

## Online Activity Worksheet 9.2

### ***The cell cycle multiplies cells.***

*Examine stages in the cell cycle.*

**PAGE 1 OBJECTIVE:** to examine stages in the cell cycle

Biologists study how cells grow and divide in a process called the cell cycle. This process is almost identical in all eukaryotic cells, from yeast to humans. In the cell cycle, the cell undergoes four main processes: growth, replication of DNA, mitosis, and division. As you will see in the activity, these processes are regulated at several checkpoints.

- Click **start** to see the cell cycle. The cycle will become linear so that you can clearly view the stages.
- In  $G_1$  the cell grows and carries out its cellular functions. At the end of  $G_1$ , it reaches a checkpoint. Check each box to see if these conditions have been met. If so, click **continue**.
- During the S phase, the nucleus enlarges as the hereditary material in the nucleus replicates in preparation for cell division. Following S, the cell continues on to the  $G_2$  phase where it grows and prepares for cell division. At the end of  $G_2$ , the cell reaches a checkpoint. Check each box to see if these conditions have been met. If so, click **continue**.
- In M, the cell undergoes mitosis (nuclear division) and cytokinesis (cytoplasmic division). The cell cycle ends with the production of two genetically identical daughter cells. Now each new cell will begin its own cycle.

Now answer the following questions in the spaces provided.

1. What three conditions must most cells meet before they enter the S phase of the cell cycle?

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2. Why does the nucleus enlarge during the S phase?

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- 3.** If the cell meets all the criteria at each of its checkpoints, it finally enters the M phase. Describe what happens during this final stage of the cell cycle.

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- 4.** Do all cells complete the cell cycle or go through it at the same rate? Explain.

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**PAGE 2 OBJECTIVE:** to investigate the rate of human cell division

You are made up of over 10 trillion cells and have about 200 different types of cells. Each cell type has a specific job to do. Some of these jobs, like fighting infection, depend on a fresh supply of cells. Other jobs, such as conducting nerve impulses, rely on permanent cells. The rate at which a cell goes through the cell cycle is programmed within the cell. In this activity, you will observe how long it takes some human cells to go through the cell cycle.

Roll over the image to locate some cells and learn about them.

Now answer the following questions in the spaces provided.

- 1.** Predict where in the cell cycle a neuron would remain throughout its lifetime.

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- 2.** Hypothesize why stomach cells reproduce rapidly, while neurons seldom reproduce, if at all.

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