

Review Questions
Lectures 24

1. What is the definition of a stem cell?
2. How are stem cells different from progenitor cells?
3. Are progenitor cells differentiated? Explain your answer.
4. Define multipotent and pluripotent.
5. Which potency (multipotency or pluripotency) do ES cells have? Which potency do iPS cells have? Which potency do adult stem cells have? So, if you need a stem cell type that could produce any tissue in the body, which could you use? If you need a stem cell to just produce neurons, which could you use?
6. What is asymmetric division and why is it important for stem cells?
7. What would happen if a dividing stem cell lost its ability to asymmetrically localize cytosolic factors during mitosis?
8. Define stem cell niche. Why is it important? What can happen if the stem cell niche is misregulated?

9. Give two examples of stem cell niches.

10. Which stem cell types are naturally occurring and which are derived in a lab?

11. Define adult stem cell. Do they divide rapidly or slowly?

12. How are ES cells derived? Why aren't they considered naturally occurring?

13. What are the two tests to determine if cells are actually pluripotent ES cells? How/why do these tests indicate cells are pluripotent? (Be sure to understand what a teratoma is.)

14. What are iPS cells? How are they generated? How are they believed to be identical to ES cells?

15. Why are iPS cells such an exciting advancement in regenerative medicine?