

Genetics Review Cards Pt 1

Cell cycle/ Mitosis

- a. Reason for division- as cells increase in volume, the SA decreases and demand for material resources increases. This limits cell size.
- b. Cell cycle switches between interphase and cell division.
- c. Interphase has three phases: growth (G1), synthesis of DNA (S) and preparation for mitosis (G2).

- > The cell cycle is directed by internal controls or checkpoints. Internal (enzymes and promoting factors) and external signals (growth factors) provide stop and-go signs at the checkpoints. Ex. Mitosis-promoting factor (MPF)
- > Cancer results from disruptions in cell cycle control (too much division, defective tumor suppressor genes, overactive genes) which are a result of DNA damage to proto-oncogenes (regulatory genes) which make products like cyclins and cyclin-dependent kinases.

- > Cells spend different amounts of time in interphase or division. Nondividing cells may exit the cell cycle; or hold at a particular stage in the cell cycle.
- > Mitosis is used for growth and repair in animals; plants use mitosis to make gametes and for growth or repair

Meiosis & Variation

- > Meiosis (occurs after interphase) takes diploid cells and reduces the chromosome number to haploid. $2n \rightarrow 1n$.
- > During meiosis, homologous chromosomes are paired (one from mom and one from dad). The homologues are pulled apart and separated in meiosis I. A second division occurs in which the duplicated chromosomes are pulled apart.
- > Variation occurs in gametes during "crossing over," and fertilization because of all possible combinations of homologous chromosomes aligning during metaphase I.