

Immunology and vaccinology

with Professor Ross Kedl

Talking points

Knowledge

1. What is an adjuvant?
2. Who discovered that adjuvants improved vaccines?

Comprehension

3. What are the differences between the innate and adaptive immune systems?
4. What are the differences between CD4 T cells, CD8+ T cells and B cells?

Application

5. If you met Ross, what questions would you ask him to learn more about his research and career background?
6. If you were trying to persuade a nervous patient to have a clinically proven vaccine, what fears do you think they may have, and how would you reassure them?

Analysis

7. Why is Ross interested in developing vaccines that produce very large CD8+ T cell responses?
8. Why is it harder to vaccinate against some pathogens than others?

Evaluation

9. Ramon and Glenn discovered the concepts of adjuvants by testing vaccines on hamsters and Ross tests his vaccines on mice. To what extent do you agree that animal testing is necessary for improving human health?
10. Ross' high school biology teacher had a significant impact on his decision to become a scientist. Who has inspired you with their teaching? What is it about their way of teaching that engages and enthuses you?

Activity

Practise your science communication skills

Three Minute Thesis is a global competition that challenges PhD students to present their research to a non-scientific audience in just three minutes, with a single PowerPoint slide as a visual aid. Watch some of the winning entries from over the years to see how students condense their years' worth of research into a short and engaging presentation: www.threeminutethesis.uq.edu.au/watch-3mt

Create your own Three Minute Thesis style presentation to explain Ross' work to an audience of 11-14-year-olds. Which information do you think will be most important and interesting to share? How will you explain concepts such as the different parts of the immune system, different types of immune cells and the importance of adjuvants in an engaging way using clear language? What visual information will you include on your PowerPoint slide to enhance your presentation?

Deliver your presentation (if possible, to a younger class) and invite the audience to ask questions about the content and give feedback on your presentation.

Challenge: Science communication is about more than just talking to an audience. Why not present Ross' research to a younger audience through a different medium? For example, you could draw a cartoon strip or perform a play about the discovery of adjuvants or how the immune system is like TSA agents and police officers. Be creative!

More resources

- In these articles, Ross describes what happened when he took part in a clinical trial during the development of the COVID-19 vaccines and addresses concerns some people have about vaccines:
news.cuanschutz.edu/news-stories/when-foreigners-invade-the-body-fights-back.-and-it-can-hurt
news.cuanschutz.edu/news-stories/going-viral-cu-school-of-medicine-experts-tackle-circulating-vaccine-concerns

- In this Futurum article, Ross' colleagues at the University of Colorado Anschutz School of Medicine explain how they are studying the immune system: www.futurumcareers.com/investigating-immunity
- This engaging article lists some of the surprising substances that are used as adjuvants in vaccines: www.bbc.com/future/article/20201027-what-is-added-to-vaccines
- Have a go at playing Immune Attack, a video game that teaches cell biology and immunology in a fun and engaging way: www.sciencegamecenter.org/games/immune-attack