# Review Sheet Cell Cycle & Reproduction
# Lester BIOL 150

**General things to do to prepare for the exam:**

- **study the PowerPoints**
- **write out the answers to the learning objectives found with each PowerPoint**
- **listen to my lecture recordings**

**Chapter 12**

Define cell division. Why do multicellular organisms depend on this?

Define: genome, chromosomes, sister chromatids, chromatin, somatic cells, gametes, and centromere.

Contrast mitosis with cell division (cytokinesis).

In terms of cells produced, how are mitosis and meiosis different?

Describe what occurs during the 5 phases of the cell cycle.

Describe what occurs during the 5 phases of mitosis.

Recognize these stages in microscope slides.

Compare and contrast cytokinesis in a plant cell vs. an animal cell.

Describe how the mitotic spindle, centrosome, aster, and kinetochores interact with each other.

What is the metaphase plate and how can you recognize it?

Which cell type produces a cleavage furrow? A cell plate?

Describe the process of binary fission. In what kinds of cells does it occur?

Describe density-dependent (contact) inhibition and anchorage dependence

What types of cells lose contact inhibition? In very general terms, how do these cells get created?

Compare and contrast benign, malignant, and metastatic tumors.

**Sample Test Questions**

Eukaryotic chromosomes are composed of which of the following macromolecules?
A) DNA and RNA B) DNA only
C) DNA and proteins D) DNA and phospholipids

Scientists isolate cells in various phases of the cell cycle. They isolate a group of cells that have 1 1/2 times more DNA than G1 phase cells. What is the most likely part of the cell cycle from which these cells were isolated?
A) between the G1 and S phases in the cell cycle B) in the G2 phase of the cell cycle
C) in the M phase of the cell cycle D) in the S phase of the cell cycle

G1 is associated with which of the following cellular events?
A) normal growth and cell function B) DNA replication
C) the beginning of mitosis D) break down of the nuclear membrane

The mitotic spindle plays a critical role in which of the following processes?
A) splitting of the cell (cytokinesis) following mitosis
B) triggering the compaction and condensation of chromosomes
C) dissolving the nuclear membrane
D) separation of sister chromatids

In what way do kinetochore microtubules facilitate the process of splitting the centromeres?
A) They use motor proteins to hydrolyze the centromere at specific arginine residues.
B) They create tension by pulling toward opposite poles.
C) They slide past each other like actin microfilaments.
D) They phosphorylate the centromere, thereby changing its conformation.

How is plant cell cytokinesis different from animal cell cytokinesis?
A) The contractile filaments found in plant cells are structures composed of carbohydrates; the cleavage furrow in animal cells is composed of contractile proteins.
B) Plant cells deposit vesicles containing cell wall building blocks on the metaphase plate; animal cells form a cleavage furrow.
C) The structural proteins of plant cells separate the two cells; in animal cells, a cell membrane separates the two daughter cells.
D) Plant cells divide after metaphase but before anaphase; animal cells divide after anaphase.

At which phase of the cell cycle do centrioles begin to move apart in animal cells?
A) anaphase B) telophase C) metaphase D) prophase

If a cell at metaphase of mitosis contains 20 sister chromatids, how many chromosomes will be present in a G1 cell?
A) 5 B) 10 C) 20 D) 40

Taxol is an anticancer drug extracted from the Pacific yew tree. In animal cells, Taxol prevents microtubule depolymerization. Thus, Taxol stops mitosis by interfering with which of the following structures or processes?
A) the mitotic spindle B) cytokinesis C) centriole duplication D) chromosome condensation

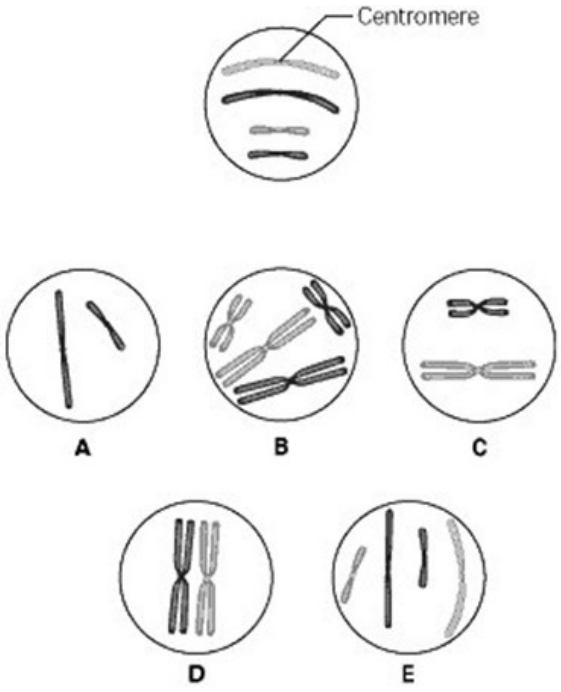
Movement of the chromosomes during anaphase would be most affected by a drug that prevents which of the following events in mitosis and cell division?
A) nuclear envelope breakdown B) elongation of microtubules
C) shortening of microtubules D) formation of a cleavage furrow

During which phase of mitosis do the chromatids become chromosomes?
A) telophase B) anaphase C) prophase D) metaphase

A cleavage furrow is _____.
A) a ring of vesicles forming a cell plate
B) the separation of divided prokaryotes
C) a groove in the plasma membrane between daughter nuclei
D) the space that is created between two chromatids during anaphase

Use the figure to answer the question below.

The unlettered circle at the top of the figure shows a diploid nucleus with four chromosomes that have not yet replicated. There are two pairs of homologous chromosomes, one long and the other short. One haploid set is black, and the other is gray. The circles labeled A to E show various combinations of these chromosomes.




What is the correct chromosomal condition for one daughter nucleus at telophase of mitosis?
A) B B) C C) D D) E

Which of the following events occurs during interphase of the cell cycle?
A) condensation of the chromosomes B) separation of the spindle poles
C) spindle formation D) replication of the DNA

Why do neurons and some other specialized cells divide infrequently?
A) They no longer have active nuclei. B) They have entered into G0.
C) They can no longer degrade cyclins. D) They no longer produce MPF.

Density-dependent inhibition is explained by which of the following processes?
A) As cells become more numerous, they begin to squeeze against each other, restricting their size.
B) As cells become more numerous, the cell surface proteins of one cell contact the adjoining cells, and they signal each other to stop dividing.
C) As cells become more numerous, the protein kinases they produce begin to compete with each other, such that the proteins produced by one cell essentially cancel those produced by its neighbor.
D) As cells become more numerous, the level of waste products increases, which slows metabolism and inhibits growth.

One difference between cancer cells and normal cells is that cancer cells
A) are unable to synthesize DNA.
B) are arrested at the S phase of the cell cycle.
C) continue to divide even when they are tightly packed together.
D) cannot function properly because they are affected by density-dependent inhibition.