Cloning & Stem Cells Notesheet C. Kohn, Agricultural Sciences - Waterford WI

Name: Hour Date:

Date Assignment is due: Why late? Score: + ✓ -  
 Day of Week Date If your project was late, describe why**Directions**: use the accompanying **Cloning PowerPoint** (available online) to complete the questions below. This sheet will be due upon the completion of the PowerPoint in class. These assignments are graded on a +/√/- scale.

1. One of the most complicated questions regarding genes in the early 1900s was   
     
   \_
2. It is clear that when a sperm cell an egg to create that first cell (a )  
     
   that particular cell must have in order to   
     
   become a
3. What scientists did not know was whether the were as cells specialized into   
     
   skin cells, liver cells, nerves, etc., or if these genes were simply “ ”.
4. One of the first scientists to successfully address this question was the embryologist  
     
   \_
5. Describe Spemann’s work:   
     
   \_   
     
   \_
6. Spemann’s work showed that early in cell , each cell retained
7. This suggested that cells did not “ ” DNA but that genes did become ‘ as cells differentiated.
8. Define differentiation:
9. What was the opposing hypotheses to Spemann’s?   
     
   \_
10. After Spemann’s work, scientists wondered if   
      
     \_
11. In 1952, US Scientists carried out the first successful   
      
    \_ (SCNT)
12. What is the process SCNT?   
      
    \_
13. Briggs and King removed the of a frog (   
      
     ) using a and inserted it into an   
      
    \_
14. The egg became a .
15. When did the first example of animal cloning take place? By who?
16. How is a cell and a nucleus like a bus driver and a bus?   
      
    \_   
      
    \_
17. What two questions did John Gurdon’s work address?  
      
    1\_   
      
    2\_
18. Describe John Gurdon’s experiment:   
      
    \_   
      
    \_
19. What were success rates like in these cloning experiments?   
      
    \_
20. This provided evidence to what idea about cell reprogramming?   
      
    \_
21. Why did scientists believe for decades that mammalian cloning was impossible?   
      
    \_
22. Dolly the Sheep was created by what scientists?
23. Dolly the Sheep was created by taking the from the   
      
    glands of an adult sheep and put it into an   
      
    egg from a different breed (the ).
24. Write the 5 steps of cloning Dolly below:  
      
    1\_   
      
    2\_   
      
    3\_   
      
    4\_   
      
    5\_
25. It took attempts to create Dolly – in other words, Dolly was the first success after failed attempts.
26. Besides a low success rate, what other problems were associated with the Dolly experiment?  
      
    \_   
      
    \_   
      
    \_
27. As a whole, animals (the that are   
      
    created) suffer from   
      
    \_
28. One proposed hypothesis for this increase in in   
      
    animals is the difference between
29. The age of a cell can be determined by the length of its
30. What are telomeres?
31. What are telomeres like?
32. What happens to telomeres as a cell continues to divide?
33. Dolly, like many cloned animals, had , a sign   
      
    that her cells
34. Is this true of all cloned animals? Explain:   
      
    \_
35. Are human cloning experiments legal? Why?   
    \_
36. Is cloning now common? Explain:   
      
    \_
37. The primary reason for perfecting cloning technology would be so that   
      
    \_
38. E.g. The same lab that created Dolly also created the clone – a sheep that was   
      
    genetically engineered to
39. Creating clones of would   
      
    hypothetically be than trying to   
      
    create these same animals through .
40. Once standardized, genetically altered nuclei could be and inserted   
      
    into , - style.
41. What is an example of an endangered species that has been cloned?
42. What was the first commercially cloned pet? What did it cost? $
43. Would the clone be just like the original? Why?   
      
    \_
44. What was the first cloned cat? Did it look like her original?
45. Why didn’t the first cloned cat look like the original?   
      
    \_   
      
    \_
46. What is your opinion on cloning?   
      
    \_   
      
    \_   
      
    ========BREAK========

**Directions**: use the accompanying **Stem Cell PowerPoint** (available online) to complete the questions below. This sheet will be due upon the completion of the PowerPoint in class. These assignments are graded on a +/√/- scale.

1. What are three current problems with modern medicine?
2. How could stem cells change these problems? `
3. What are stem cells? Stem cells are that become   
     
      
     
    and replace
4. What is an undifferentiated cell?
5. To differentiate means to
6. For each of the following, state how they became unique as a result of differentiation:   
     
   Muscle cells:   
     
   Nerve cells:   
     
   Bone cells:
7. List and describe the two kinds of stem cells:   
     
   1: Description:

2. Description:

1. Many, but not all tissues have that   
     
   \_
2. How often does the lining of your intestine have to be replaced?   
     
   Where does this new tissue come from?
3. Briefly describe the following kinds of stem cell sources:  
   1. Hematopoietic stem cells:
   2. Mesenchymal stem cells:
   3. Neural stem cells:
   4. Epidermal stem cells:
4. Tissue-specific stem cells are . This means that they can   
     
      
   1. For example, the stem cells beneath your skin can only   
        
       under normal circumstances.
5. True or false – there are already medical treatments that exist that use tissue-specific stem cells.
6. What is leukemia?
7. Briefly describe how tissue-specific stem cells are used to treat leukemia:
8. What is a pluripotent stem cell?
9. What is the primary difference between a multipotent and pluripotent stem cell?
10. List and describe the two kinds of pluripotent stem cells:   
      
    1: Description:

2. Description:

1. Embryonic stem cells are from   
     
   knowingly by
2. Where do embryonic stem cells come from?
3. What is a blastocyst?
4. How were the blastocysts used for stem cell research created?
5. Why are there usually leftover eggs from in vitro fertilization (IVF) clinics?
6. All tissue in the body comes from the of a 5-7 day old   
     
   The develops into three , the   
     
    , the and the .
7. Briefly describe what each of the following forms:  
     
   Endoderm:   
     
   Mesoderm:   
     
   Ectoderm:
8. To be a pluripotent stem cell, a stem cell must be able to   
    **.**
9. Induced pluripotent stem cells begin as   
   1. What are sources of cells for this?
10. How do scientists turn a normal mature bodily cell into an induced pluripotent stem cell?   
      
    Scientists turn off and turn   
      
    of these so that they have the same
11. What are three advantages of pluripotent stem cells?
12. What are three disadvantages of pluripotent stem cells?
13. How could pluripotent stem cells help scientists to better understand birth defects, cancer, and degenerative diseases?
14. How might stem cells help to address the problem of transplant organ shortages?
15. How might pluripotent stem cells aid in the discovery of new drugs?
16. Briefly list three kinds of guidelines that stem cell researchers must follow:
17. What is your opinion about stem cells? I think stem cell research is a good idea a bad idea not sure  
      
    Explain your stance:

Unit Wrap-up C. Kohn, Agricultural Sciences - Waterford WI

This page is designed to help raise your grade while enabling you to develop skills you will need for after high   
school. You will need to complete every question and blank in order to receive full credit for your notes. Note: if you cannot come up with a strategy to remember a difficult concept on your own, see your instructor for help.

1. What is a topic or concept from this unit that you found to be more challenging? Write or describe below:  
     
      
     
   In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:
2. What is a 2nd topic or concept from this unit that you found to be more challenging? Write or describe below:  
     
      
     
   In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:
3. What is a 3rd topic or concept from this unit that you found to be more challenging? Write or describe below:  
     
      
     
   In the space below, create a mnemonic, rhyme, analogy, or other strategy to help you remember this particular concept:
4. Circle the most appropriate response.

Circle one: *I used my notes outside of class to prepare for the quiz.* Definitely – Yes – Sort of - No

Circle one: *I took extra notes in the margins for very difficult concepts.* Definitely – Yes – Sort of - No

Circle one: *I think I will be satisfied with the quiz grade I received this week.* Definitely – Yes – Sort of - No

1. On a scale of 1 (totally confused) to 5 (completely comprehending), how do you rank yourself for this unit? \_\_\_\_
2. Should you be getting additional help from your instructor before you take this quiz?