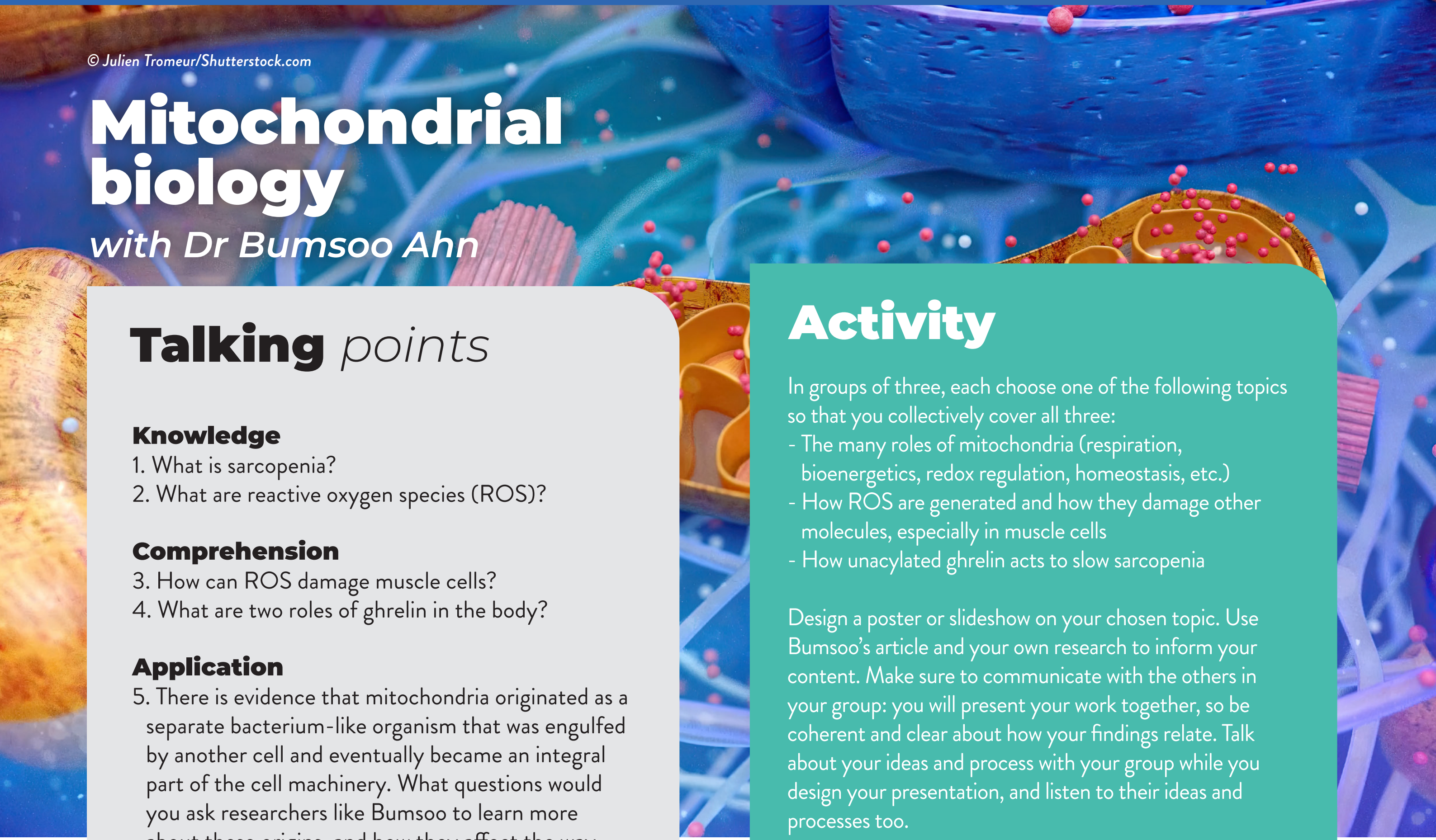

Mitochondrial biology

with Dr Bumsoo Ahn

Talking *points*

Knowledge

1. What is sarcopenia?
2. What are reactive oxygen species (ROS)?

Comprehension

3. How can ROS damage muscle cells?
4. What are two roles of ghrelin in the body?

Application

5. There is evidence that mitochondria originated as a separate bacterium-like organism that was engulfed by another cell and eventually became an integral part of the cell machinery. What questions would you ask researchers like Bumsoo to learn more about these origins, and how they affect the way mitochondria function today?
6. Red blood cells do not contain mitochondria. Why do you think this is? How do you think this affects their function?

Analysis

7. Why do you think the ghrelin clinical trial with Prader-Willi Syndrome patients is significant to Bumsoo's research?
8. Why do you think that our muscles naturally get weaker as we age? Why has evolution not led to muscles that stay stronger for longer?

Evaluation

9. Imagine that research efforts eventually lead to major increases in healthspan in your country. In response, the government proposes an increase in retirement age. To what extent would you agree with this proposal? How might different people in your country react?
10. Imagine that research efforts discover pharmaceutical interventions that majorly increase healthspan, but these interventions are very expensive. How would you feel about this? How do you think other people might feel about this?

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.link/dh5j1nes**

Activity

In groups of three, each choose one of the following topics so that you collectively cover all three:
- The many roles of mitochondria (respiration, bioenergetics, redox regulation, homeostasis, etc.)
- How ROS are generated and how they damage other molecules, especially in muscle cells
- How unacylated ghrelin acts to slow sarcopenia

Design a poster or slideshow on your chosen topic. Use Bumsoo's article and your own research to inform your content. Make sure to communicate with the others in your group: you will present your work together, so be coherent and clear about how your findings relate. Talk about your ideas and process with your group while you design your presentation, and listen to their ideas and processes too.

While designing your poster or slideshow, consider the following:
- What are my key messages?
- Why is this information important?
- How can I convey this information clearly?
- How can I use images, diagrams and graphics effectively?
- How can I link scientific information to real-world significance?

When your group is finished, plan how you will present your work to your class. Give your presentation and try to answer any questions from your classmates. Watch their presentations too; how did they approach the task differently? Is there anything you would do differently if you were to do the task again?

More *resources*

- Visit Bumsoo's Futurum webpage to read his article in Spanish and to find an animation, podcast and PowerPoint about his work: **futurumcareers.com/mitochondrial-biology-with-dr-bumsoo-ahn**
- The Ahn Lab, which Bumsoo leads, has an active webpage where you can explore the team's research and recent discoveries: **school.wakehealth.edu/research/labs/ahn-lab**
- This video from Dr Eric Berg DC explains how reactive oxygen species form and why they are destructive in the body: **youtube.com/watch?v=gUUsTbeu4LE**
- This article from MedicalNewsToday explores the many roles of mitochondria in the body, including their role in ageing: **medicalnewstoday.com/articles/320875#aging**