Genetics 10

For educators

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Why should I use it?

- Topic: Genetics and Bioinformatics
- Built from the scholar curriculum
- Interactive & active learning
- Customizable & adaptable → easier to use
- First-person engaging
- Applied activity promotes critical thinking & problem-solving skills
- Collaboration, team projects and communication

Why should I use it?

- Web-based
- No installation required → good for school-managed devices
- OS-agnostic
- No coding knowledge required
- Scalable tool

How can I use it?

EXPLAIN FUNDAMENTAL CONCEPTS OF GENOMICS

IDENTIFY THE TIME TO INTRODUCE THE SOFTWARE

Challenge-like activities

LEVERAGE IT BY INTEGRATING REAL-WORLD EXAMPLES, AND CHALLENGE-LIKE ACTIVITIES

PROMOTING CRITICAL THINKING

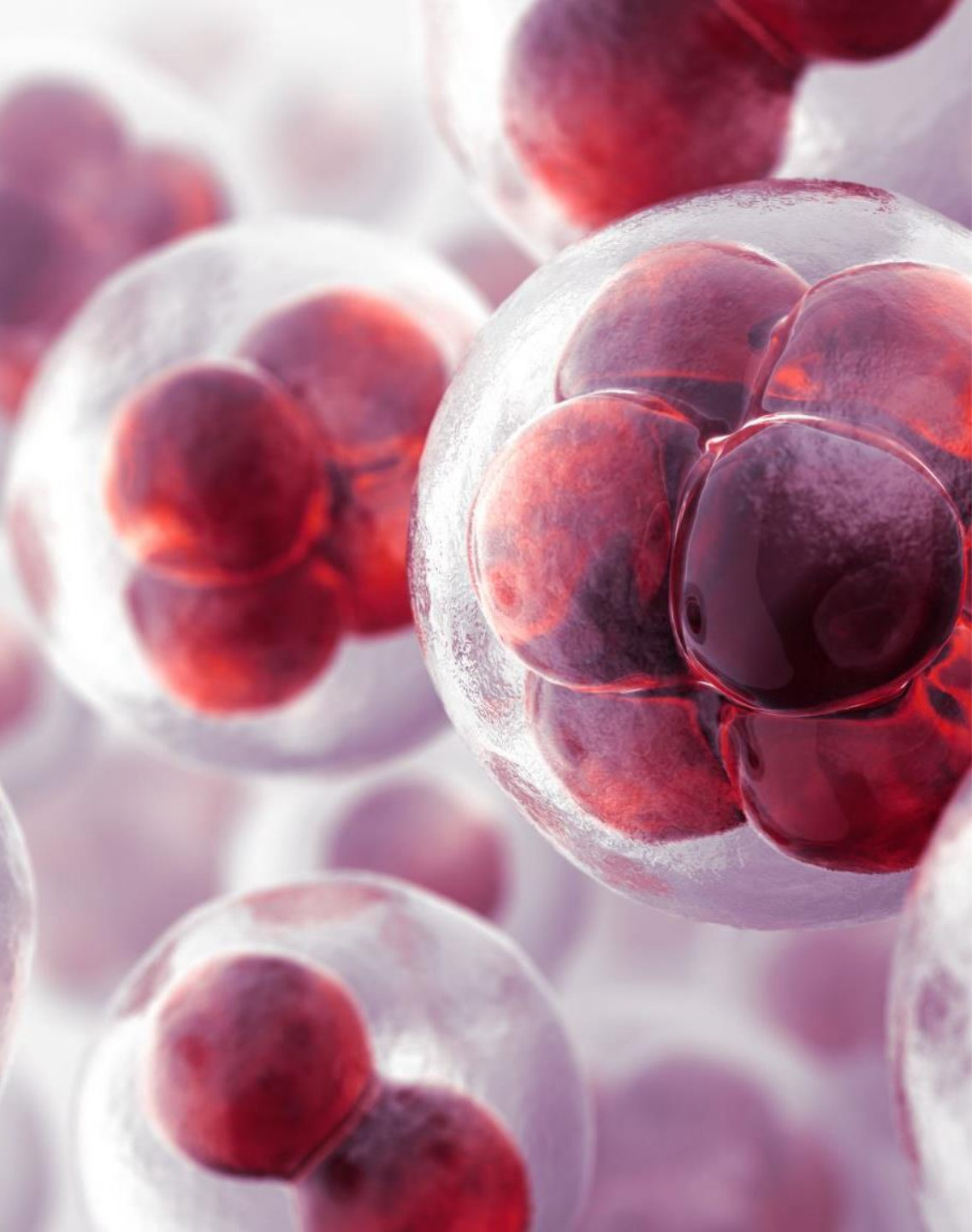
OPPORTUNITY FOR TEAMWORK

Correct mutation

"You were given two copies of a gene. One of them has a mutation that causes a disease, you are asked to identify and correct that mutation. Write your own code using the pre-established functions."

Educators can use the `createmutation()` function to create DNA or RNA strings.

Students then use the `compare()` and `check()` to find mutations. In addition, they can use translate/transcript the string into amino acids to see the effect of mutations.



Protein structure

“Researchers have identified a gene mutation causing a disease. To develop a treatment, you want to know how the mutation in the DNA sequence causes changes in the protein structure. Write your code with the pre-established functions.”

Students would use the AlphaFold API to compute the structure of proteins. Then they could use 3D visualization to see the differences.

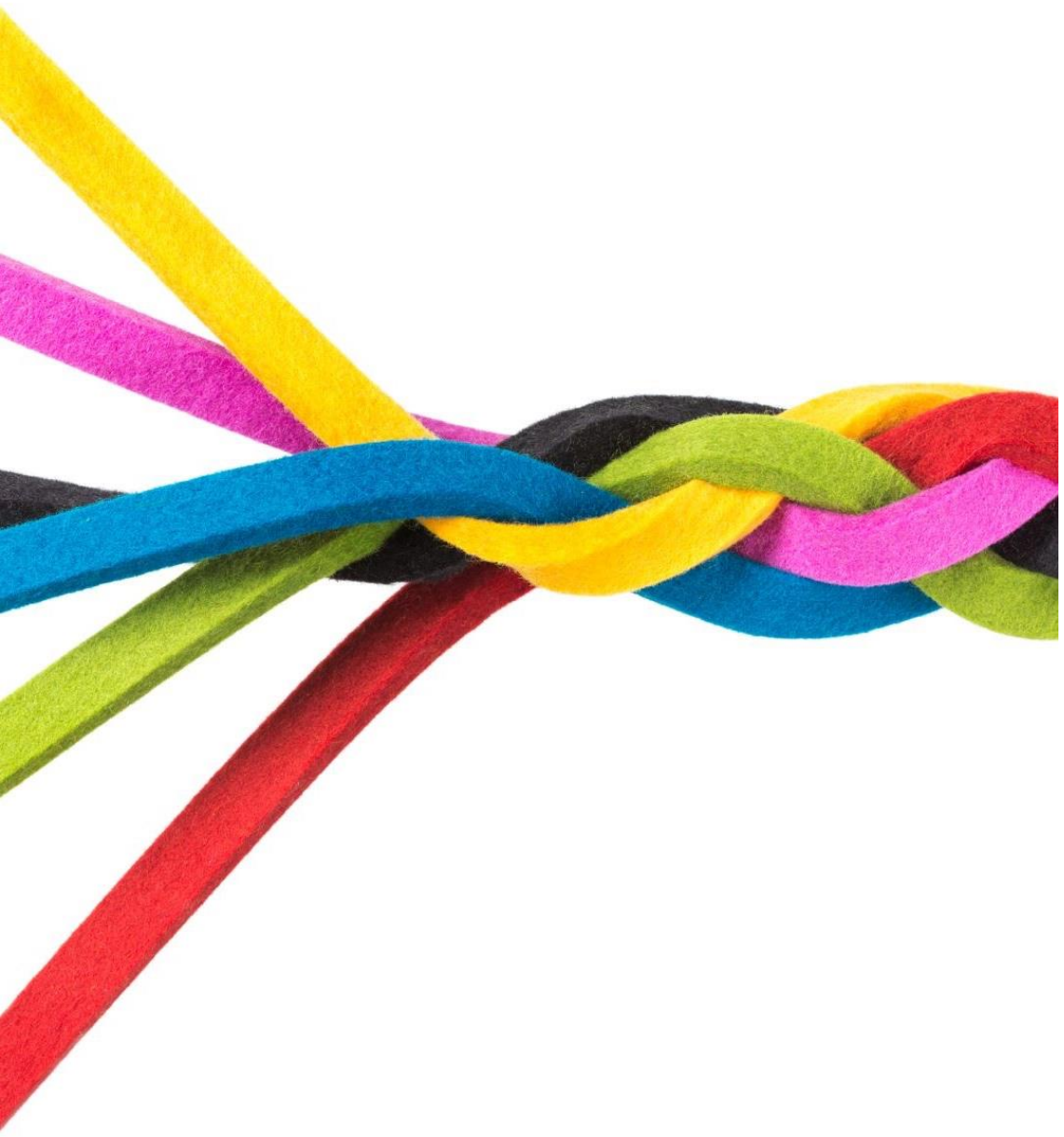
Heritage or surroundings?

“You are asked to show if a decease is heritable or not. Previous studies have identified the amino acid sequence of the disease protein. At your disposal you are given 10 DNA strings from an ill person.”

Students would need to read literature and extract the amino acid sequence of the malicious protein (optional). Then they will use the iterate() function to compute 10 translations and transcriptions. And the compare() and check() functions to compare the amino acid sequence of the protein with the computed ones. If they are identic, the disease is heritable, otherwise the disease is caused somewhere else.

Flipped classroom

- Assigning tutorials as homework
- Use class time for interactive and active learning
- Maximized classroom engagement
- Personalized instruction



Collaboration

- Encourage group projects (e.g. create a new function)
- Fostering of teamwork and communication skills
- Learning from each other


Questions?
Submit a GitHub issue @ github.com/joanalnu/gen10!