

Name: \_\_\_\_\_, Date: \_\_\_\_\_, Period: \_\_\_\_\_

## EXAMINING CANCER PATIENT DATA

### Part 1: Hypothesis

1. Would you expect patients with the same kind of cancer to have a greater number of mutated genes in common or would you expect patients with different kinds of cancers to have a greater number of mutated genes in common? Explain.
2. Would you expect to see more mutations in oncogenes or tumor suppressor genes? Explain.
3. Would you expect to see more mutations in genes involved with cell fate, cell survival or genome maintenance? Explain.

### Part 2: Your Patient

1. How many mutated genes are found in your patient?
2. What chromosomes have mutations?
3. What percent of those genes are oncogenes? Reminder: to find percentage, divide the number of oncogenes by the total number of genes listed and multiply by 10.
4. What percent of those genes are tumor suppressor genes? Reminder: to find percentage, divide the number of tumor suppressor genes by the total number of genes listed and multiply by 10.
5. What percentage of the genes are involved with cell fate? Reminder, to find percentage, divide the number of genes involved with cell fate by the total number of genes listed and multiply by 10.

6. What percentage of the genes are involved with cell survival? Reminder: to find percentage, divide the number of genes involved with cell survival by the total number of genes listed and multiply by 10.
7. What percentage of the genes are involved with genome maintenance? Reminder: to find percentage, divide the number of genes involved with genome maintenance by the total number of genes listed and multiply by 10.

### Part 3: Comparing by cancer type

*Get into a group with all of your classmates that have patient cards with the same type of cancer. For example, all of the lung cancer patients will group together.*

1. Which patient has the most genetic mutations? How many?
2. Which patient has the fewest genetic mutations? How many?
3. On average, how many genetic mutations are involved in each patient's cancer? Reminder: to find average, add together the total number of mutated genes and divide by the number of patients.
4. Looking at all of your patients, which chromosomes have mutations?
5. Looking at all of your patients, what percent of those genes are oncogenes? Reminder: to find percentage, divide the number of oncogenes by the total number of genes listed and multiply by 10.
6. Again looking at all of your patients, what percent of those genes are tumor suppressor genes? Reminder: to find percentage, divide the number of tumor suppressor genes by the total number of genes listed and multiply by 10.
7. Looking at all of your patient cards, what percentage of the genes are involved with cell fate? Reminder, to find percentage, divide the number of genes involved with cell fate by the total number of genes listed and multiply by 10.



11. Are there any of these genes that are mutated in multiple patients? If so, which one? Is it a tumor suppressor or oncogene? Is it involved with cell fate, cell survival or genome maintenance?
12. How many total different genes are involved with your patient's cancers?

#### Part 4: Comparing by patient number

*Get into a new group with all of your classmates that have the same patient number. For example, LC1, BC1, G1, M1, etc., would all be in the same group.*

1. Which patient has the most genetic mutations? How many?
2. Which patient has the fewest genetic mutations? How many?
3. On average, how many genetic mutations are involved in each patient's cancer? Reminder: to find average, add together the total number of mutated genes and divide by the number of patients.
4. Looking at all of your patients, which chromosomes have mutations?
5. Looking at all of your patients, what percent of those genes are oncogenes? Reminder: to find percentage, divide the number of oncogenes by the total number of genes listed and multiply by 10.
6. Again looking at all of your patients, what percent of those genes are tumor suppressor genes? Reminder: to find percentage, divide the number of tumor suppressor genes by the total number of genes listed and multiply by 10.
7. Looking at all of your patient cards, what percentage of the genes are involved with cell fate? Reminder, to find percentage, divide the number of genes involved with cell fate by the total number of genes listed and multiply by 10.
8. Looking at all of your patient cards, what percentage of the genes are involved with cell survival? Reminder: to find percentage, divide the number of genes involved with cell survival by the total number of genes listed and multiply by 10.

9. Looking at all of your patients, what percentage of the genes are involved with genome maintenance?  
Reminder: to find percentage, divide the number of genes involved with genome maintenance by the total number of genes listed and multiply by 10.

10. Compile your data into a table. In the far right column, list the gene that is affected. Check the box for each patient who has that mutated gene (not all of the rows may be needed, depending on your patient number).

Mutated gene	Lung cancer	Breast cancer	Colorectal cancer	Glioma	Melanoma	Hepatic	Pancreatic	Leukemia
Mutated gene	Lung cancer	Breast cancer	Colorectal cancer	Glioma	Melanoma	Hepatic	Pancreatic	Leukemia


11. Are there any of these genes that are mutated in multiple patients? If so, which one? Is it a tumor suppressor or oncogene? Is it involved with cell fate, cell survival or genome maintenance?

12. How many total different genes are involved with your patient's cancers?

#### Part 5: Drawing conclusions

- Using data to support your conclusion, did patients with the same kind of cancer have a greater number of mutated genes in common or did patients with different kinds of cancers have a greater number of mutated genes in common?
- Is there a gene (or genes) that occurs in multiple different cancer types? Which gene?
- What other trends do you notice?