

Biology

Name: _____

Virtual Lab: The Cell Cycle and Cancer

Date: _____

Hour: _____

1. In which phase of mitosis do each of the following occur:
- a. Centromeres split and chromosomes move toward opposite sides of the cell _____
 - b. Chromatin coils to form visible chromosomes

 - c. The nuclear membrane disappears

 - d. Sister chromatids line up in the center of the cell _____
2. In which phases of mitosis are sister chromatids visible, and attached to each other at the centromere?

Table 1: Record your data for the number of cells in each stage of the cell cycle observed in normal tissues.

Tissue Type	# Cells in Interphase	# Cells in Prophase	# Cells in Metaphase	# Cells in Anaphase	# Cells in Telophase
Lung Tissue Sample 1					
Lung Tissue Sample 2					
Stomach Tissue Sample 1					
Stomach Tissue					

Sample 2					
Ovarian Tissue Sample 1					
Ovarian Tissue Sample 2					

Table 2: Record your data for the number of cells in each stage of the cell cycle observed in cancerous tissues.

Tissue Type	# Cells in Interphase	# Cells in Prophase	# Cells in Metaphase	# Cells in Anaphase	# Cells in Telophase
Lung Tissue Sample 1					
Lung Tissue Sample 2					
Stomach Tissue Sample 1					
Stomach Tissue Sample 2					
Ovarian Tissue Sample 1					
Ovarian Tissue Sample 2					

Table 3: Use the data in Table 1 to calculate the Mitotic Index (average % cells dividing) for each normal tissue type.

Tissue Type	Avg. % cells at rest	Mitotic Index
Lung - normal		
Stomach - normal		
Ovary - normal		

Table 4: Use the data in Table 2 to calculate the average % cells dividing and average % cells at rest in each cancerous tissue type.

Tissue Type	Avg. % cells at rest	Mitotic Index
Lung - cancerous		
Stomach - cancerous		
Ovary - cancerous		

Questions:

1. What does your data indicate about the rate of cell division in cancerous tissue compared to the rate of cell division in normal tissue?

What data did you use to answer this question?

2. Which type of cancer is the fastest growing? Explain your answer, using your relevant data.

3. With what you have observed in this lab, if you were to compare tissue sample from normal breast tissue and cancerous breast tissue:

- a) Would you expect to see a difference in the rate of cell division in the cancerous breast tissue compared to the normal breast tissue? Explain your answer.

- b) Could you make a prediction about the average % dividing cells in the cancerous breast tissue? Explain your answer.

4. Consider the % dividing cells in normal lung, normal stomach, and normal ovarian tissue. Why do you think there are more cells dividing in the stomach and ovary tissue than in the lung tissue?

5. This lab explores three common cancers. An additional form of cancer – Skin Cancer – used to be seen only in older individuals but is now seen in younger individuals, many in their early 20s. Skin cancer results from accumulated mutations to the DNA of skin cells, caused primarily by sun exposure. What factors do you think may be contributing to the increase in skin cancer among young adults?
