

Molecular and integrative physiology

with Dr Carol Elias

Talking points

Knowledge & Comprehension

1. What are hormones?
2. What is leptin, and how is it produced in our body?
3. What is brain mapping?
4. What are genetically-modified mouse models?
5. What are the main roles of leptin, and what is its impact on metabolism and reproductive health?

Application

6. Consider the two main approaches mentioned in Carol's article for creating genetically-modified mouse models in studying leptin. How do these models help researchers understand leptin's role?
7. What ethical considerations do you think Carol and her team take into consideration when performing experiments on model organisms such as mice?

Analyse

8. How does brain mapping help researchers understand the neural circuits related to leptin's function?
9. What is the relationship between leptin, energy availability and reproductive health?

Synthesis

10. Imagine a hypothetical scenario where leptin is not produced in the body. What would be the potential effects on metabolism, appetite and reproductive health? Based on your hypothesis, what do you think could be potential interventions or treatments?

Evaluation

11. Why were scientists so excited by the discovery of leptin in the 1990s? What implications did this discovery have for future research and interventions?
12. How do you think the integration of diverse perspectives and expertise in research teams contributes to scientific breakthroughs like the discovery of leptin?

Activities

1. Brain mapping exploration

Using both the knowledge you gained from Carol's article and other sources such as textbooks or online databases, research and create a visual representation (diagram, mind map or infographic) of the brain's structure and functions related to leptin and reproductive health.

Identify and label specific regions of the brain connected to metabolic control and reproductive functions influenced by leptin.

Consider using different colours or symbols to represent the pathways and connections between these brain regions.

Reflect on the following questions:

- How does understanding the brain's structure contribute to the study of hormones like leptin? Consider the role of specific brain regions in processing hormonal signals and regulating physiological functions.
- What insights did you gain from visually mapping the neural pathways associated with leptin's action?

2. Exploring interdisciplinary discoveries

Embark on an interesting exploration into the intersections of biology, physics, chemistry and computer science. Inspired by Carol's insight that "we do not do science alone", research instances where these diverse fields worked together, resulting in groundbreaking discoveries. Explore how teamwork shapes our scientific understanding and find a specific example that shows the powerful results when different fields collaborate. Share your example with your classmates/friends and reflect on how these collaborations shape the future of innovation.

More resources

- Learn more about leptin:
my.clevelandclinic.org/health/articles/22446-leptin
- Read about the structure of the brain:
kidshealth.org/en/kids/brain.html