334(6056):686-90. doi: 10.1126/science.1206880. PMID: 22053052.

Review Paper:

McKinley KL, Cheeseman IM. The molecular basis for centromere identity and function. *Nat Rev Mol Cell Biol*. 2016 Jan;17(1):16-29. doi: 10.1038/nrm.2015.5. Epub 2015 Nov 25. PMID: 26601620; PMCID: PMC8603311.