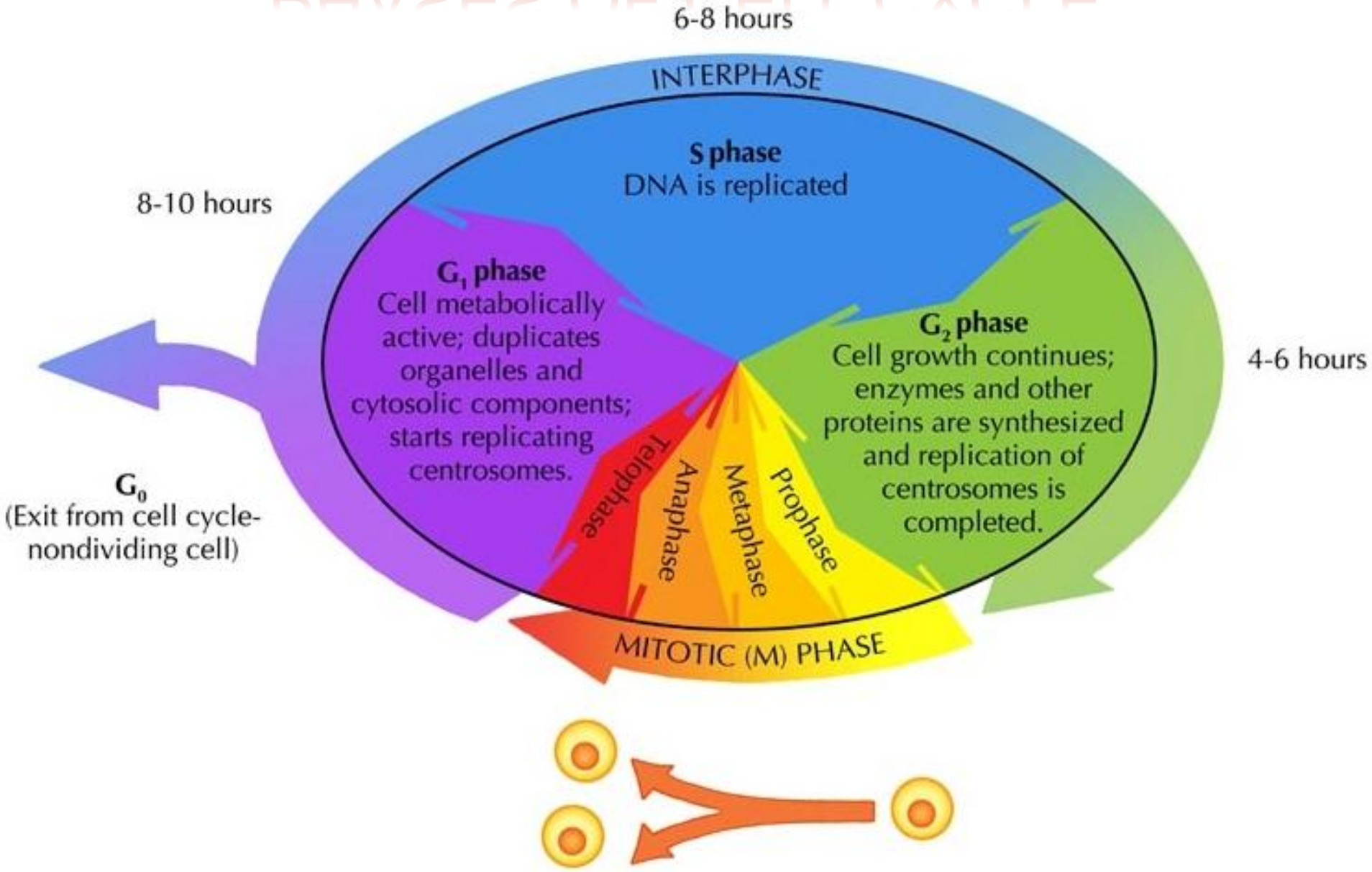
MEDICAL BIOLOGY

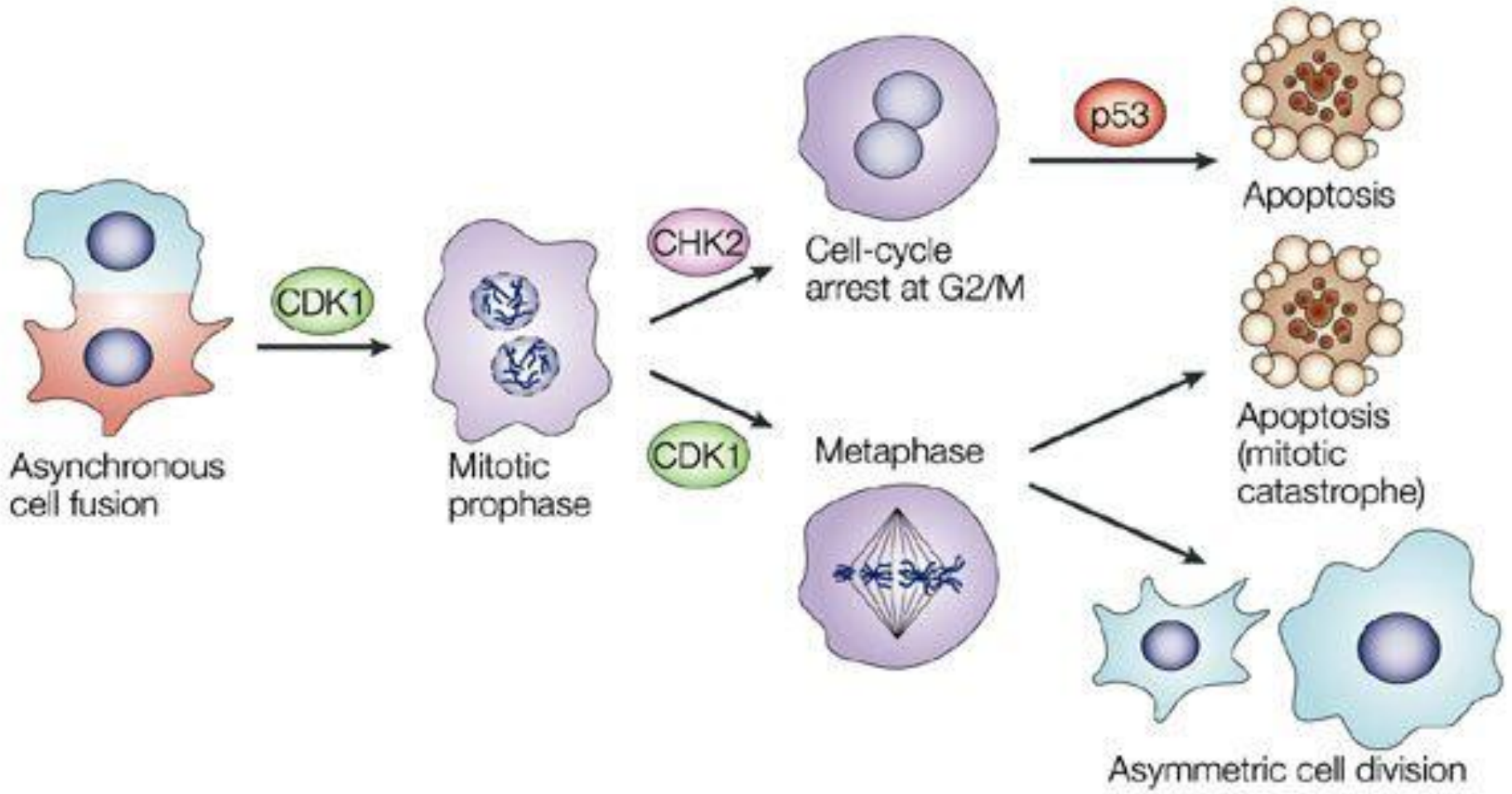
Cell Cycle

DEPARTMENT OF HUMAN ANATOMY – MUCOM 2022

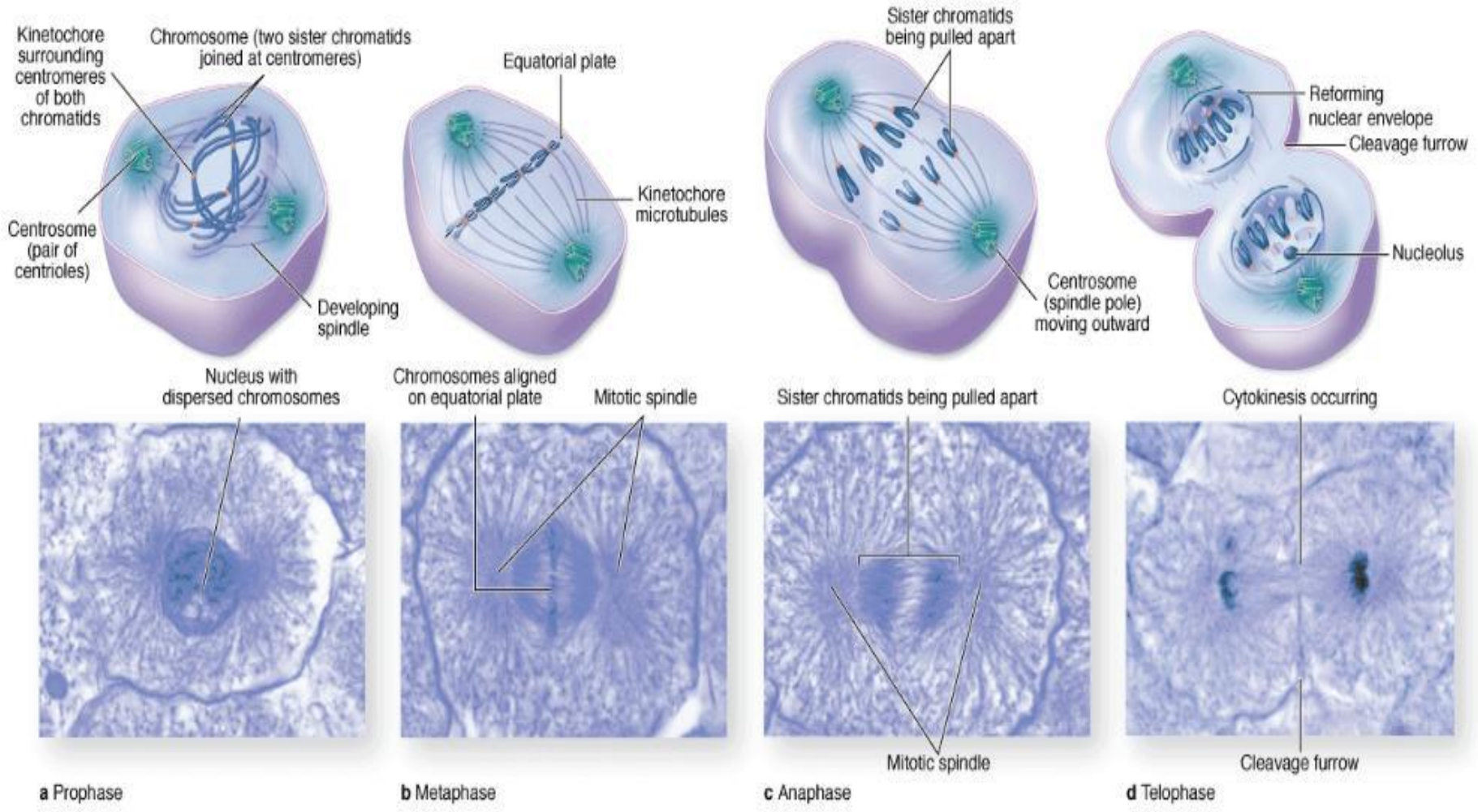
PHASES OF CELL CYCLE

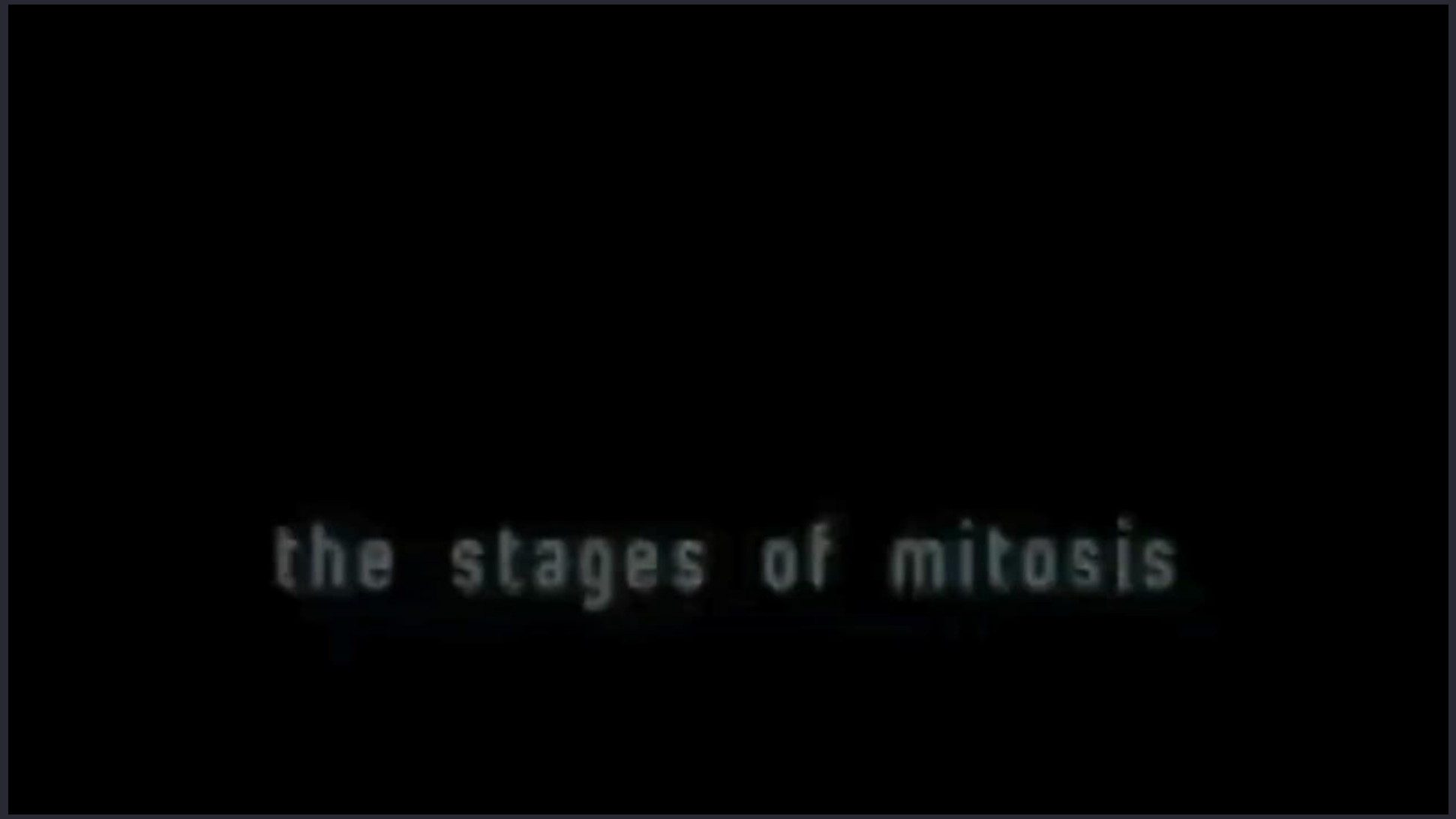


Mitotic Catastrophe

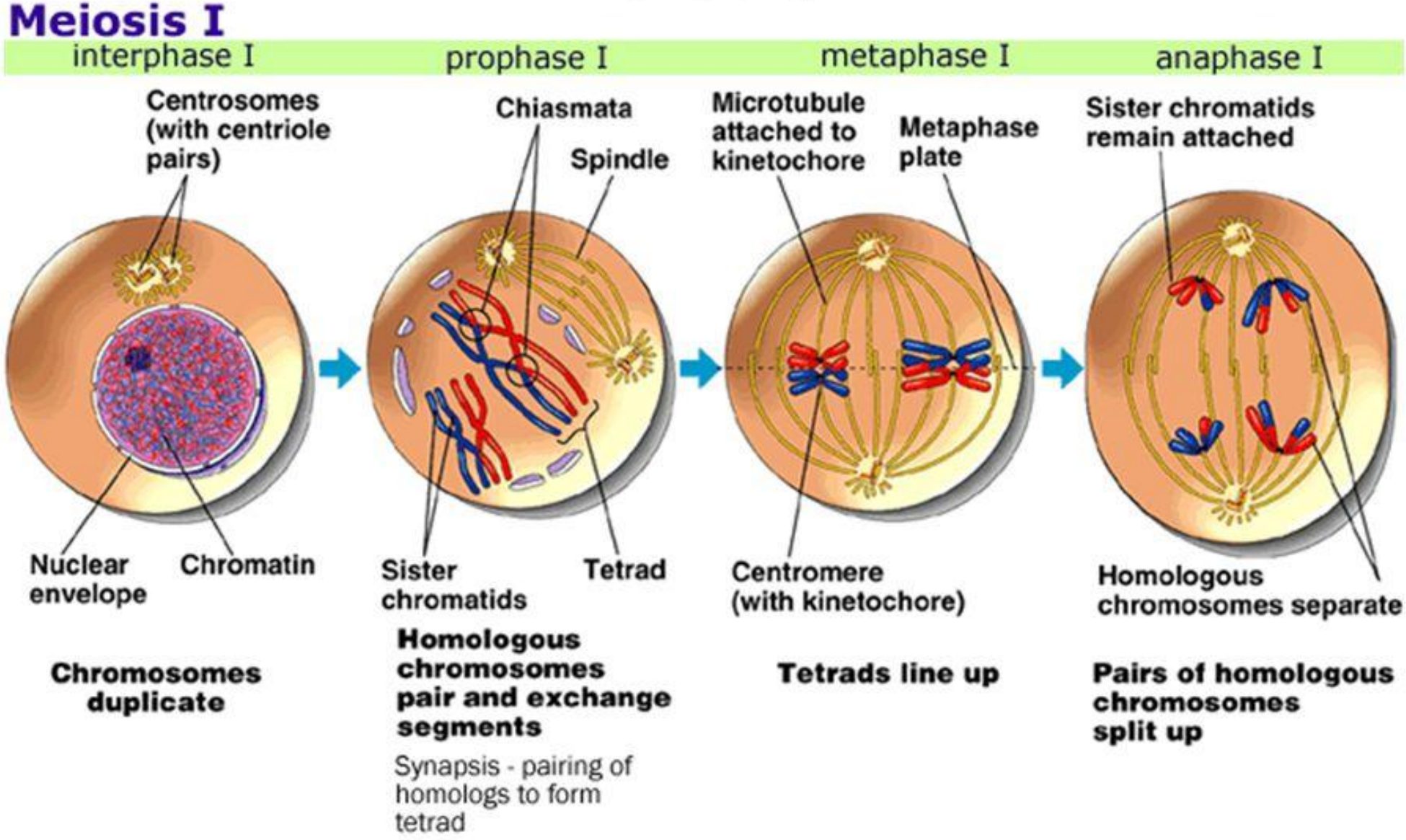


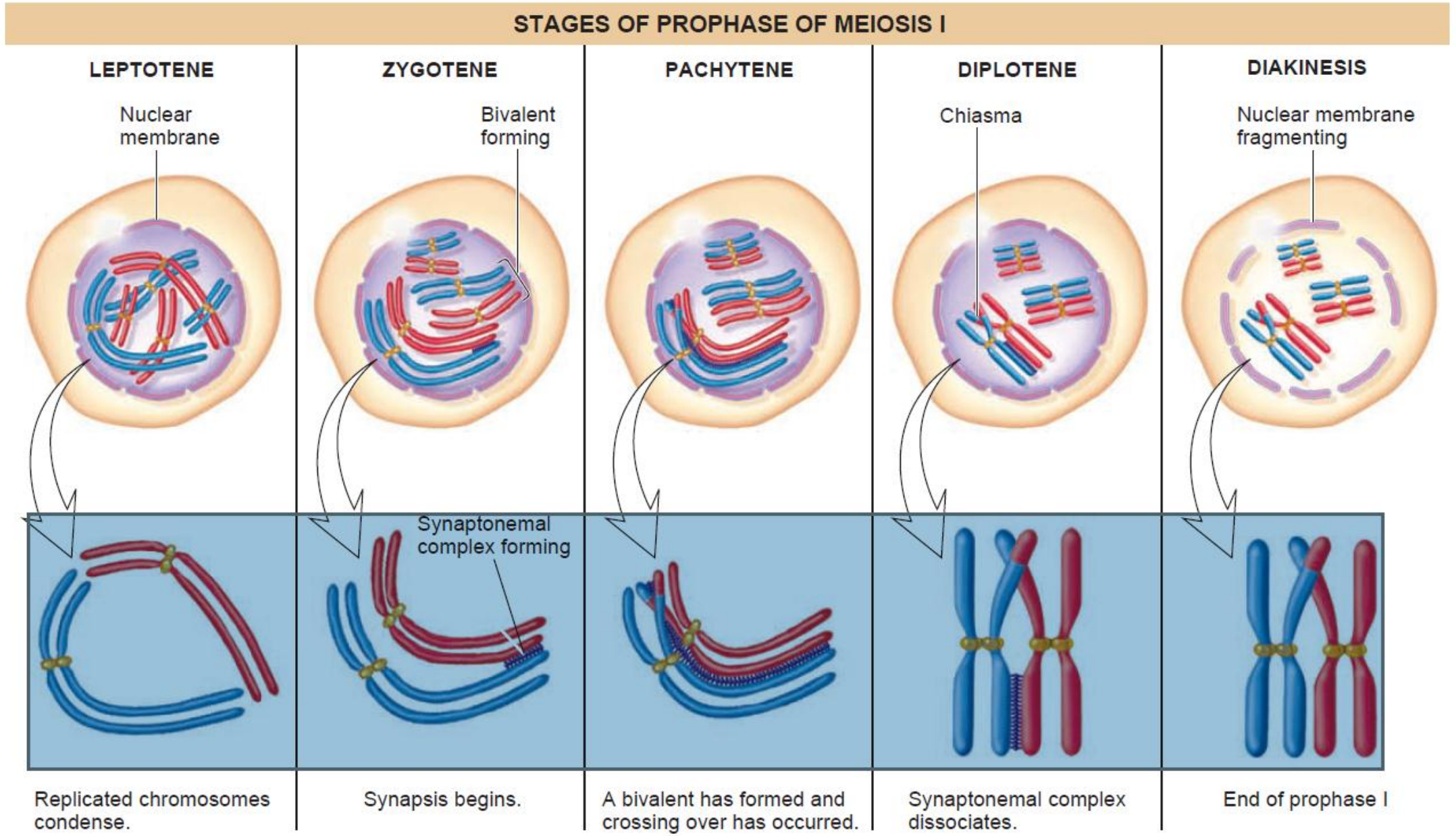
Mitosis

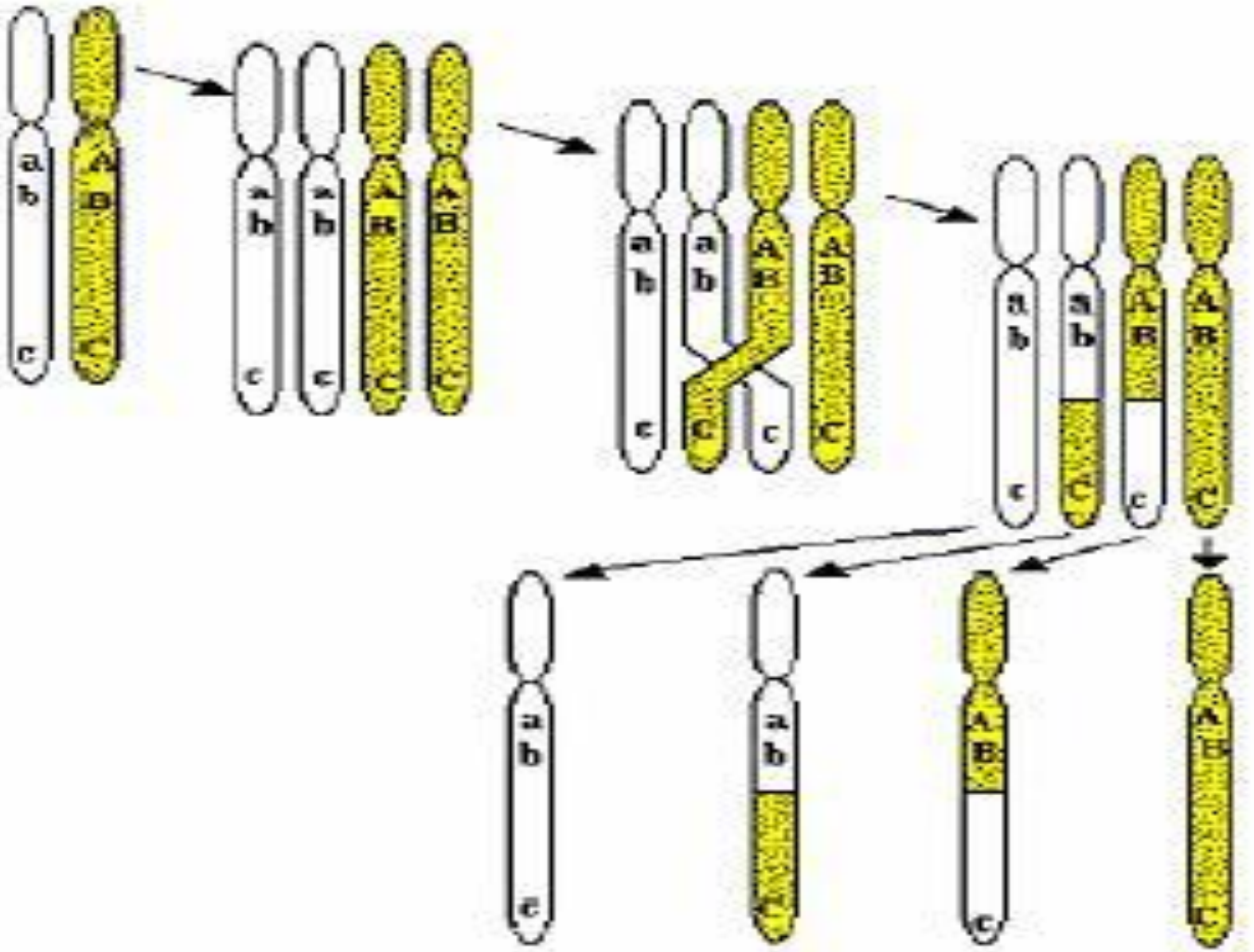

Kinetochore surrounding centromeres of both chromatids
Chromosome (two sister chromatids joined at centromeres)
Centrosome (pair of centrioles)
Developing spindle
Equatorial plate
Kinetochore microtubules
Sister chromatids being pulled apart
Centrosome (spindle pole) moving outward
Reforming nuclear envelope
Cleavage furrow
Nucleolus
Nucleus with dispersed chromosomes
Chromosomes aligned on equatorial plate
Mitotic spindle
Sister chromatids being pulled apart
Mitotic spindle
Cytokinesis occurring
Cleavage furrow
a Prophase
b Metaphase
c Anaphase
d Telophase


the stages of mitosis

Meiosis 1

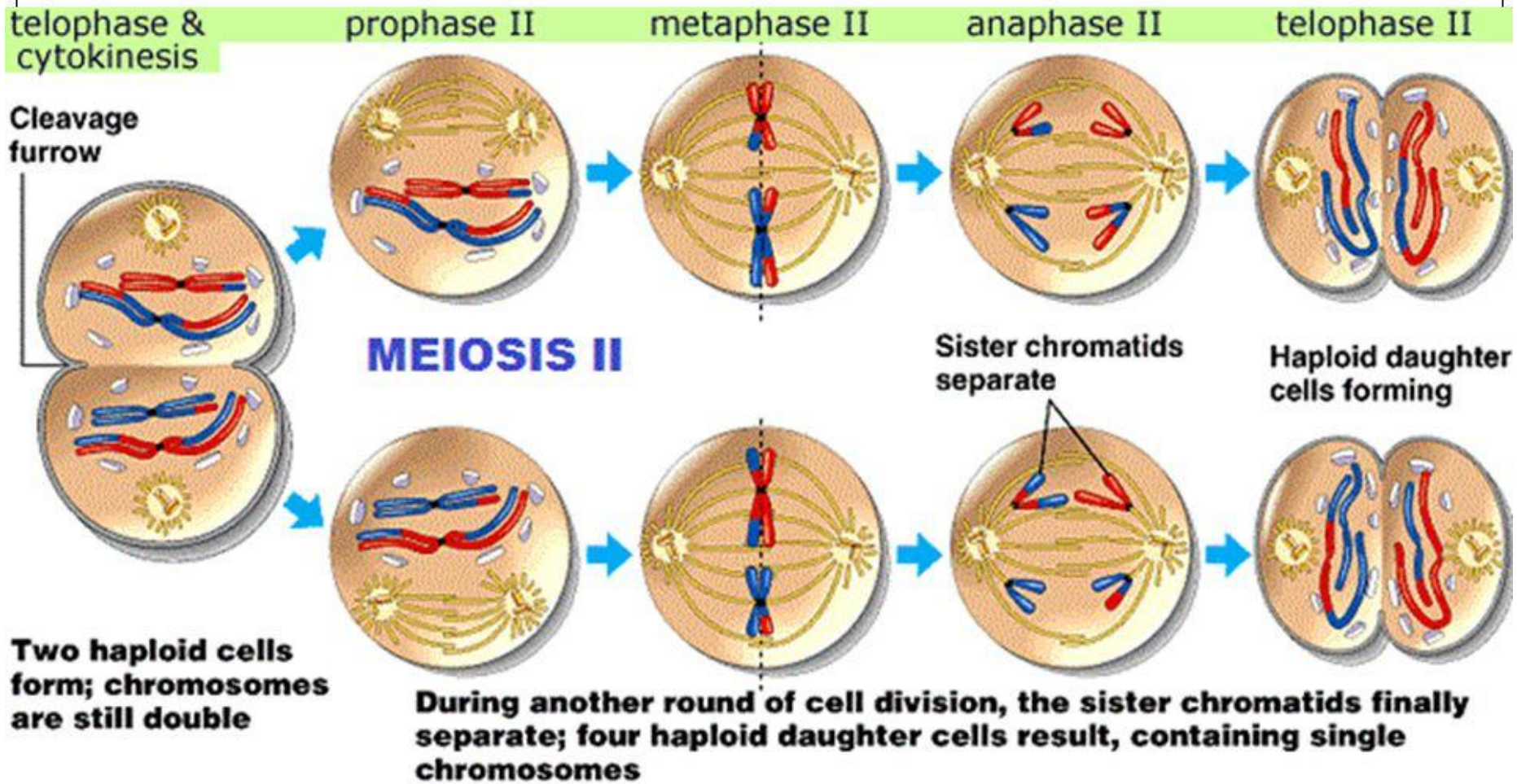

Meiosis I
interphase I
prophase I
metaphase I
anaphase I
Centrosomes (with centriole pairs)
Nuclear envelope
Chromatin
Chromosomes duplicate
Chiasmata
Spindle
Sister chromatids
Tetrad
Homologous chromosomes pair and exchange segments
Synapsis - pairing of homologs to form tetrad
Microtubule attached to kinetochore
Metaphase plate
Centromere (with kinetochore)
Tetrads line up
Sister chromatids remain attached
Homologous chromosomes separate
Pairs of homologous chromosomes split up


STAGES OF PROPHASE OF MEIOSIS I
LEPTOTENE
ZYGOTENE
PACHYTENE
DIPLOTENE
DIAKINESIS
Nuclear membrane
Bivalent forming
Chiasma
Nuclear membrane fragmenting
Synaptonemal complex forming
Replicated chromosomes condense.
Synapsis begins.
A bivalent has formed and crossing over has occurred.
Synaptonemal complex dissociates.
End of prophase I



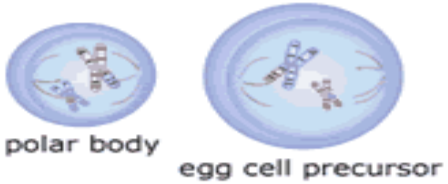
Crossing-over and recombination during meiosis

MEIOSIS II

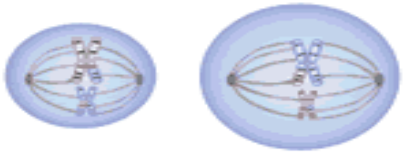

telophase & cytokinesis
prophase II
metaphase II
anaphase II
telophase II
Cleavage furrow
MEIOSIS II
Sister chromatids separate
Haploid daughter cells forming
Two haploid cells form; chromosomes are still double
During another round of cell division, the sister chromatids finally separate; four haploid daughter cells result, containing single chromosomes

Meiosis II in Females

Prophase II
chromosomes begin to condense
nuclear membrane dissolves
spindle fibers form

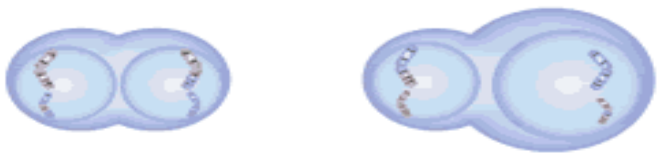


Metaphase II
spindle fibers attach to chromosomes
chromosomes line up in center of cell

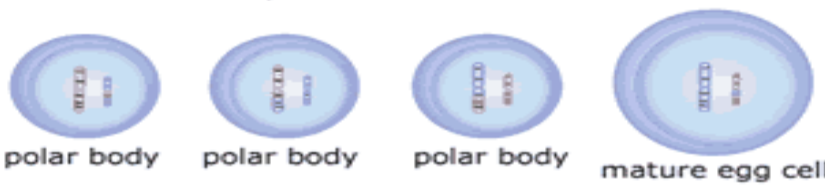


Anaphase II
centromeres divide and sister chromatids move to opposite ends of cell as spindle fibers shorten

Telophase II
chromosomes reach opposite ends
nuclear membrane forms

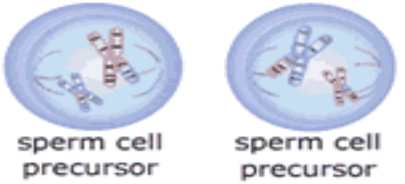


Cytokinesis
cell division occurs



Meiosis II in Males

Prophase II
chromosomes begin to condense
nuclear membrane dissolves
spindle fibers form



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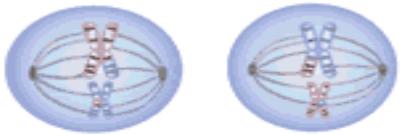

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Telophase II
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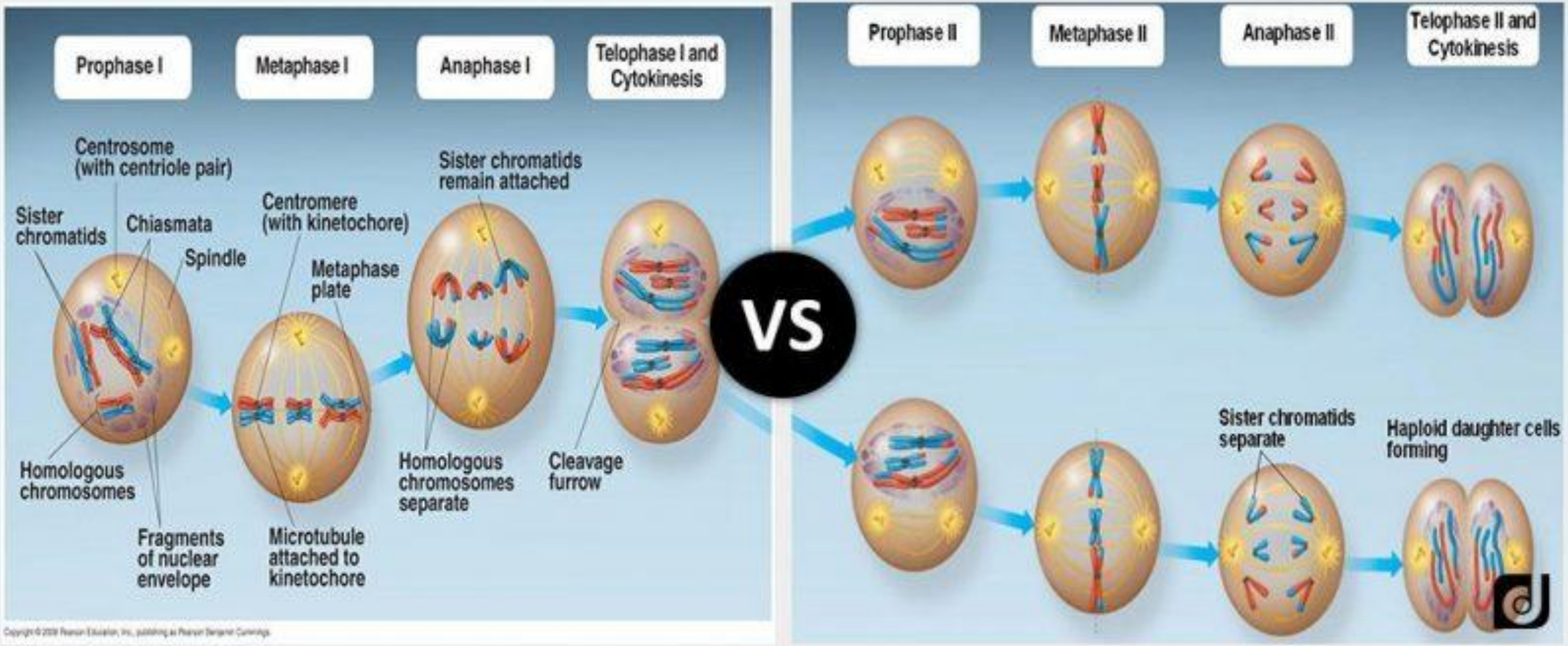

Meiosis I vs. Meiosis II

Interphase