

CELL BIOLOGY WITH DR PASCALE V GUILLOT

TALKING POINTS

KNOWLEDGE

1. What are some of the ways that fragile bones can develop?
2. What is the difference between osteoblasts and osteoclasts?

COMPREHENSION

3. Why does Pascale's team develop bone tissue *in vitro* rather than *in vivo*?
4. Why do you think the scientists who discovered cellular reprogramming to pluripotency received a Nobel Prize?

APPLICATION

5. How would you assess the success of stem cell transplants to treat osteogenesis imperfecta?

ANALYSIS

6. How do you think Pascale's team may have uncovered the multiple effects of osteogenesis imperfecta on cells in the bone tissue?
7. Why do you think Pascale's team used epithelial cells from patients' urine as a starting point for their work with stem cells?

SYNTHESIS

8. Pascale hopes her team's findings will be useful for sufferers of other fragile bone conditions, such as osteoporosis. How would you go about planning to test this?

EVALUATION

9. Are there any ethical concerns surrounding gene editing techniques, such as CRISPR? How could these be addressed?

CREATIVITY

10. Imagine if Elizabeth Garrett Anderson had not been allowed to pass her medical exams by the medical establishment in 1865. What impact do you think that would have had on women's healthcare and the right for women to study medicine?

ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

Pascale's work involves making use of a lot of cutting-edge techniques that are leading to large steps forward in science and medicine. The main ones are listed in the following table. Use the internet to fill in the gaps with your own research.

TECHNIQUE	WHAT DOES IT INVOLVE?	WHEN WAS IT DEVELOPED?	HOW CAN IT HELP PEOPLE?
Cellular reprogramming to pluripotency			
<i>In vitro</i> tissue construction			
Stem cell transplants			
CRISPR			

MORE RESOURCES

- Pascale's website, 'Hope for the Future', includes more information about her work in bone regeneration, as well as the other projects her lab is working on – including research into brain regeneration and amniotic fluid stem cells. <https://www.stemcell-innovation.com/>
- The British Society for Cell Biology has a number of free educational materials, including softCell e-learning: <https://bscb.org/learning-resources/softcell-e-learning/>
- This video from IFOM talks you through the science behind induced pluripotent stem cells. <https://www.youtube.com/watch?v=arho5uFPrgq>
- This article from LiveScience explains how CRISPR is used for gene editing. <https://www.livescience.com/58790-crispr-explained.html>