

10.4 Cell Differentiation

From One Cell to Many

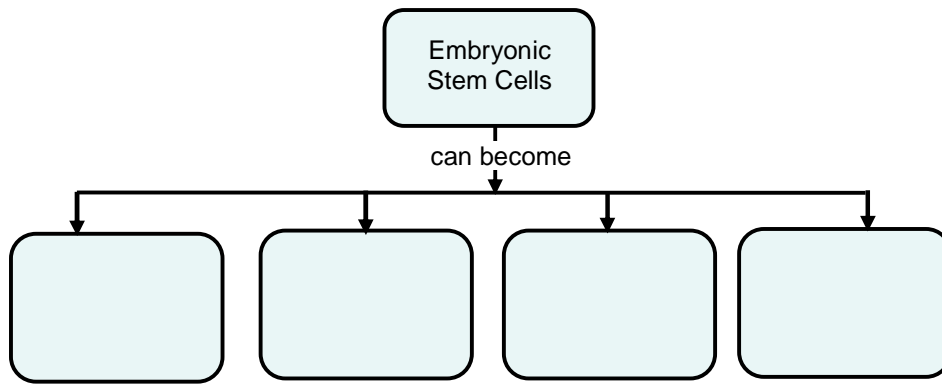
For Questions 1–4, complete each statement by writing the correct word or words.

1. Humans, pets, and petunias all pass through an early stage of development called a(n) _____.
2. Cells become _____ through the process of differentiation.
3. Scientists have mapped the outcome of every _____ that leads to differentiation in the development of the microscopic worm *C. elegans*.
4. Most cells in the adult body are no longer capable of _____.

Stem Cells and Development

For Questions 5–7, write the letter of the correct answer on the line at the left.

- _____ 5. Which is an example of a totipotent cell?
- A. blastocyst
 - B. bone cell
 - C. fertilized egg
 - D. lymphocyte
- _____ 6. Cells that are pluripotent are unable to develop into the tissue that
- A. forms the skin.
 - B. lines the digestive tract.
 - C. produces blood cells.
 - D. surrounds an embryo.
- _____ 7. Adult stem cells are best described as
- A. multipotent.
 - B. pluripotent.
 - C. totipotent.
 - D. unable to differentiate.
8. Complete the concept map by identifying some of the types of cells that embryonic stem cells give rise to. Then explain how stem cells are like the stem of a plant.



Frontiers in Stem Cell Research

For Questions 9–11, write the letter of the correct answer on the line at the left.

- _____ 9. Which is not a new, potential benefit of stem cell research?
- A. growing new skin cells to repair a cut
 - B. replacing heart cells damaged by heart attacks
 - C. repairing breaks between nerve cells in spinal injuries
 - D. preventing suffering and death caused by cellular damage
- _____ 10. What is the main reason that embryonic stem cell research is considered ethically controversial?
- A. growing new skin cells to repair a cut
 - B. replacing heart cells damaged by heart attacks
 - C. repairing breaks between nerve cells in spinal injuries
 - D. preventing suffering and death caused by cellular damage
- _____ 11. What is one new technology that could make stem cell research less controversial?
- A. implanting skin cells instead of stem cells in damaged tissue
 - B. developing the ability to switch on the genes that make an adult cell pluripotent
 - C. replacing stem cells with cancer cells
 - D. using the Internet to get more people to accept stem cell research