

CANCER & CELL CYCLE PRACTICE

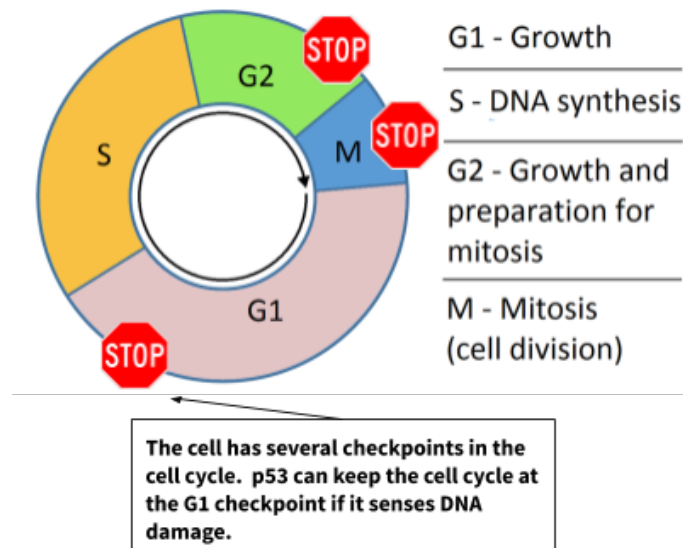
Part I: Intro to Cancer

Name: _____

Cell Cycle and Cancer

Cancer often occurs when the cell growth exceeds the rate at which cells die, so that cells are dividing uncontrollably. This uncontrollable growth can occur due to issues with the regulation of the cell cycle. If damaged or mutated cells do not die and move through the cell cycle, they may accumulate mutations. Mutations mostly occur in proto-oncogenes and tumor suppressor genes. Tumor suppressors, such as p53 and the retinoblastoma protein (RB), function to suppress the cell cycle, promote apoptosis, or both. Oncogenes, such as BRCA1 and BCL2, increase cell production, or prevent apoptosis. The tumor suppressor p53 is found mutated in almost 50% of all tumors. Another example is the BCL2 oncogene, which is involved in some types of leukemia and lung cancer. By understanding the cell cycle and how it is regulated, scientists can have a better understanding of cancer and determine which types of therapies might be most effective. Under normal conditions, growth-regulating mechanisms exist to maintain homeostasis. Homeostasis within a cell is regulated by the balance between growth and apoptosis. If there is a disturbance in the balance between cell growth and death, cancer may occur. Cancer cells do not properly respond to signals that normally tell a cell to grow, differentiate, or die.

The above passage is modified from www.creativebiomart.net/researcharea-cell-cycle-proteins_33.htm



The four phases of the cell cycle. G1 - the initial growth phase. S - the phase in which DNA is synthesized. G2 - the second growth phase in preparation for cell division. M - mitosis; where the cell divides to produce two daughter cells that continue the cell cycle. Modified from an image created by Simon Caulton



Describe the role of the tumor suppressors in the cell cycle:

Describe the role of Oncogenes in the cell cycle:

How could scientists use information about the cell cycle to help develop therapies to slow the progression of cancer?

What questions do you have about this topic?

