

## Science Time

### Program Content for December 7, 2016

Read the article “‘Collateral damage’: Drugs attack cancer - and organs ” on page A2 of the Sunday, December 4, 2016 edition of The Seattle Times.

#### **Objective**

- I can explain the benefits and risks of immunotherapy drugs.

#### **Next Generation Science Standards (NGSS) connection**

##### *Disciplinary Core Ideas*

- Systems of specialized cells within organisms help them perform the essential functions of life.
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.

**Pre-reading and Vocabulary:** Define each term and then use it in a sentence to demonstrate your understanding.

1. melanoma
2. immune system
3. oncologist
4. tumor
5. pancreas

#### **Comprehension Questions**

1. Why did Chuck Peal appear to be dying in early September?
2. What type of cancer drugs had Chuck Peal been treated with prior to his severe illness?
3. How did the new drugs that Chuck Peal had been treated with work?
4. What disease did immunotherapy cause to occur in Chuck Peal?
5. How much money do some immunotherapy drugs cost per year?
6. How did Peal's body respond on August 30 after taking the immunotherapy drugs Nivoluma and Ipilimumab?
7. What happened the next day?
8. What was the name of the condition that Peal suffered from during his reaction to the immunotherapy drugs he received?
9. How has Peal's diagnosis and patients with similar reactions change the way Type 1 diabetes is categorized?
10. Describe the 2 results of the initial experiments involving immunotherapy treatments.
11. What happened during the TeGenero tragedy?
12. Why are some doctors in favor of continuing to use immunotherapy drugs instead of chemotherapy?

#### **Prompts and Extensions**

1. Immunotherapy drugs target your immune system. Learn or refresh your memory about how this body system works [here](#).
2. Watch this [animation](#) on how immunotherapy drugs work against cancer cells. Here's another [video clip](#) as explained by doctors.

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3. In the article both Chuck Peal (a patient) and multiple doctors voice their support for immunotherapy. Do you agree with their opinions? Why or why not? Provide evidence and reasoning for your response.