CONCEPT: CANCER MUTATIONS

● Cancer develops after multiple _____ accumulate in one cell

□ **Passenger mutations** have no direct contribution to the cancer

□ **Driver mutations** provide the cancer cell a way to grow aberrantly

● There are two classes of cancer mutations

□ **Oncogenes** are mutant alleles that act dominantly

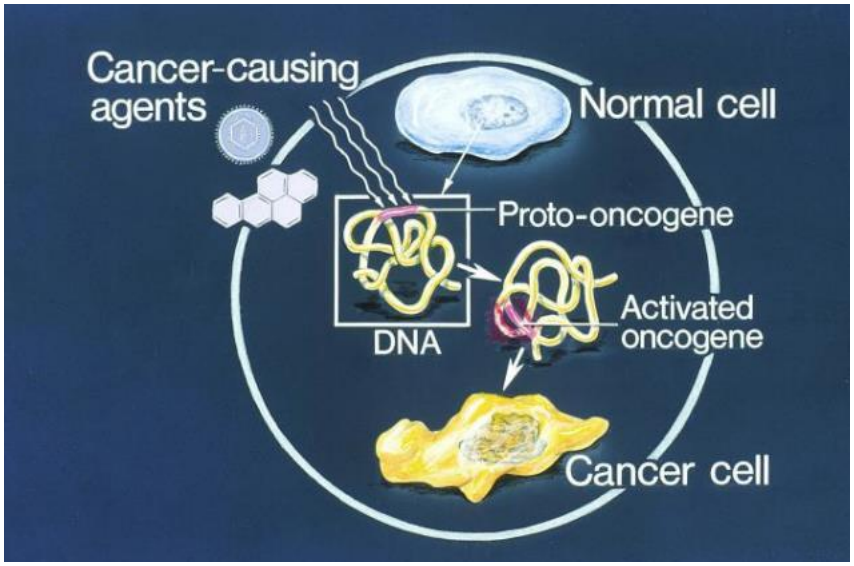
- **Proto-oncogenes** are the wild-type alleles that become oncogenes when mutated

- Ex: *Ras* GTPase, and Human Papillomavirus E6 and E7 proteins

□ **Tumor suppressors** are alleles whose normal function is to stop cell division

- Ex: Retinoblastoma, p53 transcription factor

EXAMPLE:



PRACTICE:

1. A mutation in a tumor suppressor gene causes what to happen?
    a. The mutated tumor suppressor acts to suppress the tumor
    b. The mutated tumor suppressor can no longer act to suppress the tumor, and allows tumor growth
    c. The mutated tumor suppressor has no direct contribution to the cancer

2. True or False: Proto-oncogenes are mutated versions of oncogenes
    a. True
    b. False

3. Which of the following proteins is an example of a tumor suppressor?
    a. *Ras* GTPase
    b. HPV E6 protein
    c. p53 transcription factor