

Microbiology

with Dr Ariangela Kozik

Talking points

Knowledge

1. At what oxygen concentration did *Prevotella melaninogenica* stop growing?
2. What is the term for microorganisms that live in or on a host and derive a benefit without causing harm?

Comprehension

3. What is an obligate anaerobe, and why did this classification create a paradox for *Prevotella*?
4. Why does Ariangela compare her work to being the new manager of a soccer team?

Application

5. Given what you have learned about the respiratory tract microbiome, why might two asthma patients respond differently to the same steroid treatment?
6. How might the methods used in respiratory tract microbiome research (such as culturing bacteria in controlled environments) be applied to study the gut microbiome?

Analysis

7. “Science needs that creativity and spark,” says Ariangela. In what ways might creative and artistic skills be useful in a career as a scientist?
8. Compare the ‘biological reality’ of human diversity to the ‘social constructions’ of race. How does conflating these two concepts lead to misunderstandings and undermine meaningful research?

Evaluation

9. Why did Ariangela co-found the Black Microbiologists Association (BMA)? Why do you think organisations like this are important, and how can they support communities both within and outside the field of microbiology?
10. Ariangela studies commensal microorganisms, even though they appear neither harmful nor particularly beneficial. Why does she study these organisms? To what extent do you agree that these organisms are worthy of scientific study?

Activity

The human respiratory tract microbiome is home to a diverse community of billions of microorganisms. Microbiologists like Ariangela study this microscopic ecosystem to discover what these organisms are, how they interact with each other and what role they play in keeping us healthy. Create a short comic book or graphic novel that helps to bring this hidden world to life.

Do your research. Choose one organism from the respiratory tract microbiome to be the focus of your story — you could pick *Prevotella* or another inhabitant such as *Streptococcus*, *Veillonella*, or *Rothia*. Find out what your chosen organism looks like, where it lives, what role it plays and how it interacts with other organisms in the respiratory tract. Think about the human host your characters live inside and how they shape the world your characters inhabit.

Plan your story. You could personify your main organism and follow its perspective, tell the story as an ecosystem documentary or frame it as a crisis narrative where an infection disrupts the community. Whatever approach you choose, your story needs a clear beginning, middle and end, and must be grounded in accurate science.

Create your illustrations. Think carefully about how to make your comic or graphic novel visually distinctive. Try to capture the actual colours, shapes and forms of your organisms and their environment. Make sure that your artwork helps the reader understand the science you are trying to communicate as well as the story you are trying to tell.

Make sure that you have included at least three accurate scientific facts in your story, that your organisms are depicted realistically, and that a reader who knew nothing about the respiratory tract microbiome would come away having learnt something new. On a final page, write a short author’s note explaining the science behind your story and noting anywhere you took creative liberties.

More resources

- You can access talks and discussions from the BMA’s annual Black in Microbiology week on their YouTube channel: youtube.com/@BlackInMicrobiology
- The Microbiology Society hosts a podcast which features interviews with researchers working in the field of microbiology: soundcloud.com/microbiosoc
- You can read Ariangela’s research paper here: pubmed.ncbi.nlm.nih.gov/42447308