

CELL BIOLOGY

WITH DR KRISTINA AMES

Talking points

KNOWLEDGE

1. How much blood does an adult human body contain?
2. What role do red blood cells, platelets and B cells each play?
3. Where does haematopoiesis occur?

COMPREHENSION

4. What is the difference between 'wet-lab' and 'dry-lab' scientific approaches?
5. What causes myelodysplastic syndrome (MDS), and how does it differ from acute myeloid leukaemia (AML)?
6. What similarities did Kristina discover between her mouse models and patients with myelodysplastic syndrome?
7. Why is it important that cell biologists do not just study individual cells in isolation?

SYNTHESIS

8. Each of Kristina's experimental results directed the next stage of her research and led to her next discovery. Summarise how each finding led to her final discovery that autophagy-inducing drugs could help people with MDS.

EVALUATION

9. Using animal models to understand human diseases is a controversial issue. Do you agree that mice should be used to help scientists better understand the causes of and treatments for cancer? Why, or why not?
10. If you have several things that need doing, how do you balance them? Are you a multitasker or a juggler? To what extent do you think you could benefit from trying a different method to deal with multiple tasks?

Activity

Be a cell biologist and examine the structure of cells

The very thin membrane that lies between each layer of an onion is called the epidermis and is only one cell thick. As such, it is perfect for examining cellular structure under a microscope.

For this activity you will need: an onion, a microscope, a glass microscope slide and cover, iodine solution (optional) and a pipette (optional).

1. Cut up an onion and peel a small (~1 cm x 1 cm) section of epidermis from between the layers of onion flesh.
2. Put a drop of water at the centre of the microscope slide then lay the piece of epidermis on top.
3. Using the pipette, add a drop of iodine solution to the onion epidermis (this stage is optional, but staining the cells with iodine will make their features easier to see under the microscope).
4. Gently lay the cover on the microscope slide and press it down to remove any air bubbles.
5. Examine your slide under the microscope to observe the onion cells. What do you see? What shape are the cells? What features are present in the cells? Can you observe nuclei, cell walls and vacuoles? Most plant cells contain chloroplasts. Can you see any in the onion epidermal cells? Why, or why not?

More resources

- The American Society for Cell Biology has a selection of outreach blogs about different topics: www.ascb.org/category/science-outreach
- Visit the Cell Image Library to explore cells of all shapes and sizes: www.cellimagelibrary.org/home
- Serendip Studio has a wealth of hands-on practical biology lesson plans for high school students: www.serendipstudio.org/sci_edu/waldron