



## THE EUKARYOTIC CELL CYCLE AND CANCER

### ABOUT THIS WORKSHEET

This worksheet complements the Click and Learn “The Eukaryotic Cell Cycle and Cancer” developed in conjunction with the 2013 Holiday Lectures on Science, “Medicine in the Genomic Era” (<http://www.hhmi.org/biointeractive/eukaryotic-cell-cycle-and-cancer>).

### PROCEDURE

Follow the instructions as you proceed through the Click and Learn and answer the questions in the spaces below.

Click on the “Background” tab on the right side.

1. Compare and contrast the reasons cell division is important for unicellular and multicellular organisms.

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2. Provide an example of why cell division remains important to an adult organism even after it is fully developed.

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3. What is the role of growth factors?

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4. Cells divide, differentiate, or die. What is differentiation?

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5. What is apoptosis? Explain its purpose.

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6. Organisms maintain the right number of cells by regulating the cell cycle. What are “cell cycle regulators”?

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7. Watch the video clip of cell division in the small intestine. Name the general location along the villus where the following processes occur:

Cell Division: \_\_\_\_\_

Cell Differentiation: \_\_\_\_\_

Apoptosis: \_\_\_\_\_



8. Name one harmless result of too little cell division.

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9. Name one harmless result of too much cell division.

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Click on "Cell Cycle Phases" in the center purple circle on the right and use the "Overview" information in the window on the left to answer the questions below.

10. List, in order, the four events we collectively call the "cell cycle." Next to each event, write the correlating cell cycle phase name.

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

11. In general, what is the purpose of a checkpoint in the cell cycle?

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12. What is one potential outcome when errors occur in this highly regulated cell cycle process?

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Click on "Cell Cycle Regulators and Cancer" in the center purple circle on the right. Use the information under "Regulators Overview" in the window on the left to answer the questions below.

13. What type of protein that regulates the cell cycle is encoded by proto-oncogenes?

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14. What type of protein that regulates the cell cycle is encoded by tumor suppressor genes?

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15. The most important cell cycle regulators are the \_\_\_\_\_.

16. What is a kinase, and what does it do?

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17. When are cyclin-dependent kinases (CDKs) present inside the cell during the cell cycle?

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