

Name: _____

AP Biology

Chapter 16 Active Reading Guide

Development, Stem Cells, and Cancer

Section 1

1. What three processes lead to the transformation of a zygote into the organism?
 - 1)
 - 2)
 - 3)
2. Explain what occurs in cell differentiation and morphogenesis.
3. Differential gene expression results from different activators in different cells. How do different sets of activators come to be present in two cells? Explain how each of these occurs:
 - a. distribution of cytoplasmic determinants
 - b. different inductive signals
4. What is meant by determination? Explain what this means within an embryonic cell.
5. What specifically happens to a cell during the process of apoptosis?

6. The signal for apoptosis can come from outside or inside the cell. Give one example when the signal comes from outside the cell and two examples of cellular occurrences that would prompt an apoptosis signal from inside the cell.
7. What process ensures that all the tissues and organs of an organism are in their characteristic places? Where do the molecular cues that control this process arise?
8. What is controlled by homeotic genes?

Section 2

9. What is a totipotent cell?
10. How is nuclear transplantation performed in animals?
11. List the six steps in reproductive cloning for mammals and briefly explain each step.
 - 1)
 - 2)
 - 3)
 - 4)
 - 5)
 - 6)
12. Describe three problems associated with animal cloning.

11. What are stem cells?

13. What is the major difference between embryonic stem cells (ES) and adult stem cells?

14. How might induced pluripotent stem cells (iPS) resolve the debate about using stem cells for medical treatments?

Section 3

15. What mechanism is involved in the beginning of tumor growth? Discuss oncogenes and protooncogenes.

16. What are three mechanisms for converting a proto-oncogene to an oncogene?

17. There seem to be two categories of genes involved in cancer: oncogenes, which code for proteins to regulate cell growth, and should not be stuck “on,” much like the accelerator in a car; and tumor suppressor genes, which work like the brakes on a car and must function! Let’s begin with a look at the ras gene, which codes for a G protein and is an oncogene. Explain how a ras mutation leads to cancer.

- Campbell Biology in Focus (1st Edition) – www.mrcroft.com
Adapted from Campbell Biology (9th Edition) – © 2011 Pearson Education, Inc.