AP Biology **Name** _____

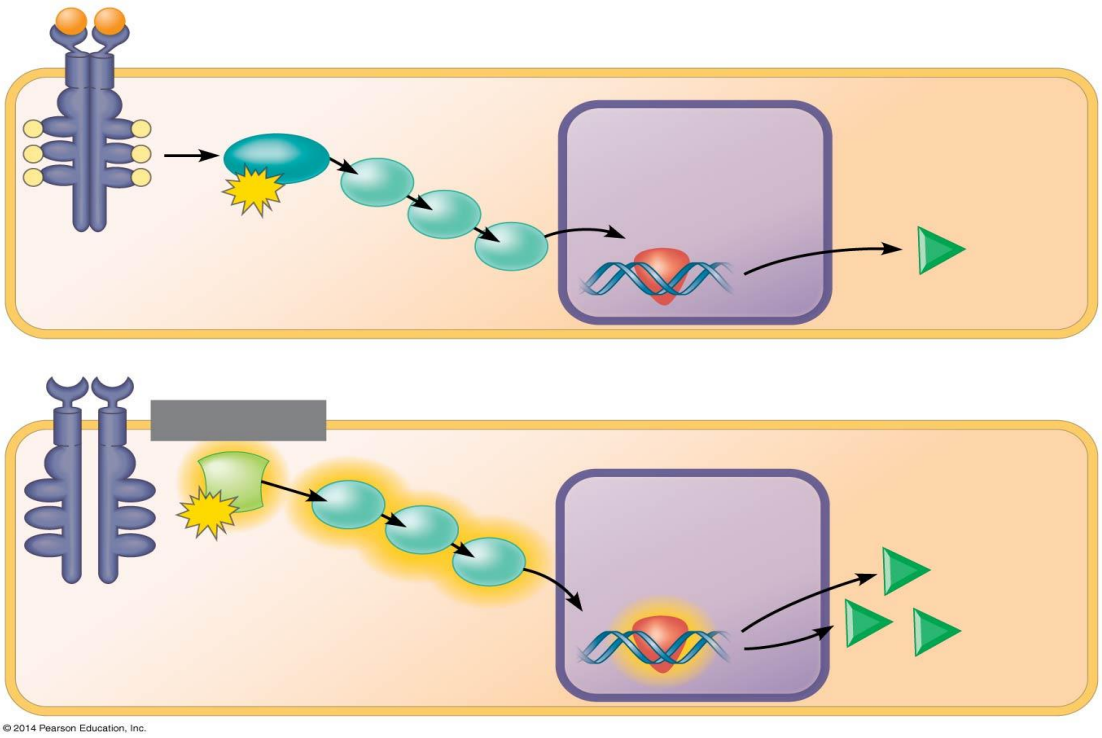
Chapter 18.5 Guided Reading: Regulation of Gene Expression 10ed.

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 <u>three</u> mechanisms for converting a proto-oncogene to an oncogene?

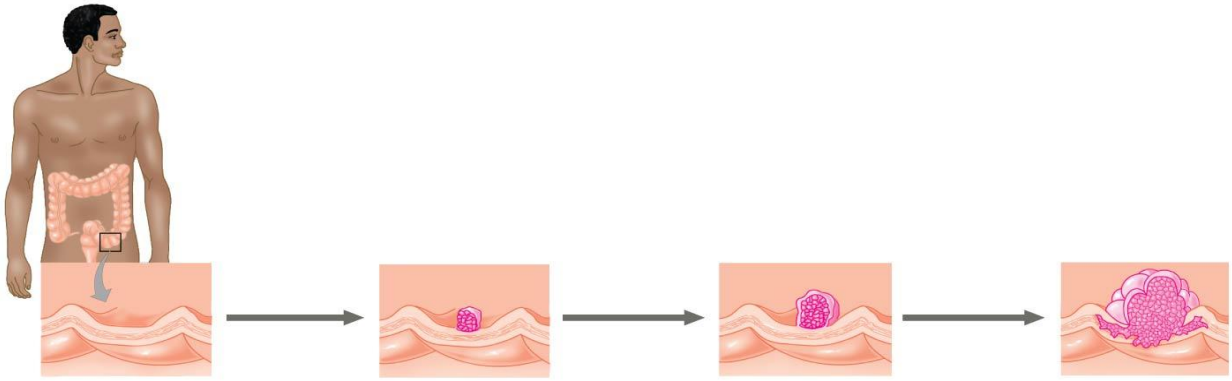
4. There seem to be two categories of genes involved in cancer: *oncogenes,* which code for proteins to regulate cell growth, and should not be stuck "on," much like the accelerator in a car; and *tumor-suppressor genes,* which work like the brakes on a car and must function. Let's begin with the look 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.



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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 *p53.* So important is the *p53* gene that it is sometimes called the "guardian angel of the genome." **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.



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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 <u>2</u>** specific viruses **and** their associated cancers.