

LECTURE 24 Mitosis, part 2

The last of the 5 stages of mitosis: **anaphase** and **telophase**
Telophase overlaps with **cytokinesis**, the last stage of M phase.

- Sister chromatids separate suddenly at anaphase; triggered by release of cohesin linkage holding sister chromatids together at metaphase plate (covered previously Fig. 17-26). Daughter chromosomes move to opposite poles (Fig. 18-25).
- The chromosomes move by 2 independent and over-lapping processes.
- In anaphase A, motor proteins at the kinetochore and depolymerizing kinetochore MTs serve to pull the daughter chromosomes poleward (Fig. 18-26, 27).
- Anaphase B, which begins after the daughter chromosomes have moved some distance apart, depends on plus-end directed motor proteins at the central spindle that push the poles apart, and on minus-end directed motor proteins at the spindle poles that pull the poles apart (Fig. 18-26, 28, 29).

Cytokinesis: Cell division

- Mitotic spindle MTs determine the cleavage plane in dividing animal cells by specifying location of contractile ring (Fig. 18-31, 34, 35)
- Some cells position their mitotic spindle so division occurs asymmetrically; daughter cells with differing cell fate potential are created (Fig. 18-32)
- Regulated spindle rotation in asymmetric cell divisions (Fig. 18-33)
- Mitosis can occur without cytokinesis (Fig. 18-36 and movie)
- Different organisms use different chromosome separation mechanisms (Fig. 18-41)

Terms to know:

spindle-attachment checkpoint
metaphase to anaphase transition
anaphase promoting complex (APC)
M-Cdk, securin, separase
anaphase A, anaphase B
central spindle
telophase
cytokinesis
cleavage furrow
contractile ring
fate determinants
asymmetric cell division
stress fibers
spindle rotation
midbody

Figures covered:

Fig. 18-25 through 36

Fig. 18-41

Movie: synchronous mitosis in early *Drosophila* embryo