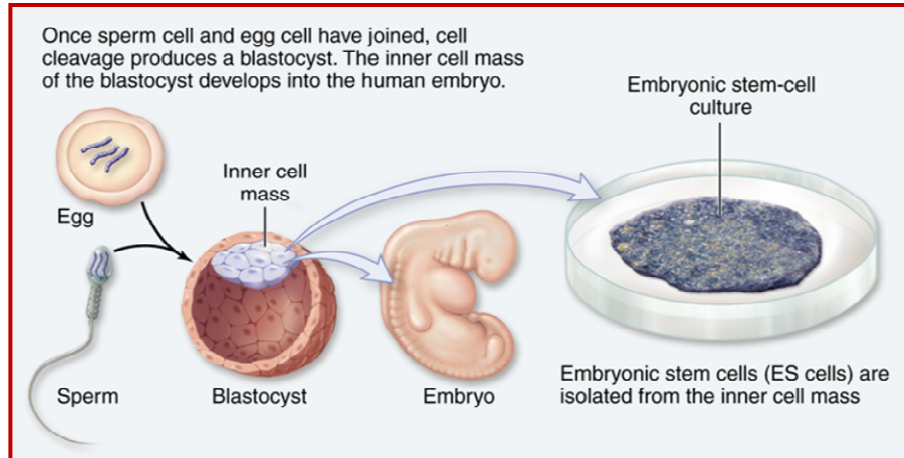


# Chapter 19 – Cellular Mechanisms of Development



1. What is meant by **development**?

---

---

2. Describe the 4 subprocesses of development:

a. **Growth (cell division)** \_\_\_\_\_

---

b. **Differentiation** \_\_\_\_\_

---

c. **Pattern Formation** \_\_\_\_\_

---

d. **Morphogenesis** \_\_\_\_\_

---

3. In animal embryos, what molecules control the timing and number of divisions during development?

---

4. In animal embryos, the period of rapid cell division following fertilization is called \_\_\_\_\_.

5. What are **blastomeres**? \_\_\_\_\_

6. Explain the following key statement, "Cleavage is not accompanied by an increase in the overall size of the embryo."

---

---

7. \_\_\_\_\_ is the most well-known model organism in the study of development.

8. What are **stem cells**? \_\_\_\_\_

9. What is the difference between **totipotent** and **pluripotent** stem cells?

---

---

10. Mammalian cleavage continues for 5-6 days, resulting in a ball of cells called a \_\_\_\_\_.

Describe its two layers. \_\_\_\_\_

---

11. What are **embryonic stem cells (ES cells)**? \_\_\_\_\_

12. In plants, growth occurs in regions of tissue called \_\_\_\_\_, where stem cells are preserved.

13. What is meant by **cell determination**? \_\_\_\_\_

14. Describe the 2 ways in which cells become committed to follow a particular developmental pathway.

---

---

---

---

---

---

---

---

---

---

15. What is **reproductive cloning**? Describe the process. (Think *Dolly*!)

---

---

---

---

---

---

---

---

16. What are some of the problems associated with reproductive cloning? What is the reason for these problems.

---

---

---

---

---

---

---

---

17. What is meant by **therapeutic cloning**?

---

---

---

---

---

---

---

---

18. Why is stem cell research a bioethical concern?

---

---

---

---

---

---

---

---

19. When developmental biologists use the term, **polarity**, what do they mean?

---

---

---

---

20. Explain the role of maternally encoded mRNAs in *Drosophila melanogaster* development.

---

---

---

---

---

---

---

21. What are **homeotic genes**? Provide some examples.

---

---

---

---

22. What is a **Hox gene**?

---

---

23. Plants use a set of control genes called \_\_\_\_\_ in their development.

24. What is **morphogenesis**? In order to achieve morphogenesis, animals must regulate which cell processes?

---

---

---

25. What is **apoptosis**? \_\_\_\_\_

26. The migration of cells in development involves the use of **cadherins** and **integrins**. Explain.

---

---

---

---

27. What are the 2 primary processes of morphogenesis in a developing plant? Remember: Plant cells cannot move.

---

---

28. Name several abiotic factors which affect seed germination.

---

---

29. Name several biotic factors which affect plant development.

---

---

30. Discuss several examples of how the environment affects normal animal development.

---

---

---

---

---

---

---

---

---

---

31. What is an **endocrine-disrupting chemical (EDC)**? Discuss several examples.

---

---

---

---

---

---

---

---

---

---