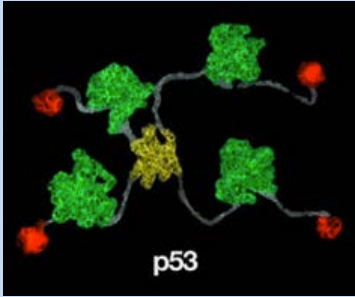


The p53 Gene and Cancer



About This Worksheet

This worksheet complements the Click and Learn “The p53 Gene and Cancer” developed in conjunction with the 2003 Holiday Lectures on Science, “Learning from Patients: the Science of Medicine.”

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Answer the following questions as you proceed through the activity slides.

1. On slide 1, “p53” is referred to as a molecule, a protein, and a gene; it is also referred to as being mutated. In your own words, and based on your knowledge of molecular genetics, how are these terms related?

2. Define the following terms:

a. Oncogene: _____

b. Tumor suppressor gene: _____

c. DNA repair gene: _____

3. Based on the information on slide 2, how is p53 related to oncogenes and tumor suppressor genes?

4. Watch the video clip on slide 2 and answer the following questions:

a. How is a mutated oncogene analogous to a 100-pound weight on the gas pedal in a car?

b. How does the car analogy apply to a mutated tumor suppressor gene?

c. What is required for a cell to “spin out of control”?

5. What three conditions or factors activate p53 to shut down cell division?

6. Why is p53 called the “guardian of the genome”?

7. The p53 protein contains three domains. In your own words, what is the function of each domain?

a. Transactivation domain: _____

b. DNA binding domain: _____

c. Complexing domain: _____

8. What is a transcription factor?

9. Based on the information given in slides 3 and 5, for what set of genes does p53 act as a transcription factor?

10. What are the two roles of Mdm2?

11. Watch the video clip on slide 6 and answer the following questions:

a. What is the purpose of ubiquitin?

b. What is the role of the proteasome?

12. Hypothesize how Mdm2 “tags” p53 for degradation.

13. Read slide 7 and watch the animation. Answer the following:

a. How does p53 “turn on” transcription?

b. Name two cell processes that are regulated by p53?

c. Cancer can be defined as “uncontrolled cell division.” Based on this definition, explain how mutations in the p53 gene play a role in cancer.

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