**Virtual Lab: The Cell Cycle and Cancer Worksheet** Name:

*\*\*Go to our class resources page and click on the link for the Virtual Lab* Date: Period:

1st! From the Information Tab:

1. Describe how cancer develops in 3 sentences or less.
2. What changes happen in cancerous cells?
3. Which type of cancer resulted in the most deaths in 2007?
4. Choose one of the three types of cancers described. Explain risk factors for this cancer type.

2nd! From the Monitor Video:

1. Complete the table by describing each phase of mitosis in your own words. Be sure to include the vocabulary words: *centrioles, spindle fibers, chromosomes, centromere, sister chromatids, and daughter cells*

|  |  |
| --- | --- |
| **Phase of Mitosis** | **Description** |
| Interphase |  |
| Prophase |  |
| Metaphase |  |
| Anaphase |  |
| Telophase |  |

3rd! From the Microscope:

**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  Normal |  |  |  |  |  |
| Stomach Tissue  Normal |  |  |  |  |  |
| Ovarian Tissue  Normal |  |  |  |  |  |

**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  Cancerous |  |  |  |  |  |
| Stomach Tissue  Cancerous |  |  |  |  |  |
| Ovarian Tissue  Cancerous |  |  |  |  |  |

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

|  |  |  |
| --- | --- | --- |
| **Tissue Type** | **% 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** | **% Cells at Rest** | **Mitotic Index** |
| Lung - cancerous |  |  |
| Stomach - cancerous |  |  |
| Ovary - cancerous |  |  |

**Formulas:** To calculate the % cells at rest (in interphase) in normal tissue:

(# cells at rest/total #cells) X 100 = % cells at rest

Mitotic Index = % cells dividing (note: cells dividing are cells not in interphase)

(# cells dividing/total # cells) X 100 = % cells dividing

Questions (answer on a separate piece of paper):

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:
   1. 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.
   2. 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?
6. Different types of normal tissues in the human body have different mitotic indices. From the following list, which normal tissues would you expect to have the highest mitotic index: muscle, skin, kidney, or lung? Explain your answer