

Cornell Guided Notes

Genetics of Disease (Medical Interventions) | 2027-03-24

Name

Period

Date

Lesson

Lesson focus

Expression data lab

Key words and questions

Prepared details and student notes

Essential question
What is today's target?

Use a gene expression table to calculate fold change and flag upregulated and downregulated genes. Big idea: How do numbers in a spreadsheet reveal which genes a disease turns on or off?

My notes, examples, and questions

Key words
What vocabulary unlocks the lesson?

- gene expression
- mRNA
- upregulated
- downregulated
- correlation
- risk
- diagnosis

My notes, examples, and questions

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Cornell Notes - Continued

Key words and questions

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Must-know ideas
What should I understand by the end?

- Fold change = diseased expression / healthy expression; greater than 1 is upregulated, less than 1 is downregulated.
- Microarray data is generated by measuring fluorescence intensity at each probe spot; the numbers in the dataset represent those intensities.
- An upregulated gene in diseased tissue may be driving the disease (oncogene) or responding to protect cells (repair gene).

My notes, examples, and questions

Process notes
What happens during class?

- 0-8: Hook heat map and fold-change formula introduction; confirm dataset access
- 8-25: Open dataset; locate diseased and healthy columns; calculate fold change for genes 1-2
- 25-45: Calculate fold change for genes 3-4; label all four as up or downregulated
- 45-60: Write one sentence on what an upregulated gene might mean for the disease
- 60-72: Partner check: verify each other's calculations for arithmetic errors
- 72-80: Save fold-change table to course shell; preview Thursday heat-map work

My notes, examples, and questions

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Steps and evidence What do I do and turn in?

- Open the expression dataset in the shell and find the diseased and healthy sample columns.
- For four genes, calculate fold change by dividing diseased expression by healthy expression.
- Label each gene upregulated or downregulated based on whether fold change is above or below one.
- Write one sentence on what an upregulated gene might mean for the disease.
- Save your fold-change table as your lab evidence.

Evidence: Data table - Fold-change table for four genes with upregulated/downregulated labels and one sentence on the biological meaning of an upregulated gene.

My notes, examples, and questions

Checks for understanding How do I know I got it?

- You'll be able to calculate fold change from expression data.
- You'll be able to flag genes as upregulated or downregulated.

My notes, examples, and questions

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Lab or safety notes
What must I handle carefully?

Safety:

- No wet lab materials today; all work is computational.
- Dataset is anonymized class-aggregate; do not enter or share personal identifying information.
- Save your work frequently; do not rely on browser auto-save for the dataset.

Supplies:

- Computer or tablet with access to the expression dataset in the course shell (one per student or pair)
- Printed or digital data-table template for recording fold-change calculations
- Colored pencils or digital fill (two colors) for preliminary heat-map shading on Thursday
- Calculator or spreadsheet formula access for division calculations

My notes, examples, and questions

Summary

Today's lesson focused on Expression data lab. The main target was: Use a gene expression table to calculate fold change and flag upregulated and downregulated genes. The evidence of learning is Data table: Fold-change table for four genes with upregulated/downregulated labels and one sentence on the biological meaning of an upregulated gene.. In my own words, the most important idea from today is:

My summary

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My final question or connection