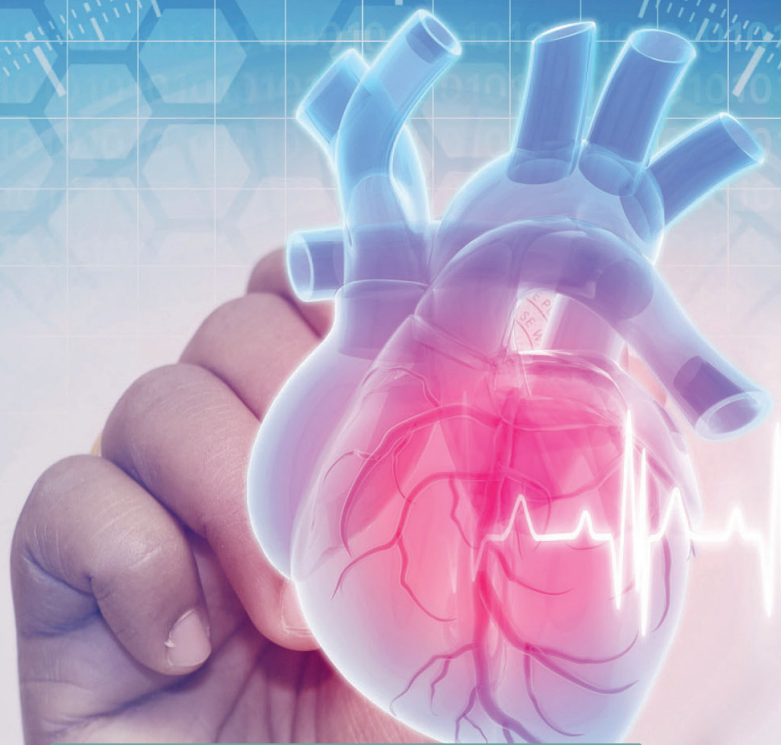


MOLECULAR BIOLOGY

with Professor Beverly Rothermel



Talking points

KNOWLEDGE

1. How much of the protein in a human brain is calcineurin (CaN)?
2. What is a circadian rhythm?

COMPREHENSION

3. What differences exist in the chromosomes and mitochondria of people with Down syndrome (DS) compared to people without DS?
4. How does the artificial process of ischemia/reperfusion mimic what happens when a person is treated for a heart attack?
5. What is the difference between mitochondrial fusion and fission? What occurs during each process?

APPLICATION

6. Why might some medical treatments that are successful on mice not be successful when applied to humans? How could mouse trials be adapted to increase their effectiveness when translated into humans?
7. What implications does Bev's research have for people undergoing heart surgery?

SYNTHESIS

8. How might Bev's research lead to treatments for the symptoms of DS, such as obesity and the degenerative nature of the condition? If you were in Bev's lab, what research questions would you investigate next to help improve health outcomes for people with DS?

EVALUATION

9. How did Rebecca benefit from the experience of working in Bev's lab? How do you think you would benefit from participating in a similar opportunity?
10. Bev's research involves experimenting on genetically engineered mice to improve our understanding of human health. To what extent do you agree that animal testing is justified for medical research?

Activities

Molecular biology is often regarded as a very technical and confusing subject, even for those who are experts in the field!

1. Drew Berry is a biomedical animator who creates scientifically accurate animations of biological processes at the molecular scale. Watch Drew's 15-minute TEDx talk 'Astonishing molecular machines' (www.youtube.com/watch?v=DfB8vQokr0Q) then consider the following:

- How did famous historical scientists use art to convey their ideas?
- To what extent do you find Drew's animations helpful for explaining biological processes to you?
- What additional understanding do you think you gain from watching an animation of a process, compared to reading a textual description of it or seeing it represented in a still image?

2. After watching Drew's talk, research a biological process. Use your creative skills to explain this process to your classmates in an accessible and engaging way. You could create an animation, draw a cartoon, write a poem, paint a picture, or harness any other creative skill you have that can bring the complex process to life!

More resources

- Science Journal for Kids is a website full of accessible articles about different scientific topics, such as 'How can we use genetic engineering to get rid of malaria for good?' and 'Which chickens are better at fighting off a virus, and why?' Explore the collection of molecular biology articles: www.sciencejournalforkids.org/key-word/molecular-biology
- Visit Drew Berry's website to view more scientific animations: www.drewberry.com