Name_____

Control of the Cell Cycle/Checkpoints/Cancer

Directions—Answer the following questions in your notes to keep as your preparation for our assessment over this unit.

1. What are the two most important cyclins that regulate a cell's progression through the cell cycle?
2. When do each type peak and then wane during the cell cycle?
3. Cyclins act by binding to kinases, what are kinases? and how do they activate enzymes?
4. Describe the relationship and activity of mitotic cyclins and kinases in G2 of the cell cycle and the sequence of necessary cell processes that occur through the phases of mitosis. How are cyclins broken down appropriately?
5. Identify two problems that could occur during the cell cycle that would need to be corrected before a cell progressed further through the cell cycle.
6. Provide a brief description of what is meant by checkpoint controls of the cell cycle as well as what is meant by cell-cycle arrest.
7. What specific role does the human protein p53 (coded for by the p53 gene) have in cell cycle arrest?

For the following items, closely study the Focus On—Cancer passage on page 228.

8. Uncontrolled cell growth can lead to the development of a tumor, what are two dangerous effects of tumor growth.

As a means to supplement the text description of cancer, consider that cells should have an important ability called, *contact inhibition*. Contact inhibition, in short, is the ability for cells to appropriately stop dividing when in contact with other cells. When neighboring cells die, it becomes appropriate for cells to divide to take the place of those that are lost. Contact inhibition is an ability, in part, that occurs due to the presence of membrane proteins that react with membrane proteins on other cells, essentially to inhibit the continuation of the cell cycle when in contact with the membrane proteins of other cells and to not inhibit the continuation of the cell cycle when not in contact.

In this context, recognize from the text passage that there two pathways acting in a G0 cell, one promoting cell division (proto-oncogenes) and one that inhibits cell division (tumor suppressors)

9. What is the term that describes mutated proto-oncogenes and what effect does such a mutation have on the cell cycle?
10. If a proto-oncogene is mutated, does the cell become cancerous? By what circumstance might a mutated proto-oncogene develop into a cancer, completely develop your answer.