Virtual Learning

Medical Interventions

April 6, 2020

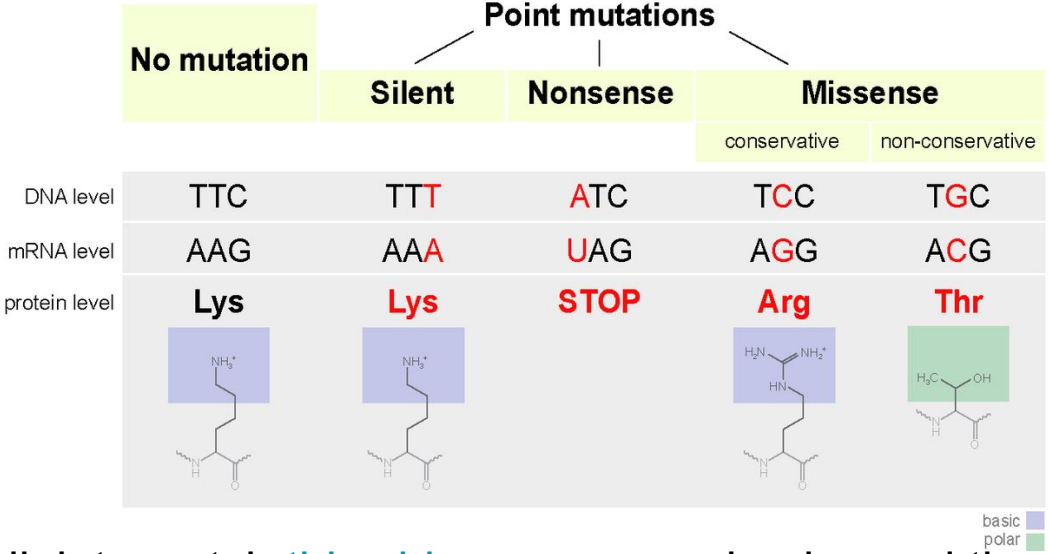
Medical Interventions
Lesson: April 6, 2020

Objective/Learning Target:

Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.

Let's Get Started:

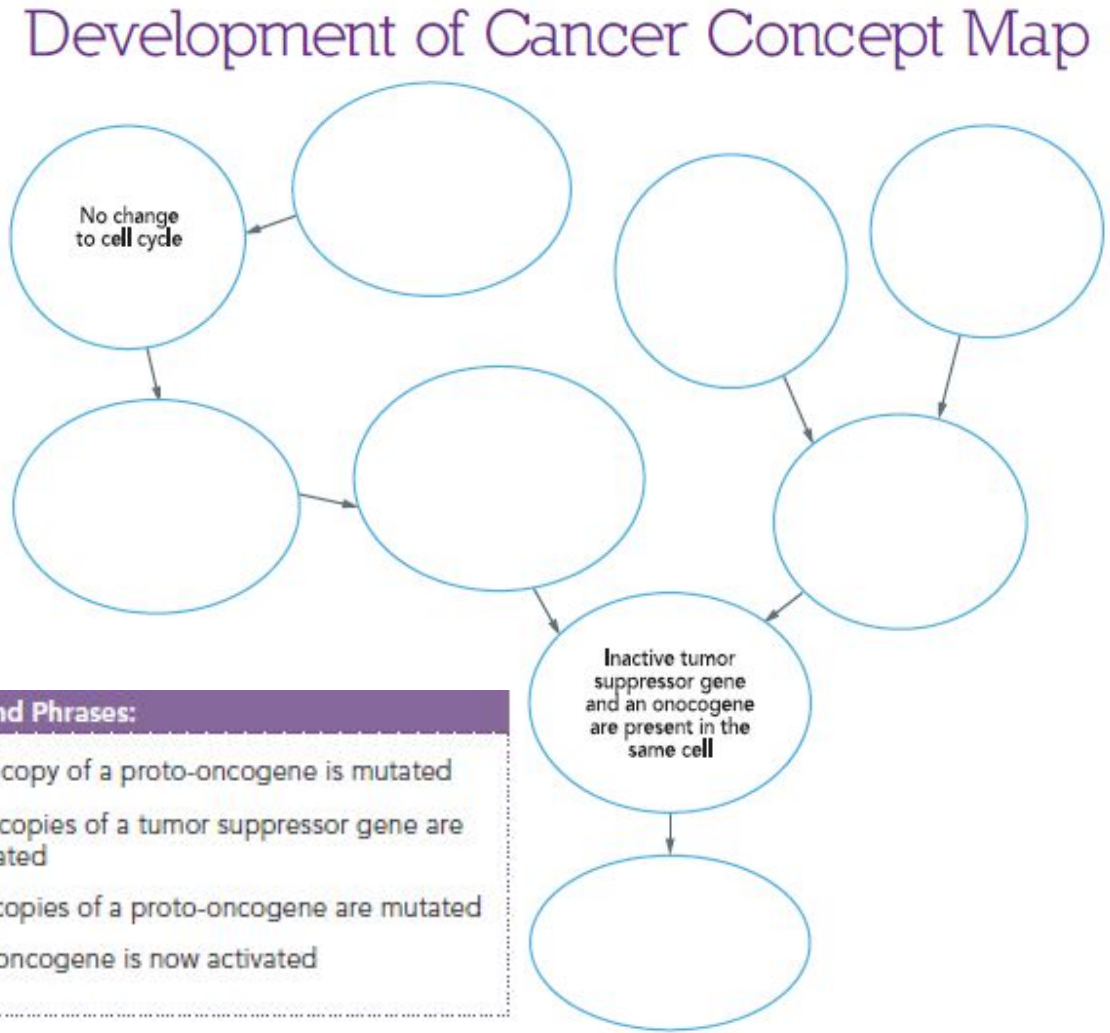
1. Use the picture below to describe what a mutation is and its effect on the protein.



2. Click on the link to watch this video on cancer basics and the cell cycle.
3. Write your own unique definition of cancer in your notebook or on a piece of paper.

Activity

In your notebooks or on a sheet of paper, copy the concept map to the right and place the correct statement from the table below onto the concept map.

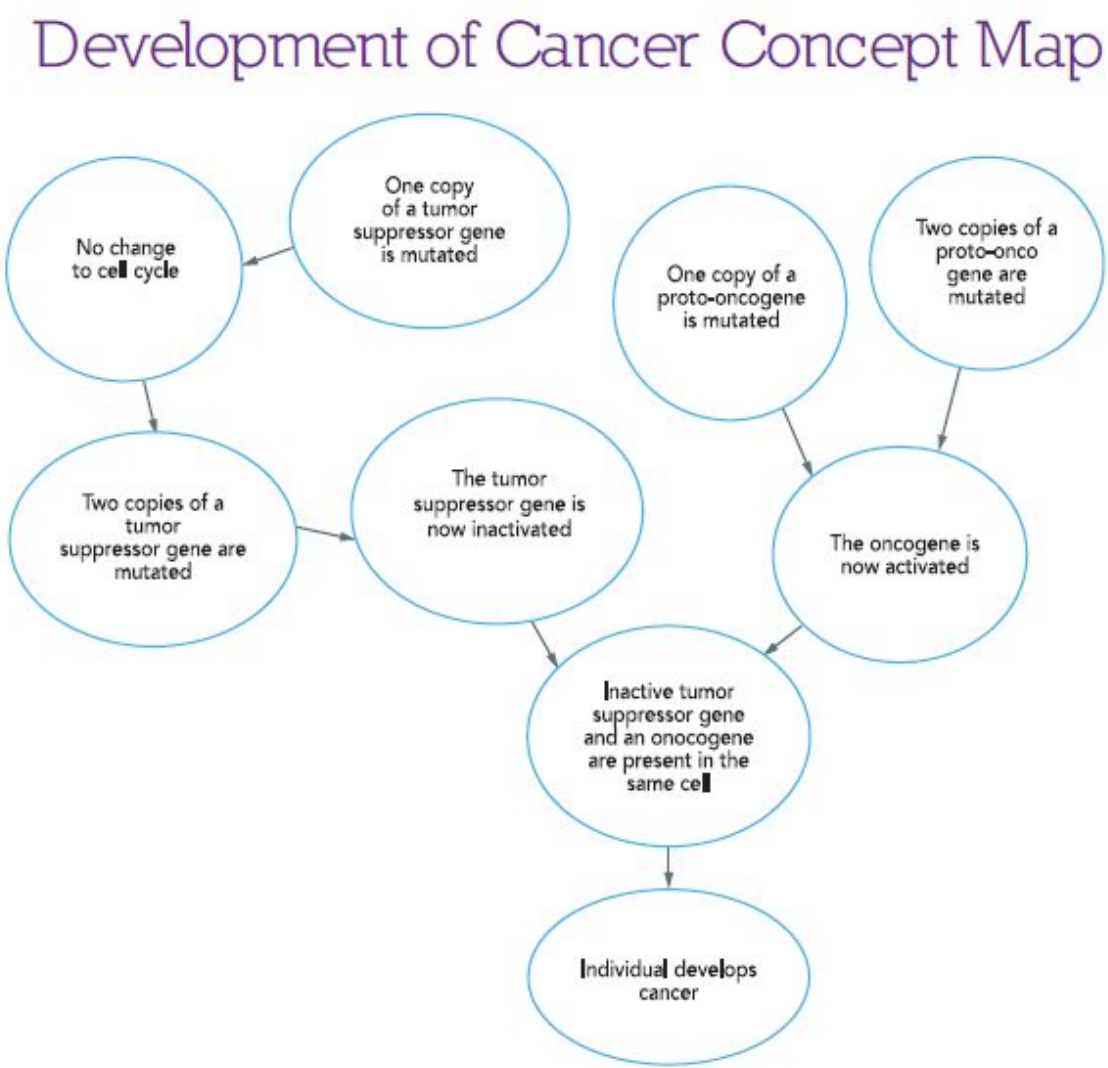


Concept Map Key Words and Phrases:	
a. the tumor suppressor gene is now inactivated	d. one copy of a proto-oncogene is mutated
b. individual develops cancer	e. two copies of a tumor suppressor gene are mutated
c. one copy of a tumor suppressor gene is mutated	f. two copies of a proto-oncogene are mutated
	g. the oncogene is now activated

Activity - Answers

Remember:

Proto-oncogenes are like the “gas pedal” of a car in that they keep the cell dividing. Tumor suppressor genes act like the “brakes” of the car to slow down the cell cycle.



Practice

Indicate whether cancer would likely develop in a patient with the following scenarios. Explain why or why not.

1. A patient has a 1 mutated copy of Proto-oncogene and 2 mutated copies of tumor suppressor genes.
2. A patient has an inactive oncogene and 2 mutated copies of tumor suppressor genes.
3. A patient has an inactive oncogene and an inactivated tumor suppressor gene.
4. A patient has an active oncogene and 1 mutated copy of tumor suppressor gene.
5. A patient has 2 mutated copies of Proto-oncogene and an inactivated tumor suppressor gene.

Practice Answers

1. Yes - activated oncogene and inactivated tumor suppressor
2. No - no active oncogene to drive cellular growth
3. No - no active oncogene to drive cellular growth
4. No - tumor suppressor gene still active with only 1 mutated copy
5. Yes - activated oncogene and inactivated tumor suppressor

Additional Practice

1. Using your completed concept map, explain how cancer might develop in a person in 1 paragraph in your notebooks or on a sheet of paper. Be sure to include the following terms:
    - Mutation
    - Cell cycle
    - Proto-oncogene
    - Tumor suppressor gene
2. Check your understanding by creating a model that explains the relationship between the cell cycle and the development of cancer. Your model can be an illustration, a video explanation, or a physical representation.

Additional Resources

Review the following website for more detail on how cancer might develop with epigenetic factors:

- https://www.cancerprogressreport.org/Pages/cpr19-how-cancer-develops.aspx

For cancer projections in 2020, check out this release from the Centers for Disease Control:

- https://www.cdc.gov/cancer/dcpc/research/articles/cancer_2020.htm