AP Biology **Name** _____

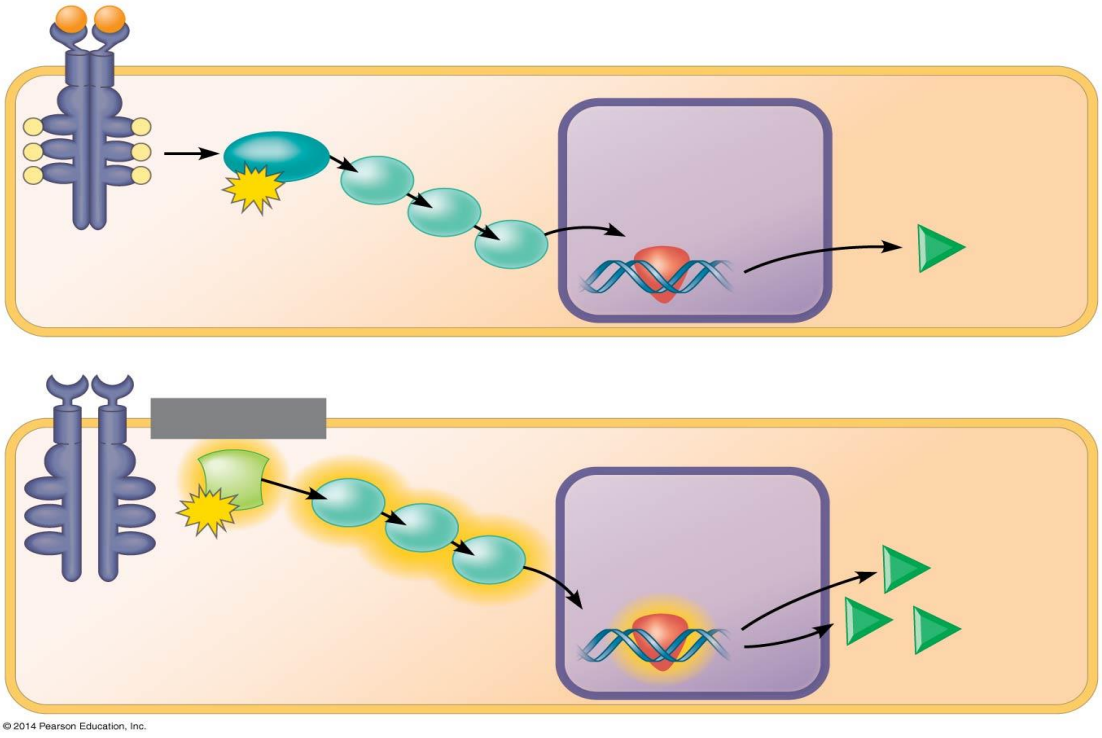
Chapter 18.5 Guided Reading: Regulation of Gene Expression 10ed.

1. Mutations that alter growth factors, their receptors, or intracellular signaling pathway molecules, or affect regulation of the cell-cycle, can lead to cancer in somatic cells. Therefore, genetic mutation is the mechanism involved in the beginning of tumor growth. What can lead to these cancer-causing mutations?

2. Compare *oncogenes* and *proto-oncogenes.*

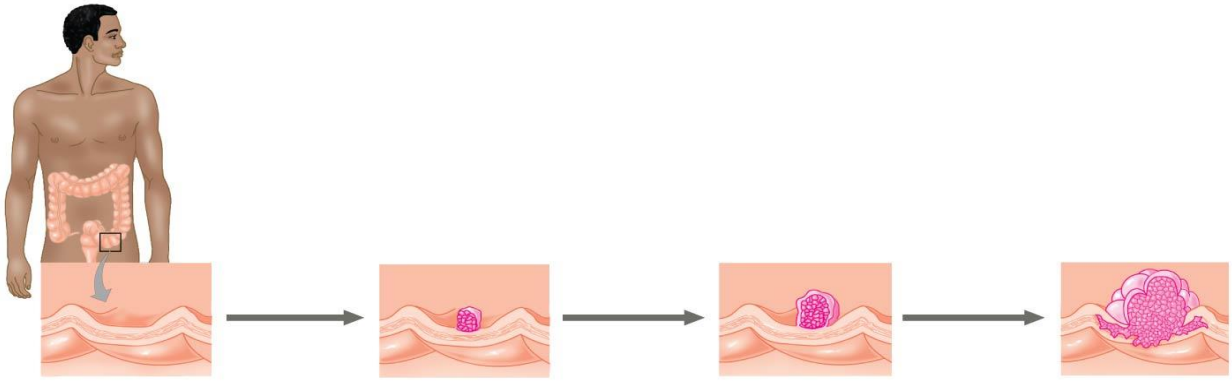
3. What are three mechanisms for converting a proto-oncogene to an oncogene?

4. There seem to be two categories of genes involved in cancer: *oncogenes,* which code for proteins to regulate cell growth, and should not be stuck "on," much like the accelerator in a car; and *tumor-suppressor genes,* which work like the brakes on a car and must function. Let's begin with the look of the *ras* gene, which codes for a G protein and is an *oncogene.* Label the following sketch to explain how a *ras* mutation leads to cancer.



5. *Tumor-suppressor genes* help prevent uncontrolled cell growth. One that is found mutated (and therefore nonfunctional) in more than 50% of a human cancer is *o53.* So important is the *p53* gene that it is sometimes called the "guardian angel of the genuine." Describe the double whammy that results from mutations of *p53.*

6. Explain the *misstep model of cancer development* by using the specific example of colorectal cancer. Use the following figure to label the five mutation levels leading to this form of cancer.



7. You probably know someone who has been treated for breast cancer. Did you realize there were genetically distinct types? Why is it not surprising that signal receptors are over-expressed in most types of cancer?

8. Why do Tamoxifen and Herceptin not work against Basal-like breast cancer?

9. Why is said that people inherit predispositions to cancer not cancer itself?

10. Describe the role of viruses in cancer.

11. Give 2 specific viruses and their associated cancers.