KENNEDY Biology

## LAB-MITOSIS

#### PURPOSE:

In this investigation, you will compare stages of mitosis in animal and plant cells. You will also identify cells in each phase of mitosis, determine the time in minutes for each phase and compare normal cells to cancerous cells.

MATERIALS: microscope, onion root tip, whitefish blastula slides

#### PROCEDURE

#### PART A

1. Obtain a microscope from the cabinet in the back room

2. Obtain an onion root tip slide and a white fish blastula slide from the boxes in the front of the room.

3. Locate the stages of the cell cycle (Interphase, Prophase, Metaphase, Anaphase, Telophase) on both slides.

4. In your lab book make a detailed sketch (colored pencils) of each phase of mitosis. Sketch the drawing of each phase in the onion root tip and the whitefish blastula next to each other so as to compare each phase in animals and plants to one another.

\*\* You sketches should be FULLY labeled ( phase, power, and any cell parts you can identify)

## PART B

1. Locate under the microscope on the onion root tip slide and area where cells are in the process of mitosis (near the tip).

2. Count and record in TABLE #1 below the number of cells in each mitotic phase and in Interphase. Count all cells in the field of view.

3. Also record your results in TABLE#2 (Class Results)

4. Fill in the rest TABLE #2 with the class results and compute the totals

5. Using the equation below, determine the time required in each phase. The time spent in a mitotic phase and in interphase can be calculated IF the total time for mitosis is known. Onion cells require about 12 hours or 720 minutes to complete the cell cycle (from interphase to interphase). The Amount of time needed for each phase can be calculated as follows:

Time for Phase = <u>number of cell in a phase</u> = \_\_\_\_\_ total number of cells counted \_\_\_\_\_ X 720 minutes = \_\_\_\_\_ 6. Calculate the time required for each phase using your data. Also calculate the time for each phase using the class data. Compare your results in terms of time for each phase to the class data.

7. Answer the analysis questions and write a conclusion

## TABLE#1- Number of cells in each phase (in field of view)

| PHASE      | # OF CELLS |
|------------|------------|
| INTERPHASE |            |
| PROPHASE   |            |
| METAPHASE  |            |
| ANAPHASE   |            |
| TELOPHASE  |            |
| TOTAL      |            |

## TABLE #2- CLASS RESULTS

| Student Name | Interphase | Prophase | Metaphase | Anaphase | Telophase |
|--------------|------------|----------|-----------|----------|-----------|
|--------------|------------|----------|-----------|----------|-----------|

TOTALS

TOTAL # of CELLS \_\_\_\_\_

ANALYSIS

1. Which phase requires the longest time for completion?

- 2. Which phase requires the next longest time for completion?
- 3. Which phase requires the shortest time for completion?

The following table shows average times required for normal and diseased chicken stomach cells to complete mitosis

# TABLE #3- Time for mitosis of normal and cancerous chicken stomach cells ( in minutes)

|            | -                            | -                         |
|------------|------------------------------|---------------------------|
| PHASE      | Normal chicken stomach cells | Cancerous chicken stomach |
|            | in minutes                   | cells in minutes          |
| INTERPHASE | 540                          | 380                       |
| PROPHASE   | 60                           | 45                        |
| METAPHASE  | 10                           | 10                        |
| ANAPHASE   | 3                            | 3                         |
| TELOPHASE  | 12                           | 10                        |

4. In normal chicken cells, which phase requires the longest time for completion?

5. In normal chicken cells, which phase requires the next longest time for completion?

7. How do your answers to questions 4 and 5 compare to your answers to 1 and 2?

8. What is the total time needed for normal chicken stomach cells to complete mitosis? (Total up the time in minutes for each phase)

9. What is the total time needed for cancerous chicken stomach cells to complete mitosis?

10. How do cancer cells differ from normal cells in time spent for each phase?

11. How do cancer cells differ from normal cells in the total time required for mitosis?