

LECTURES 23 & 24 Chapter 18: The Mechanics of Cell Division

Lecture 23 (March 3rd) will be given by Dr. Mitchell; Lecture 24 (March 4th) will be given by Dr. Pugh.

LECTURE 23 Mitosis, part 1

M phase of the cell cycle has 2 parts:

- I. Mitosis: 5 stages of nuclear division (we'll cover the 1st 3 today),
- II. Cytokinesis: cytoplasmic division

- Fig. 18-1: The eukaryotic cell cycle: cells grow, duplicate their contents and divide into two daughter cells.
- The division occurs during M phase of the cell cycle. M phase is fairly short, on the order of 1-2h in the 12-24h cell cycle typical of many animal cells.
- During preceding S-phase, DNA is replicated and centrosome (MT-organizing ctr.) is duplicated in preparation for M
- During mitosis, which has 5 sub-stages, the replicated, condensed chromosomes are lined up at the metaphase plate of the mitotic spindle and synchronously separated (segregated) into 2 equal sets.
- The end of mitosis overlaps with cytokinesis, the separation of the two daughter cells (in some cases, mitosis occurs without cytokinesis so multiple nuclei share one cytoplasm, e.g. early *Drosophila* embryo, Chapt. 21).

Terms to know:

homologous chromosome
sister chromatids
centrosome
centriole
kinetochore
mitotic spindle
cohesions, condensins
prophase, prometaphase, metaphase
metaphase plate
astral microtubules
overlap microtubules
kinetochore microtubules
microtubule dependent motor proteins: kinesin-related and dynein
polar ejection force
poleward flux
nuclear envelope, nuclear lamin

Figures covered:

Fig. 18-1, 2, 3, 4
Fig. 18-6, 7
Fig. 18-9, 10
Fig. 18-13, 14
Fig. 18-20, 21, 22
Mitosis movies (CD)