

NAME: _____ DATE: _____

The Cell Cycle

Go to Cells Alive at http://www.cellsalive.com/cell_cycle.htm watch the animation and read the explanations to fill in the blanks.

During development from stem to fully differentiated, cells in the body alternately divide (mitosis) and "appear" to be resting (interphase). This sequence of activities exhibited by cells is called the _____ (1).

Interphase, which appears to the eye to be a resting stage between cell divisions, is actually a period of diverse activities. Those interphase activities are indispensable in making the next mitosis possible.

1. Interphase: Interphase generally lasts at least _____ (2) to _____ (3) hours in mammalian tissue. During this period, the cell is constantly synthesizing RNA, producing protein and growing in size. By studying molecular events in cells, scientists have determined that interphase can be divided into 4 steps: _____ (4) (G0), _____ (5) (G1), S _____ (6) phase, _____ (7) (G2).
 - a. Gap 0 (G0): There are times when a cell will leave the cycle and quit dividing. This may be a temporary resting period or more permanent. An example of the latter is a cell that has reached an end stage of development and will no longer divide (e.g. neuron).
 - b. Gap 1 (G1): Cells increase in size in Gap 1, produce _____ (8) and synthesize _____ (9). An important cell cycle control mechanism activated during this period (G1 Checkpoint) ensures that everything is ready for _____ (10). (Click on the Checkpoints animation, above.)
 - c. S Phase: To produce two similar daughter cells, the complete DNA instructions in the cell must be duplicated. DNA replication occurs during this _____ (11) phase.
 - d. Gap 2 (G2): During the gap between DNA synthesis and mitosis, the cell will continue to _____ (12) and _____ (13) new proteins. At the end of this gap is another control checkpoint (G2 Checkpoint) to determine if the cell can now proceed to enter _____ (14) and divide.

2. Mitosis or M Phase: _____ (15) and _____ (16) production stop at this stage in the cell cycle. All of the cell's energy is focused on the complex and orderly division into _____ (17) similar daughter cells. _____ (18) is much shorter than interphase, lasting perhaps only one to two hours. As in both G1 and G2, there is a Checkpoint