

# CANCER & CELL CYCLE LAB

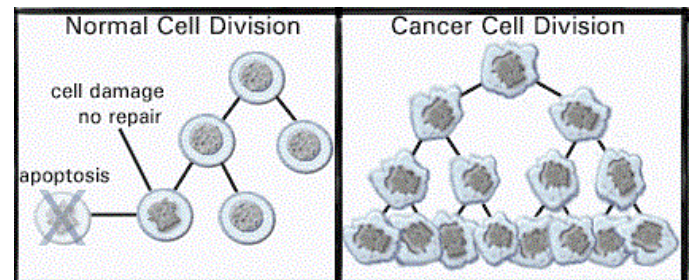
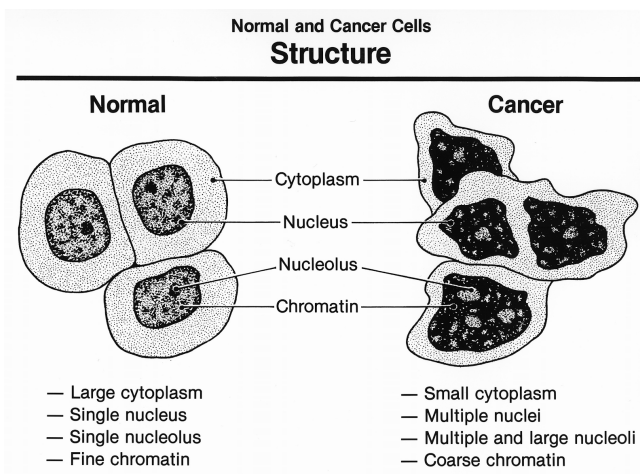
## Part I: Intro to Cancer

Name: \_\_\_\_\_

### Cancer and the Cell Cycle Lab

#### Pre-Lab

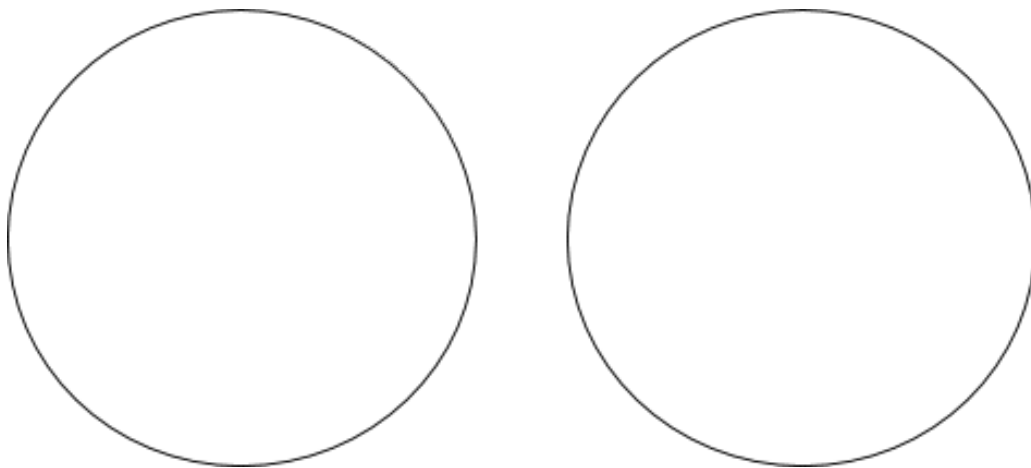
1. Apoptosis can be described as programmed cell death. Why might it be beneficial for cells to die?
2. Do you think all cells have the same lifespan? Explain your reasoning.
3. Based on your understanding of cancer, do you think cancer cells undergo apoptosis more or less than normal cells? Explain your reasoning.
4. The cell cycle includes all the events that a cell goes through as it grows and divides (mitosis). What do you think controls the cell's life cycle?
5. Observe each of the models (shown below) which highlight some of the differences between normal cells and cancer cells. In the space provided, predict why cancer cells might look and act very differently than normal cells. Include the terms growth and division in your response.



## Lab Procedure

Background: As you learned in the film, Dr. Allison is an immunologist. Immunologists study how a healthy immune system works and apply their knowledge to help study, diagnose, and treat diseases and disorders. Immunologists study cells, tissues, and organs to better understand the function of the immune system. Before we can learn about how the immune system works, we need to learn a little bit more about how cells work in our bodies and how cancer can disrupt these functions.

1. Observe the prepared slides under low, medium, and high power (blue/400x). You should compare the cancer slide with a normal tissue sample and draw these samples under high power in color, and to scale. Be sure to record the tissue type (ex. Skin, lung, liver, kidney) AND whether it is cancer or normal below the drawings. *Note: The color of the sample is not related to cancer but is based on how the scientist chose to stain the sample to highlight certain features.*



Labels →

Many cell processes are controlled by feedback mechanisms. In a feedback loop, the amount of product has a direct impact on the rate of the process. When the rate of the process increases as the product increases, it is known as positive feedback. On the other hand, negative feedback occurs when the rate of the process decreases as the product increases. Negative feedback helps ensure the organism can maintain homeostasis.

2. Tumor development, which occurs in cancer, is due to uncontrolled cell division. Do you think this is an example of positive or negative feedback? Why?



3. Mitosis is the process of cell division. Typically, normal cells only can divide a set number of times before they die, however, cancer cells often divide more often and indefinitely. In the film, Sharon is diagnosed with metastatic melanoma. The data table estimates the number of cells in each stage of the cell cycle for normal skin cells viewed under the microscope compared to the three types of skin cancer. To learn more about the link between mitosis and cancer, complete the data table, and then answer the questions that follow. **Example:** Normal Skin  $18/20 = .9 \times 100 = 90\%$

Tissue	Interphase	Prophase	Metaphase	Anaphase	Telophase	Total # of Cells	% in interphase	% dividing
Normal Skin	18	2	0	0	0	20	90%	10%
Squamous Cell Skin Cancer	16	1	2	1	0	20		
Basal Cell Skin Cancer	15	1	1	1	2	20		
Melanoma Skin Cancer	13	2	1	2	2	20		

4. Which type of cancer shows the most aggressive growth? Explain.
5. When studying cell division in tissue samples, scientists typically calculate something known as the mitotic index, which is the ratio of dividing cells to the total number of cells in the sample. Scientists will determine the mitotic index to compare the growth of different types of tissue. Which type of tissue would have a higher mitotic index, normal tissue, or cancerous tissue? Explain.



