

Key to Identifying Stem Cell Types

Select Activity - Stem Cells
Create a

Indicate a positive or negative result in the chart below. A majority of positives indicates that the stem cell you have will turn in to that type of tissue. *Stem cell Line.*

Copy in your binder

Indicate Results Below. Use "+" for positive and "-" for negative



Color of Media	Type of tissue Generated	Trial 1	Trial 2	Trial 3
purple	Bone			
gray	Blood Vessels			
light blue	Blood Cells			
yellow	Fat			
green	Tendons & Ligaments			
light green	Immune System Cells			
navy blue	Germ Cells			
orange	Liver			
red	Skeletal Muscle			
dark red	Nerves			
pink	Skin			
blue	Cartilage			



What type of stem cell do you have? Look at the descriptions below and match your results to a type of stem cell. Remember that you need a majority of the trials for a particular cell type to test positive to know that the stem cell will turn into that cell type.



Types of Stem Cells

Remember, the type of stem cell you choose should be capable of producing **all** the cell types you indicated were a positive on the chart above.

- Intestinal – a multipotent cell (can turn into several different types of cells) found in the intestine, giving rise to:
 - all types of cells in the gut such as enterocytes, goblet cells, paneth cells, and endocrine cells.
- Mesenchymal - a multipotent cell found in bone marrow, cord blood, peripheral blood, fat and fetal liver and lungs. Will give rise to a variety of cell types:
 - bone cells (osteocytes)
 - cartilage cells (chondrocytes),
 - fat cells (adipocytes),
 - other kinds of connective tissue cells such as those in tendons and ligaments.
- Hematopoietic - a multipotent cell found in bone marrow or peripheral blood. Gives rise to all the types of blood and immune cells:
 - red blood cells,
 - B lymphocytes,
 - T lymphocytes,
 - natural killer cells,
 - neutrophils,
 - basophils,
 - eosinophils,
 - monocytes
 - macrophages.
- Neural – a multipotent cell found in the brain that gives rise to:
 - nerve cells (neurons)
 - two categories of glial cells - astrocytes and oligodendrocytes.
- Epithelial – a multipotent cell found in skin and give rise to
 - hair follicles,
 - sweat glands,
 - skin cells.

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Quiz

answer in your binder



Stem Cell Line Assessment

1. A stem cell has two characteristics that set it apart from other types of cells. What are these two characteristics?
2. A stem cell line is a group of cells that have which two traits?
 - a) They are taken from bone marrow and they replicate themselves.
 - b) They can replicate themselves and they can move into different parts of the body.
 - c) They can replicate themselves and can differentiate into precursors of different types of cells.
 - d) They come from many different niches in the body and can become other cells.
3. Self-renewal means:
 - a) The ability to grow bigger
 - b) The ability to make exact copies of itself.
 - c) The ability to refresh culture media automatically.
 - d) The ability to change into other cell types.
4. Differentiation means:
 - a) Precursor cells becoming bone or blood cells.
 - b) Being different from other people.
 - c) A skin stem cell becoming a blood stem cell.
 - d) A stem cell becoming a precursor cell of another type of cell.
5. What organs of the body produce stem cells?
6. Where did Paul get the stem cells for this activity?
7. What ingredients are in the cell culture media?
8. At what temperature are the stem cells incubated?

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Quiz

9. Why might all of your cells have died after the initial incubation (when you chose which cell to culture)?
10. Why were three culture dishes for each cell type used during the step when you were testing the pure stem cell line?
11. Why did new growth medium needed to be added every day when the culture was in the incubator?
12. What type of stem cells did you end up with?

Match the vocabulary word to its definition:

- | | |
|---------------------------|---|
| 13. Media ____ | A. A flat, transparent dish capable of holding some sort of liquid (medium) on which cells are grown. |
| 14. Niches ____ | B. A molecule that is present or absent from a particular cell type. Used to identify cell types when trying to purify a culture. |
| 15. Pipette ____ | C. Places in the body where adult stem cells can be found. |
| 16. Adult stem cells ____ | D. Soft, spongy tissue found in the center of most large bones that produces the white and red cells and platelets of blood. |
| 17. Biomarker ____ | E. A narrow plastic or glass tube that is marked for measuring and is used to transfer small amounts of liquids. |
| 18. Culture Plate ____ | F. Bringing a product or technology to market or making it commercially viable. |
| 19. Bone Marrow ____ | G. Found in both juveniles and adults, these stem cells are capable of dividing or self-renewing indefinitely. |
| 20. Commercializing ____ | H. A liquid or gel designed to encourage growth of cells in a culture. |