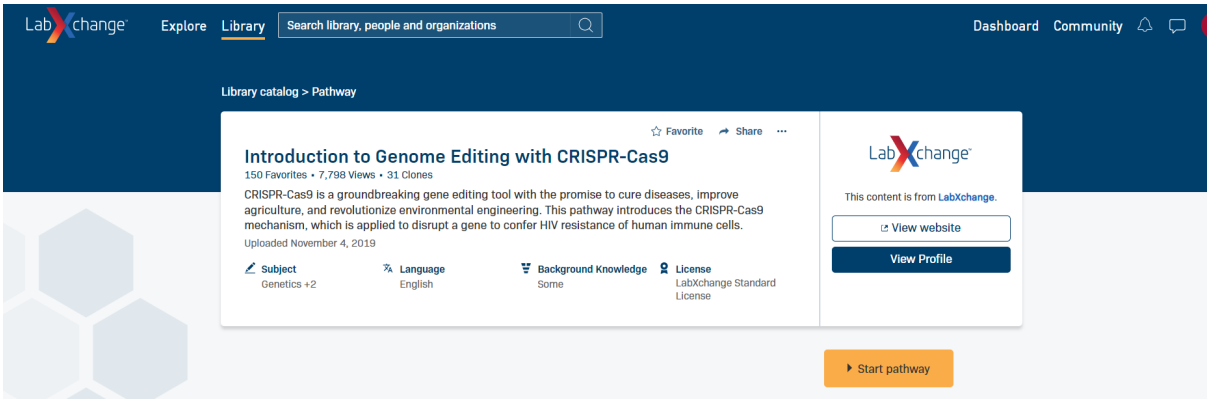
Unit 3: Advanced Biotechnology

1: Introduction to Gene Editing with CRISPR-Cas9



Learning objectives

1. You will summarize the potential applications of the gene editing tool CRISPR-Cas9.
2. You will recall the origin of the gene editing tool CRISPR-Cas9 as a bacterial defense mechanism.
3. You will examine the molecular mechanism of CRISPR-Cas9.
4. You will summarize CRISPR-triggered DNA repair mechanisms.

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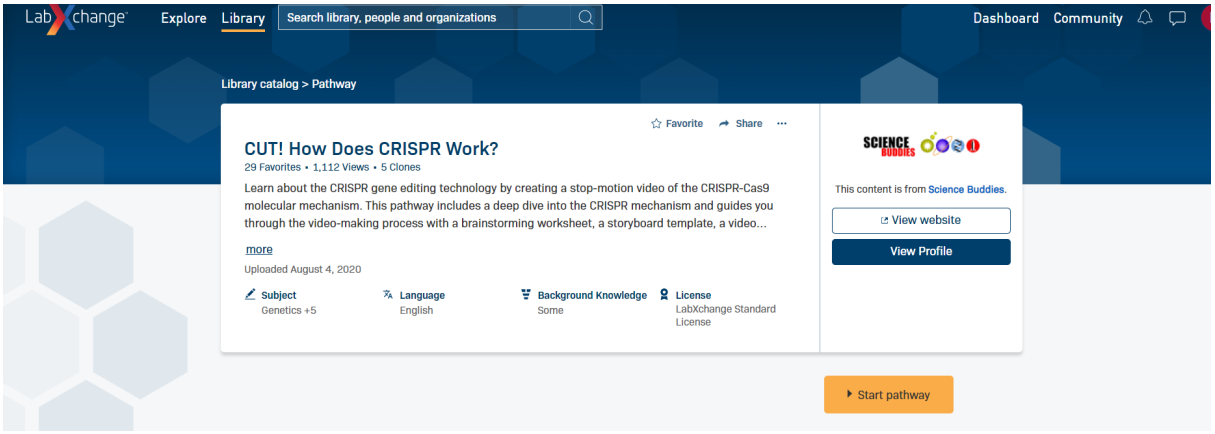
2: Gene Editing and Bioethics



Learning objectives

1. You will examine the molecular mechanism of CRISPR-Cas9 genome editing.
2. You will build a model to visualize the molecular mechanism of CRISPR-Cas9.
3. You will identify the ethical implications of the CRISPR technology and its applications.

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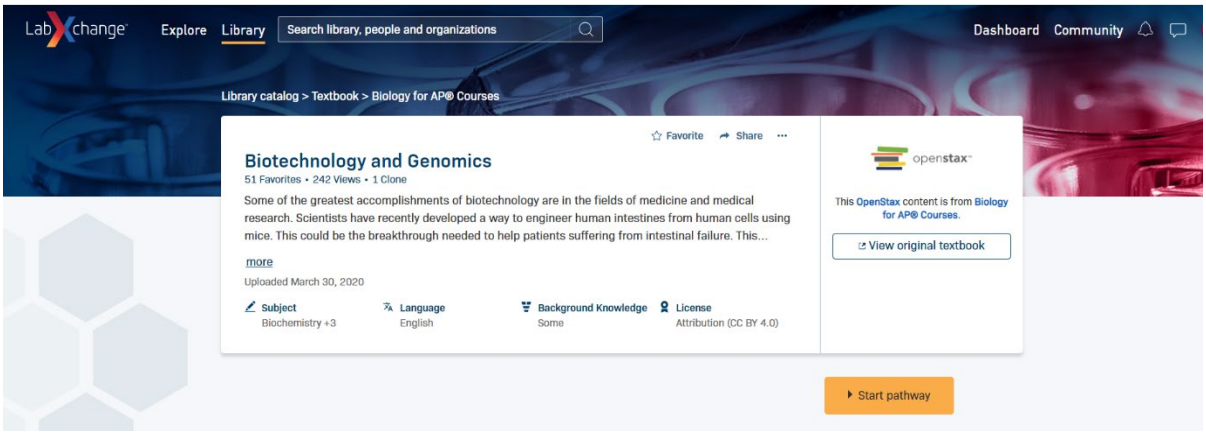
3: Biotechnology and Genomics



Learning objectives

1. You will name three types of gene sequencing.
2. You will discuss whole-genome sequencing.
3. You will define pharmacogenomics.
4. You will describe an example of a polygenic human disease.
5. You will identify examples of basic techniques used to manipulate genetic material (DNA and RNA).
6. You will describe the difference between molecular and reproductive cloning.
7. You will define a proteome.
8. You will identify examples of uses of biotechnology in medicine and agriculture.
9. You will describe a protein signature and discuss its relevance to cancer screening.
10. You will describe genomics.
11. You will define a genetic map.
12. You will describe an example of a genomic mapping method.
13. You will name three types of gene sequencing.
14. You will discuss whole-genome sequencing.

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15. You will define pharmacogenomics.
16. You will describe an example of a polygenic human disease.
17. You will define a proteome.
18. You will describe a protein signature and discuss its relevance to cancer screening.