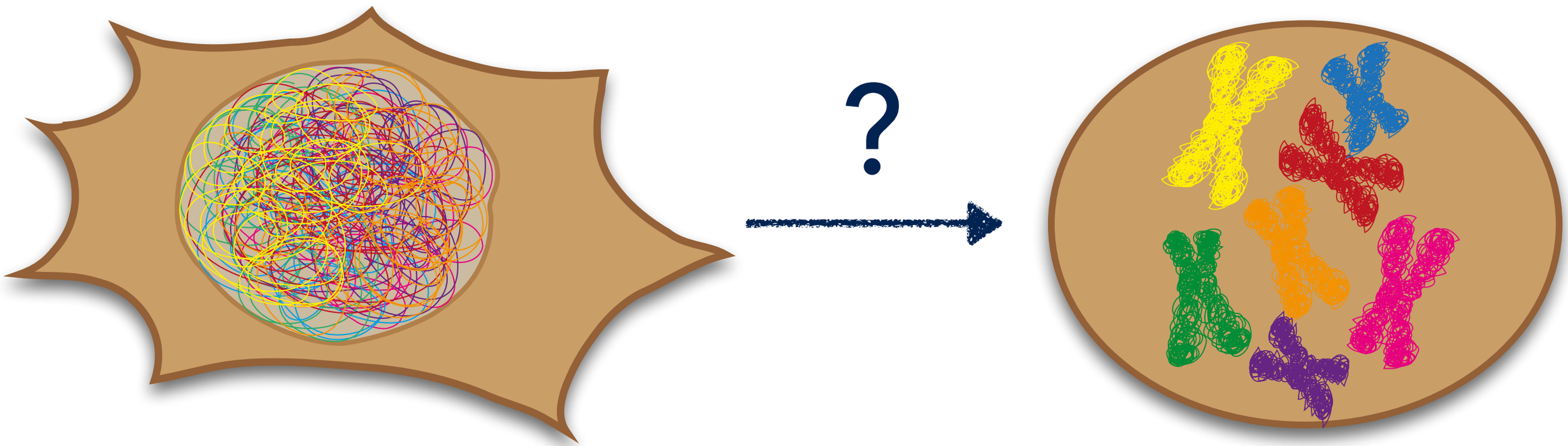
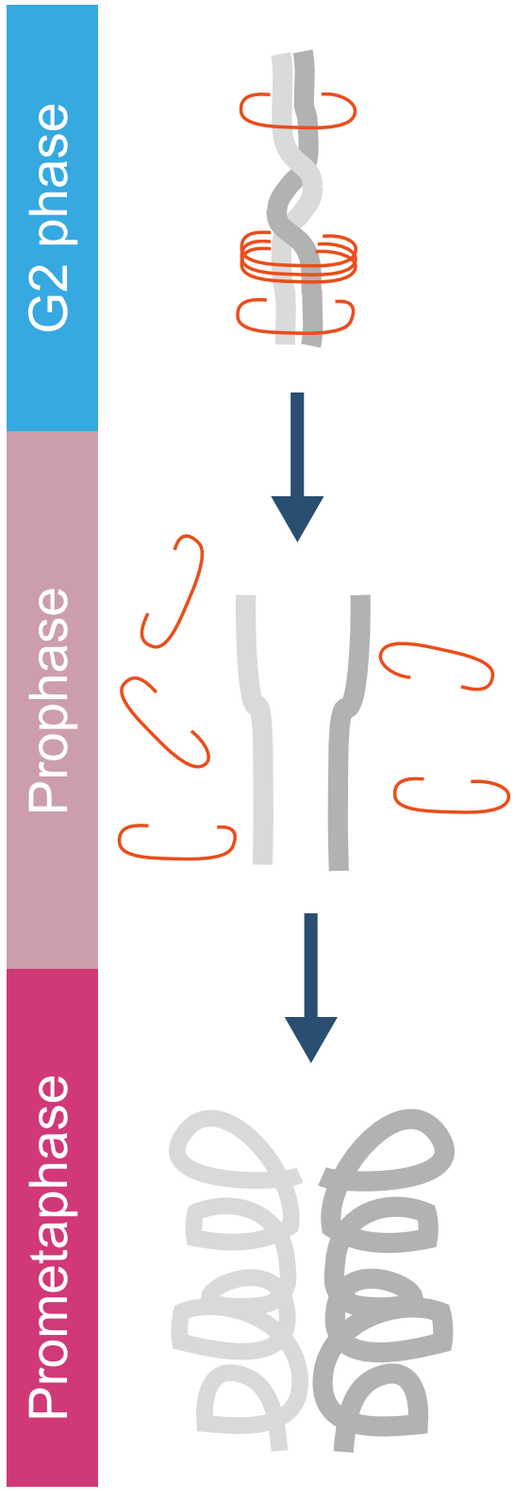


Between end of replication and prometaphase how does the cell achieve dramatic chromatin reorganisation?

HOW DOES REORGANISATION HELP CHROMOSOME SEGREGATION?

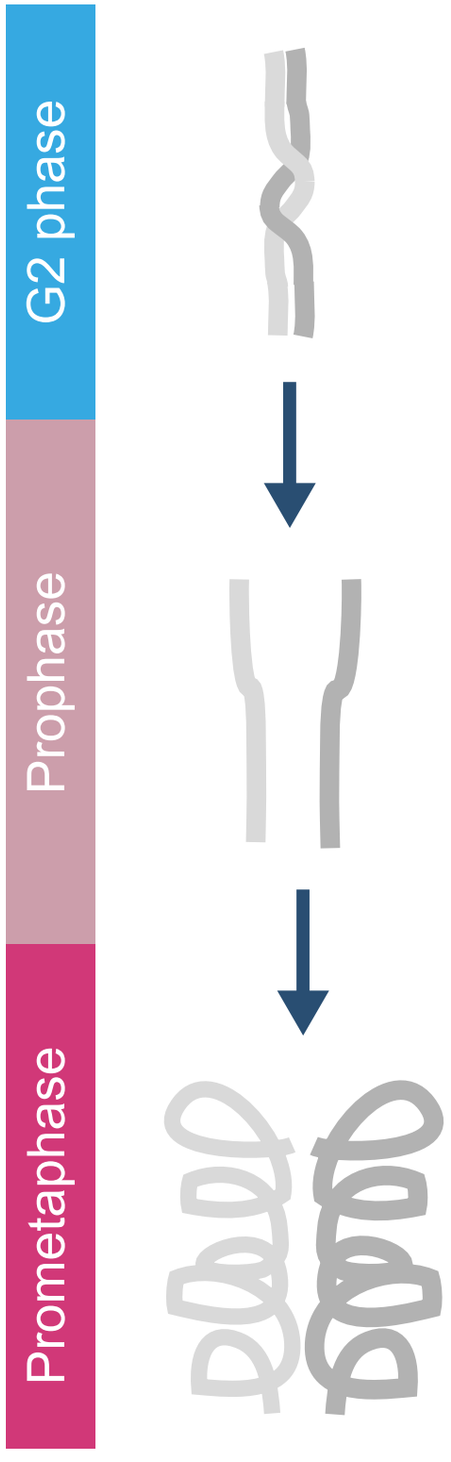


Resolution of sisters
(*individualise*)

Compaction
(*shorten & stiffen*)

PERTURBING THE SYSTEM

siRNA KNOCKDOWN, CHEMICAL INHIBITION & GENETICS



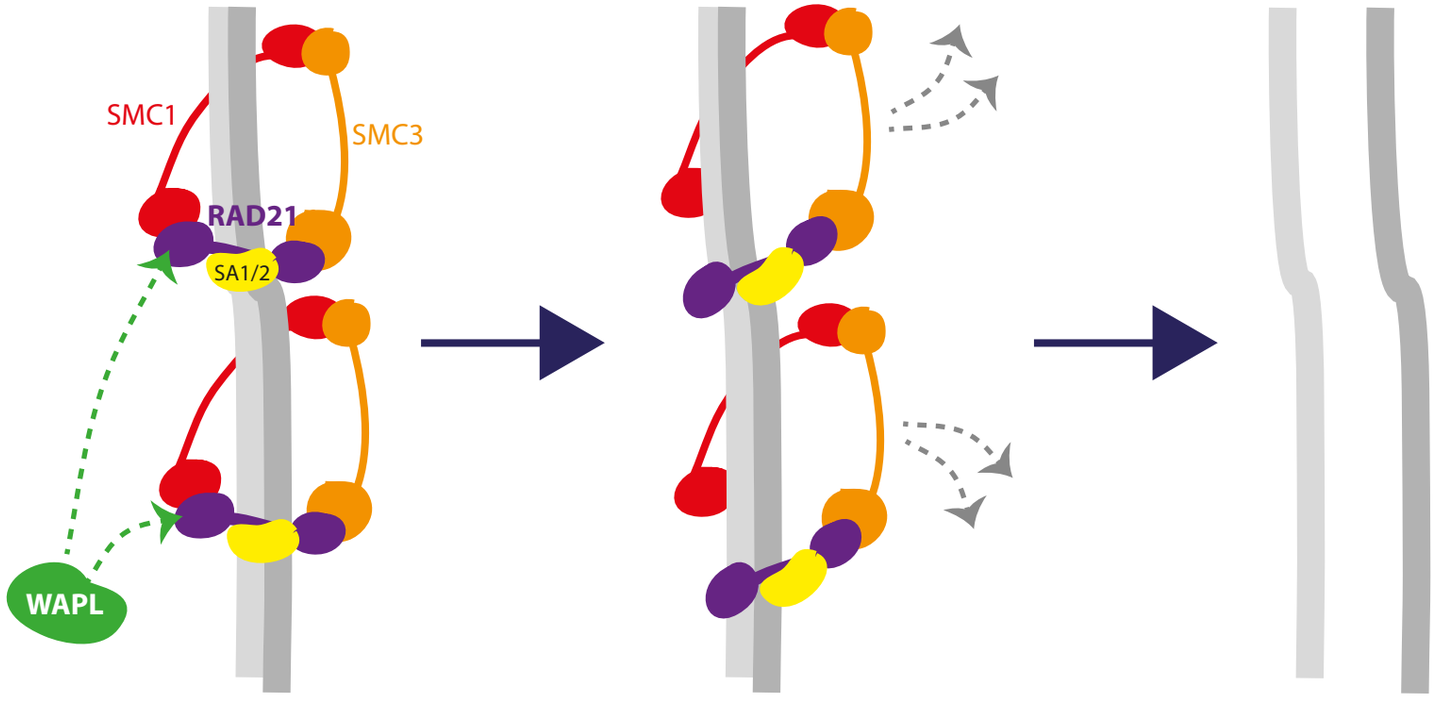
Sister chromatid resolution

- Cohesin removal (WAPL)
- Cohesin (RAD21)
- CTCF site removal
- Decatenation (TopoII inhibitor)

Compaction

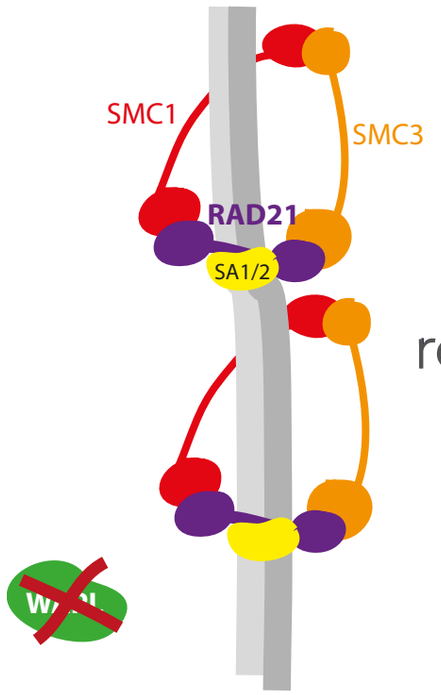
- Condensin I and II (SMC2)
- Condensin I (NCAPD2)
- Condensin II (NCAPD3)

INVESTIGATING THE ROLE OF COHESIN REMOVAL



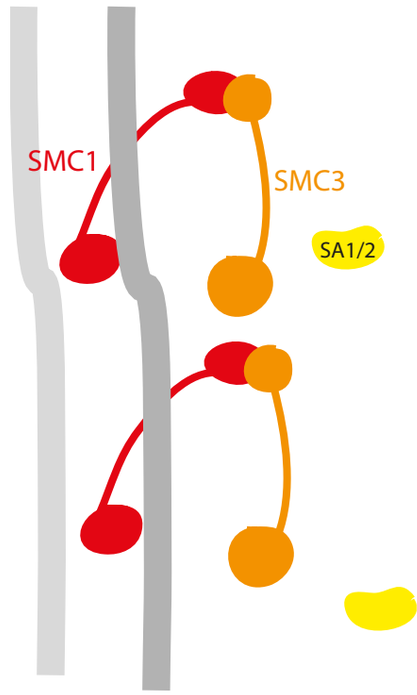
INVESTIGATING THE ROLE OF COHESIN REMOVAL

WAPL siRNA



delayed removal of Cohesin

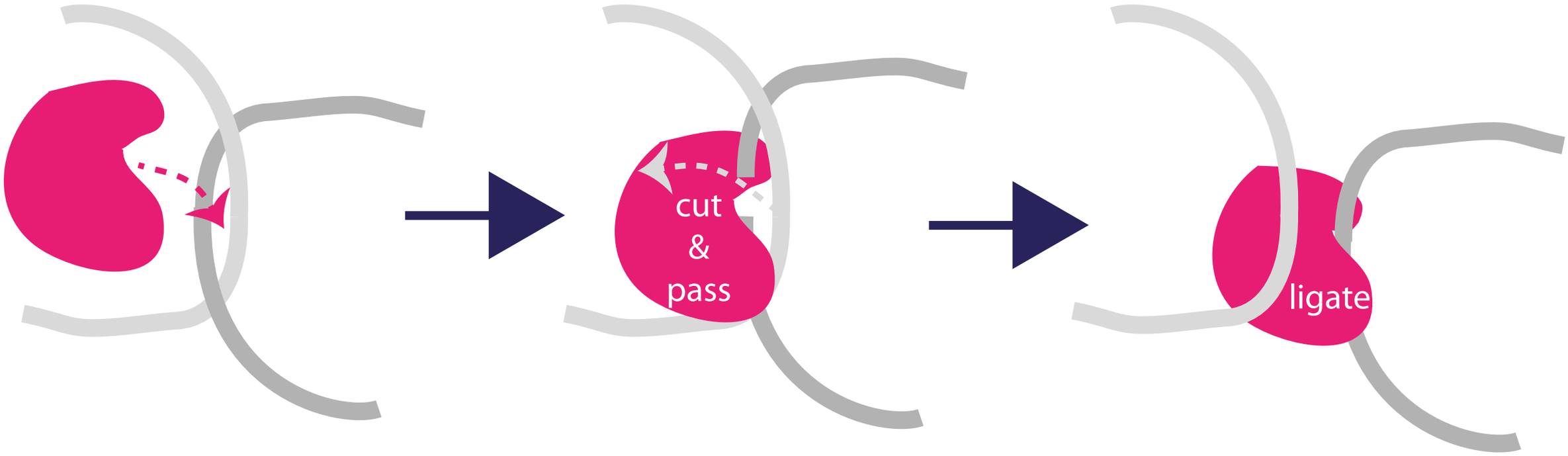
RAD21 siRNA



Cohesion not established

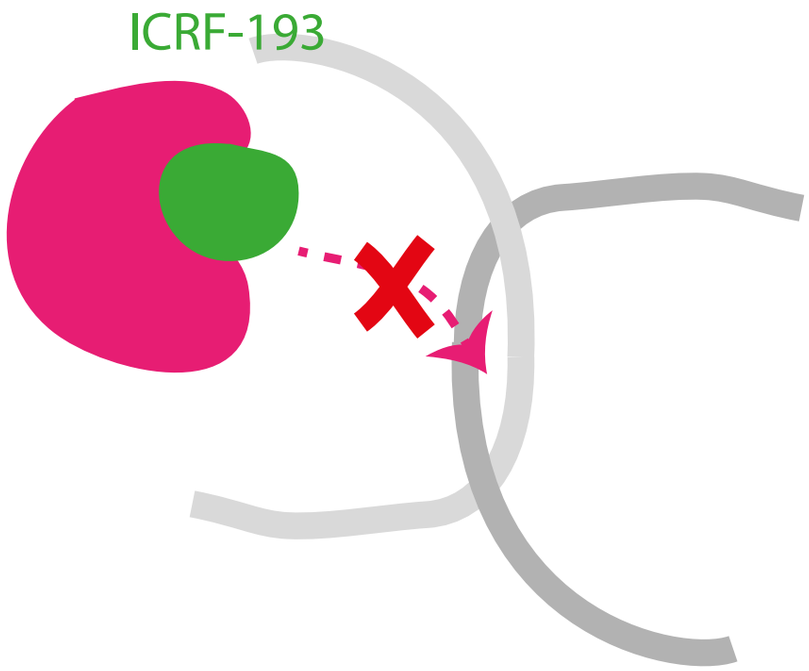
INVESTIGATING THE ROLE OF DECATENATION

(USING TOPOISOMERASE II INHIBITOR ICRF-193)



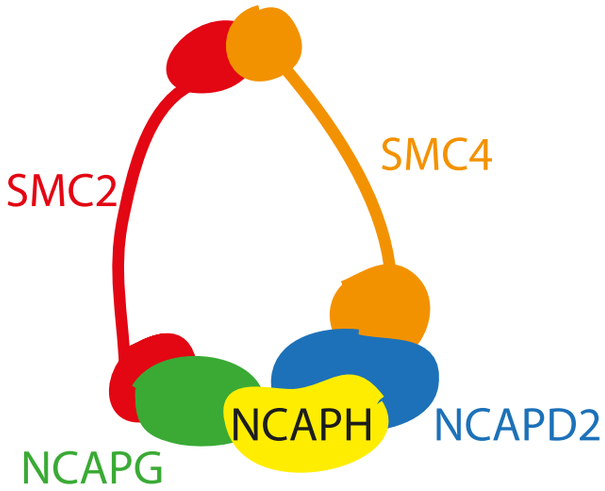
INVESTIGATING THE ROLE OF DECATENATION

(USING TOPOISOMERASE II INHIBITOR ICRF-193)

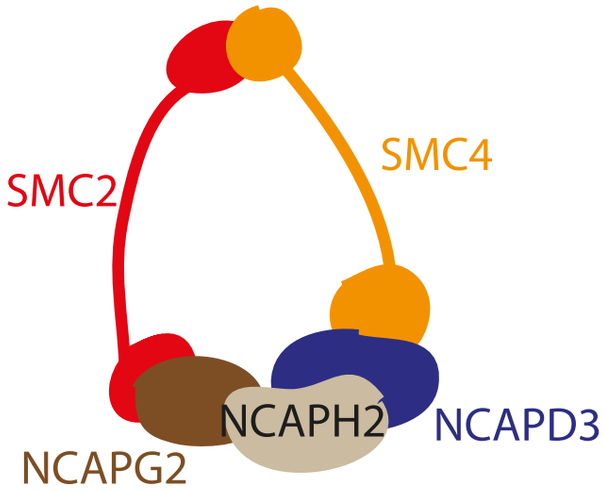


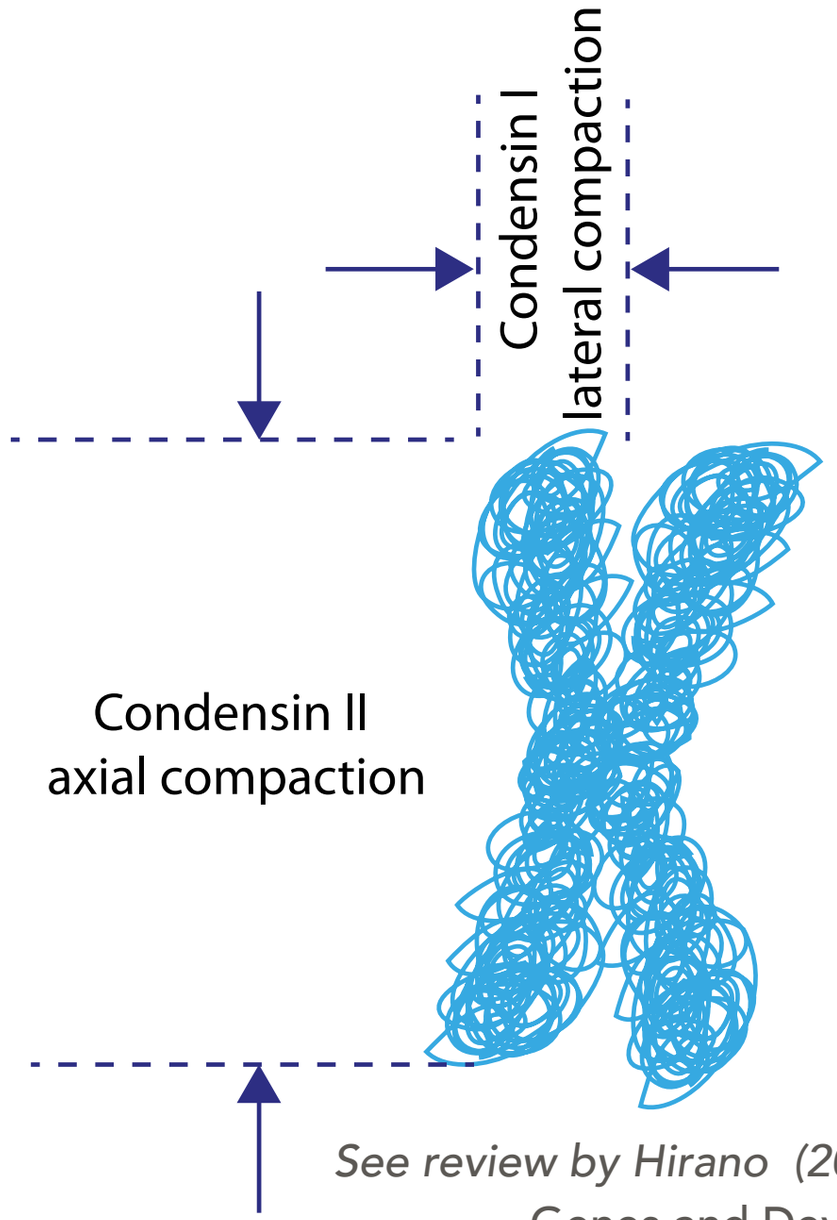
INVESTIGATING ROLES OF CONDENSIN I AND II

Condensin I



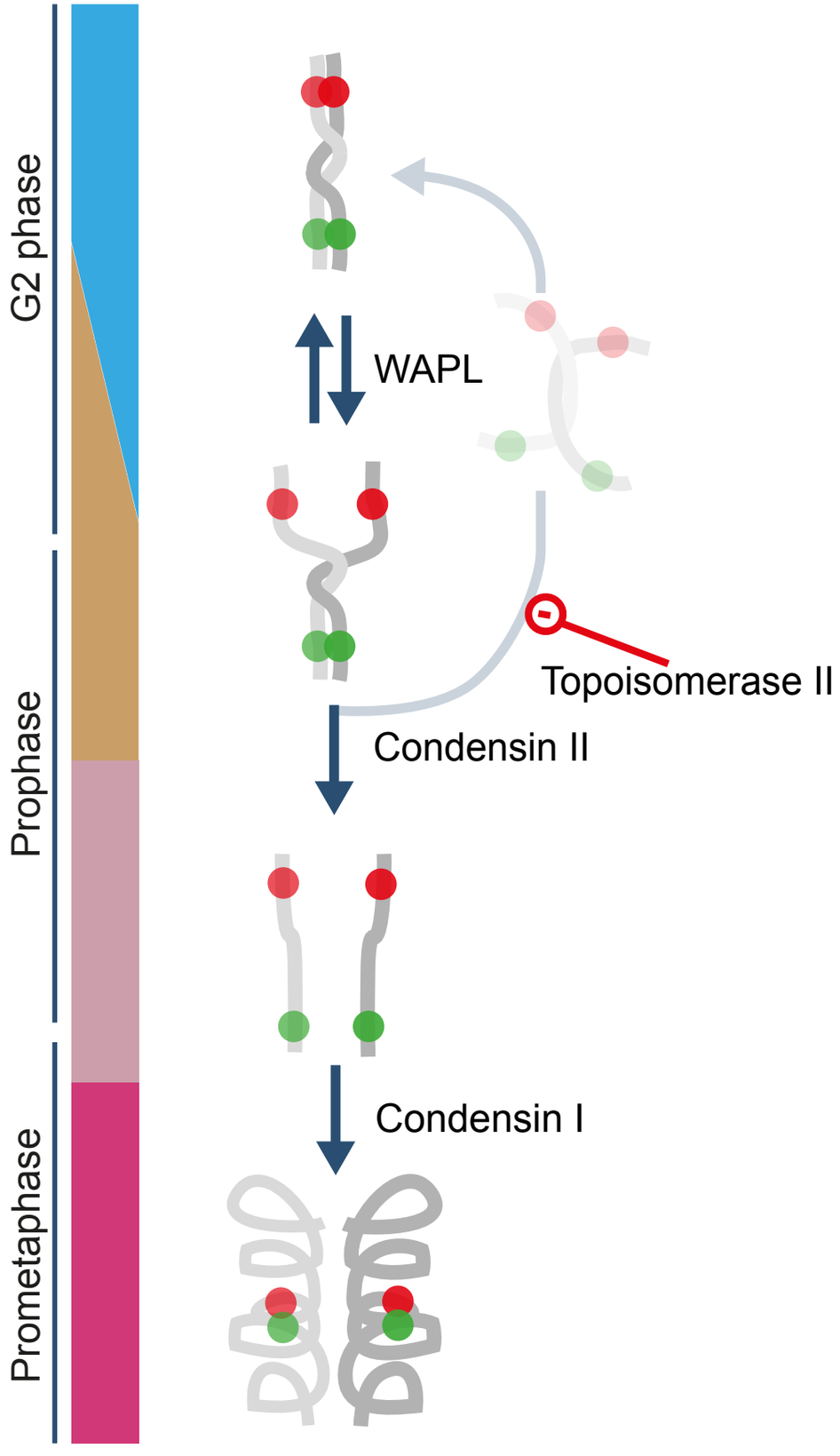
Condensin II





See review by Hirano (2012)
Genes and Dev. ***26***

SUMMARY



- We can visualise chromosome compaction with high temporal and spatial resolution
- Sister chromatid resolution begins in a cyclical manner in G2 phase
- Regional change in Cohesin distribution changes dynamics of chromatid resolution
- Decatenation is required to stabilise separated chromatids for later stages
- Compaction occurs late on and is organised sequentially by Condensin II and Condensin I