Unit 2: Adult Stem Cells, Homeostasis, and Regenerative Medicine

By Betty Jensen, Alexandra Race and Laurel Barchas

See all units

Help us improve our curriculum
Sign up to participate in our survey

Suggested time frame: three to seven class periods

Course level: Biology, AP Biology, Biotechnology, Anatomy/Phys, lower division college Biology

Inquiry teaching: Read how to modify the curriculum for inquiry teaching

- View Unit 2 Lesson Plans
- Download Unit 2 Teacher Background Information [pdf]
- Download Unit 2 Teacher Glossary [pdf] (refers to terms in Teacher Background Information document)
- Download Unit 2 Student Glossary [pdf]
- Download Unit 2 Bibliography [pdf]
- Download Unit 2 Animations
    - Symmetric cell division
    - Asymmetric cell division
    - Asymmetric cell division with microenvironment signals
- Go to Introductory Lesson download page

Brief Outline of Unit 2

View detailed unit 2 lessons outline

I. Invitation

A. Readings and discussion of Prometheus liver regeneration myth

B. Identifying cells responsible for regeneration

C. Differences between wound healing and regeneration

1. Watch video from Howard Hughes Medical Institute
2. Student worksheet and teacher version

II. Exploration

A. Comparison of adult and embryonic stem cells

1. Animation from Learn.Genetics, University of Utah
2. Discussion of location of adult stem cells in the body with graphic organizer
3. Exploration of totipotent, pluripotent, multipotent cells and their differentiation
4. Differences between adult stem cells and progenitor cells

B. Homeostasis

1. Video and discussion questions
2. Connecting adult stem cells and role in homeostasis
3. Wet lab introduction - Planaria regeneration video, student questions, and readings

4. Planaria lab lesson plan from Northwest Association for Biomedical Research

C. Regenerative medicine

1. Discussion and teacher lecture on treatment possibilities
2. Jigsaw reading activity

D. Potential uses of adult stem cells

1. Student research project with double entry journal

E. Importance of Clinical Trials

1. Explanation of steps in clinical trials
2. Clinical trials information chart

III. Application

A. Regenerative medicine and clinical trials research

1. Internet research project instructions
2. List of diseases that stem cells could help heal
3. Preliminary research forms for I-search
4. Create/deliver PowerPoint presentation summarizing clinical trial results for chosen disease

B. Creative expressions of understanding of stem cells

1. Essay, cartoon/storyboard, or pamphlet

IV. Assessment

1. Stem cell characteristics table

Source URL: http://www.cirm.ca.gov/our-progress/unit-2-adult-stem-cells-homeostasis-and-regenerative-medicine