**STUDY GUIDE NUCLEUS AND MITOSIS**

**VOCABULARY**

Structures/structural components:

Euchromatin Heterochromatin Mitosis

Cytokinesis Nucleolus Nuclear membrane

Nuclear pore RNA (m, t, &r) Kinetochore

Karyokinesis Gene Intron

Exon Nucleoplasm Fibrous Lamina

**OBJECTIVES AND QUESTIONS**

1. Be able to name and describe the arbitrarily designed staged of mitosis.
2. Be able to name and describe the arbitrarily designated stages of the cell cycle. What is happening during each stage with respect to RNA (and therefore protein) and DNA synthesis? Note that DNA synthesis (chromosome replication) does not happen during the M phase. When does it happen?
3. What is the difference in the chromatin pattern (eu vs. hetero) in metabolically active cells vs. quiescent cells during interphase? Don’t memorize this – think about it! What does DNA have to do to be transcribed? (Hint: uncoil). Can tightly coiled (hetero) chromatin be transcribed or replicated in that form?
4. What are the basic components of a ribosome? (Hint: rRNA and protein, Svedberg sedimentation coefficients of subunits). Where is the rRNA made? Where is the protein made? (Hint: see study question 1 on RER). Where is the rRNA made? Where is the ribosome assembled?
5. What is the difference between nucleic acid composition of DNA and RNA? (Hint: T vs. U).
6. What is the structure of the nuclear envelope? Why is nuclear envelope probably a better term than nuclear membrane? What is the space between the inner and outer nuclear membranes continuous with?
7. What cytoskeletal component is most important in movement of chromosomes during mitosis? What cytoskeletal component forms the contractile ring during telophase?
8. What is the nuclear (fibrous) lamina? Where is it located? What type of cytoskeletal component is it composed of? What is its function? (Hint: the nuclear lamina is a thin shell of intermediate filaments which supports the inner nuclear membrane).
9. What does the appearance of the prominent and numerous nucleoli tell you about the metabolic activity of a cell? Knowing this, what do you think the prognosis is for a patient with a tumor that has cells with prominent nucleoli vs. one with cells with distinct nucleoli? (Hint: poor prognostic sign).