Mitosis and Cancer

In this section you will see how cells divide in two, in a process called mitosis. This process replaces dead cells, and allows animals and plants to grow. It is happening in your body all the time.

A) Web site name: University Of Arizona Biology Project
Web URL: http://www.biology.arizona.edu/cell_bio/tutorials/cell_cycle/cells1.html

Read “The Cell Cycle & Mitosis Tutorial : DNA basics”

1) What is “chromatin”? ________________________________

2) What does DNA stand for? ____________________________

Click on “Next” at the bottom of the page

3) What happens during the S stage of the cell cycle? ______________

4) What is p53? ________________________________

5) What does a mutation (or change in) p53 lead to? ______________

Click on “Next” at the bottom of the page

6) Can chromosomes be seen clearly during Interphase? ______________

7) In which stage (or phase) can chromosomes first be seen with the light microscope? ________________________________

8) In which phase do the chromosomes separate and move to opposite ends of the cell? ________________________________

Although mitosis is often divided into stages, each stage gradually blends into the next, so that mitosis is really a smooth, continuous process as you will see in the next section.

B) Web site name: Kenyon College, Ohio
Web URL: http://biology.kenyon.edu/courses/biol114/Chap01/mitosis/mitosismov.html

It may take a minute for the diagram to load into your computer. Note: to view this animation you need Quicktime. You can download a free Quicktime player at: http://www.apple.com/quicktime/download/win.html
Click on the play “>” button and watch the process of mitosis. Then use the two buttons on the right hand side to go through mitosis slowly.

9) What happens during G2 of interphase?
________________________________________________________________________

10) How many chromosomes are shown in prophase? ________________

11) How many chromosomes move to each end of the cell during anaphase? ____________

12) Watch the cell cytoplasm separate into two (cytokinesis) during telophase. Does it start to separate from the center of the cell, or from the outside?
________________________________________________________________________

The next part will show you photographs of plant (onion) and animal (whitefish) cells going through mitosis.

C) **Web site name:** Cornell University biology course  

Click on “Review – Onion Root Tip” and look at the “Metaphase” photo

13) Chromosomes are usually described as forming a straight line during metaphase. Do the chromosomes look straight in the photo? _________

This is because the chromosomes are very long, and differ in length. Therefore the centromeres of the chromosomes may line up next to each other, but the ends of the chromosomes will not form a neat line. In other words “real life”, in the form of photographs, is not as neat as diagrams in a book!

Click on “Prev page”, then click on “Review – Whitefish Mitosis”

14) List two differences between the metaphase photograph of the whitefish compared to the onion root: __________________________________________________________
________________________________________________________________________

When cells divide rapidly, and the body cannot control mitosis, this causes cancer.

D) **Web site name:** National Cancer Institute  

Click on “Understanding cancer” (Start at slide 1 and click through the series)

15) What are leukemias? ____________________________________________

16) What is apoptosis? ____________________________________________
17) What is the common name for “neoplasm”? ________________________

18) What type of cancer does the “Pap test” detect? ________________________

19) Which test is used to detect colon cancer? ________________________

20) What is an example of hyperplasia? ________________________

21) What is the approximate 5 year survival rate for patients with Stage III melanoma? ___________ %

22) Which type of cancer is prominent in the United States? ________________________

23) How many different chemicals in cigarette smoke are capable of causing cancer? ________________________

24) What is the lag time between smoking cigarettes and getting lung cancer? _____

25) Which virus causes cervical cancer? ________________________

26) What type of cancer is caused by “Wilm’s tumor”? ________________________

27) Why does the chance of developing cancer increase as a person gets older? ________________________

28) What is a carcinogen? ________________________

29) What are oncogenes? ________________________

30) Is p53 (look back at questions 4 and 5 above) an oncogene or a suppressor gene? ________________________

31) How can you tell that cancer has more to do with lifestyle than genetics? ________________________

32) List two “complete carcinogens” ______________ and ______________

33) Why is non-melanoma skin cancer not usually recorded in cancer statistics? ________________________
34) What are three sources of low level ionizing radiation? _____________________________

35) What percentage of cancer is caused by:
   a) industrial chemicals ____ %
   b) diet ____ %

36) What is the greatest single cause of cancer worldwide? ____________________________

F) Web site name: American Cancer Society  
   Web URL: http://www.cancer.org/index

Click on “Learn about Cancer” then “Select a cancer type”. Select a type of cancer that you would like to get more information on. Then click on “Go” and to get specific information on this type of cancer. Summarize the information below:

37) What type of cancer did you research? ________________________________

38) What are the risk factors? ________________________________

39) What are the symptoms? ________________________________

40) What treatments are available? ________________________________