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Cancer biology

with Dr. Kelsey Fisher-Wellman

Talking *points*

Knowledge

1. What is acute myeloid leukemia (AML)?
2. What are the functions of mitochondria?

Comprehension

3. How do blood cancers differ from other cancers?
4. What does Kelsey's mitochondrial diagnostics tool allow him to do?

Application

5. AML symptoms include tiredness and shortness of breath, vulnerability to infection, and excessive bleeding when injured. Given what you have learned about blood cells and the biology of AML, why do you think people with AML display these specific symptoms?
6. How do you think future AML treatments could target the abnormalities in AML cells' mitochondria?

Analysis

7. Mitochondria contain their own DNA, separate from the DNA found in the cell's nucleus. Do you think studying the mitochondrial DNA (mDNA) of AML cells could help develop new treatments? Justify your answer.

Evaluation

8. In the future, do you think scientists will be able to eliminate cancer? Why or why not? Justify your answer using your own knowledge and information from the article.
9. Kelsey notes that people from unconventional career paths often lead innovations in cancer biology. How many different professions and fields of research can you think of that could contribute to advances in cancer biology? For each one, explain your reasoning.

Let us know what you think of this educational and career resource.
To provide input, simply scan the QR code or use this link:
redcap.school.wakehealth.edu/surveys/?s=NPK347RYHCR3FNDC

Activity

Cancer treatments are constantly advancing. Choose a type of cancer, such as leukemia (a type of blood cancer), melanoma (a type of skin cancer), or colorectal cancer (a type of gastrointestinal cancer), and search online to learn more about its causes, symptoms, and treatments. Use reputable scientific sources such as the National Cancer Institute (**cancer.gov/types**) or the American Cancer Society (**cancer.org/cancer/types**).

Divide a large piece of paper into three equal parts and design a poster that fills them with the following information for your chosen cancer:

- A treatment that has been in use for some decades.
- A treatment that has been rolled out within recent years.
- An emerging treatment that has not yet been rolled out but shows promise (or a suggested treatment idea that scientists believe could help patients).

For each treatment, use annotated diagrams to show how it works, for example by targeting then destroying or inhibiting the cancerous cells. Depending on what the treatment targets, this may also involve diagrams that explore aspects of cell biology, such as genetic mutations, the cell cycle, or cellular functions.

While creating your poster, think about the following:

- What key messages or information do you want to convey?
- How can you make your poster understandable and engaging for a wide audience while maintaining scientific accuracy?
- Which details and facts are most important to include, and which can be omitted?
- How can you use illustrations, color, and text to engage the viewer?

Once you have finished, compare your poster with a classmate who investigated a different type of cancer. Discuss the similarities and differences in approaches to cancer treatment over the years and for different types of cancer.

More *resources*

- Visit Kelsey's Futurum webpage to read his article in Spanish and to find an animation, podcast, and PowerPoint about his work: **futurumcareers.com/cancer-biology-with-dr-kelsey-fisher-wellman**
- The American Cancer Society describes the latest innovations in AML treatments: **cancer.org/cancer/types/acute-myeloid-leukemia/about/new-research**
- This TED-Ed video from George Zaidan provides a quick animated introduction to how cancer cells form, behave, and can be eliminated: **youtube.com/watch?v=BmFEoCFDi-w**