

Name _____ Date _____ Period _____

OBSERVING THE PHASES OF THE CELL CYCLE

PURPOSE:

In this investigation, you will observe the various phases of the cell cycle in both plant and animal cells. By completing these activities, you will review how to properly use the compound microscope.

HYPOTHESES:

1. If cells are observed at different phases of the cell cycle, then the *most* common phase will be _____.
2. If cells are observed at different phases of the cell cycle, then the *least* common phase will be _____.

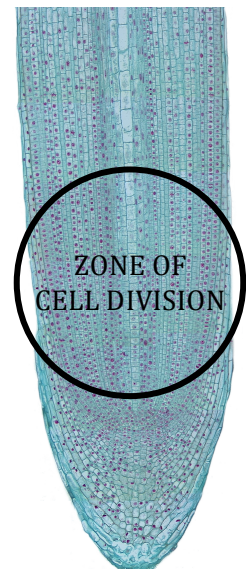
WORD BANK FOR HYPOTHESES: interphase / prophase / metaphase / anaphase / telophase

MATERIALS:

- compound microscope
- prepared slide of *Allium* (onion) root tip cells
- prepared slide of whitefish blastula cells
- prepared slide of human chromosomes
- cell phone camera

PROCEDURE:

1. Obtain a prepared slide of onion root tip cells. Identify the zone of cell division. Secure the slide to the microscope stage. Using the low-power objective, adjust the focus of the microscope until the zone of cell division is clearly visible. Make sure your image is centered.
2. Focus the cells using the medium-power objective. Again, make sure your image is centered. Finally, switch to the high-power objective and focus the cells again.
3. Using the microscope knobs, move the stage around until your field of view contains at least one cell from each of the five phases of the cell cycle. Take a photo of the field of view at high power.



4. Determine the number of cells in your field of view that are in each phase of the cell cycle. Use this data to calculate the percent of cells that are in each phase. Record this information in Data Table #1. When completing Data Table #1, do not count any cells in which it is not possible to determine the phase. NOTE: It might be easier to print out your photo and cross off the cells as you count them.
5. Crop your photo of the onion root tip cells and place one image of each phase in Data Table #1. Include 3 qualitative observations for each phase. You may use statements from your slideshow or lecture notes as part of your qualitative observations.
6. Obtain a prepared slide of whitefish blastula cells. Secure the slide to the microscope stage. Using the low-power objective, adjust the focus of the microscope until the cells are clearly visible. Make sure your image is centered. NOTE: These cells are much more difficult to observe due to the light pink stain that was used. Adjust the brightness of the microscope as well as the diaphragm in order to see them most effectively.
7. Focus the cells using the medium-power objective. Again, make sure your image is centered. Finally, switch to the high-power objective and focus the cells again.
8. Using the microscope knobs, move the stage around until your field of view contains at least one cell from each of the five phases of the cell cycle. Take a photo of the field of view at high power. If you cannot see all of the five phases in one field of view, you may take multiple photos.
9. Determine the number of cells in your field(s) of view that are in each phase of the cell cycle. Use this data to calculate the percent of cells that are in each phase. Record this information in Data Table #2. When completing Data Table #2, do not count any cells in which it is not possible to determine the phase. NOTE: It might be easier to print out your photo(s) and cross off the cells as you count them.
10. Crop your photo of the whitefish blastula cells and place one image of each phase in Data Table #2.
11. Obtain a prepared slide of human chromosomes. Secure the slide to the microscope stage. Using the low-power objective, focus and center your image. Then focus and center the image using the medium-power objective. Finally, switch to the high-power objective and focus the cells again.
12. Using the microscope knobs, move the stage around until your field of view contains the human chromosomes. Take a photo of the field of view at high power.
13. Crop your photo of the human chromosomes and place it in Data Table #3.

RESULTS:

Data Table #1: _____

Phase	Number of Cells	Percentage of Cell Cycle	3 Qualitative Observations	Photo
Interphase				
Prophase				
Metaphase				
Anaphase				
Telophase				
TOTAL				

Data Table #2: _____

Phase	Number of Cells	Percentage of Cell Cycle	Photo
Interphase			
Prophase			
Metaphase			
Anaphase			
Telophase			
TOTAL			

Data Table #3: _____

Photo

POST-LAB QUESTIONS:

1. Why were onion root tip cells and whitefish blastula cells chosen for this lab?
2. Do onion root tip cells go through the phases of the cell cycle at the same rate as whitefish blastula cells? Explain using CLAIM → EVIDENCE → REASONING.
3. How would the photo of the human chromosomes look different if they were viewed **BEFORE** the S phase of interphase versus **AFTER** the S phase of interphase?
4. How would the photo of the human chromosomes look different if they were viewed in a **SPERM OR EGG CELL** versus a **SOMATIC CELL**?
5. How is cytokinesis different in **ANIMAL CELLS** versus **PLANT CELLS**? Explain using CLAIM → EVIDENCE → REASONING. HINT: Look at the shape of the onion root tip cells and the whitefish blastula cells during telophase.

QUESTIONS TO HELP YOU WITH YOUR LAB REPORT:

1. Identify the independent and dependent variables for this lab.
2. Was your hypothesis correct? Explain using CLAIM → EVIDENCE → REASONING.
3. Identify 1 or 2 sources of error for this lab. Explain your answer(s).
4. Identify 1 or 2 ways to improve this lab. Explain your answer(s).
5. What conclusion(s) can you draw regarding the phases of the cell cycle?