

Bacterial Adaptations and Their Application in Genetic Engineering

Day 2

PART 3

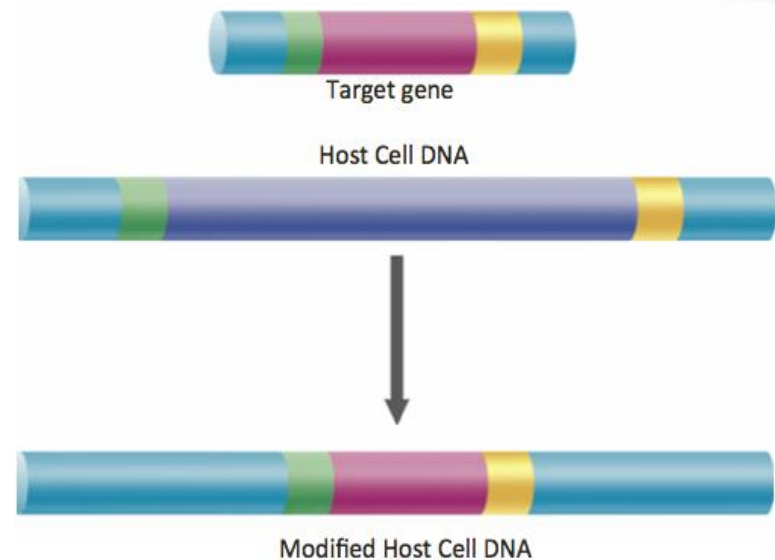


Using E. coli for transformation

As mentioned, *Escherichia coli* has been the microorganism of choice for many experiments for various reasons:

- It has a very fast growth rate, making it possible to grow one generation per 20 minutes.
- *E. coli* is relatively easy to grow.
 - Since they grow in the human body, maintaining a temperature of 98.6 degrees is easily managed in a lab.
- It is a very useful host for creating recombinant DNA.
 - Recombinant DNA is DNA that has been formed artificially combining DNA from two different organisms.

This makes *E. coli* very useful for genetic engineering.



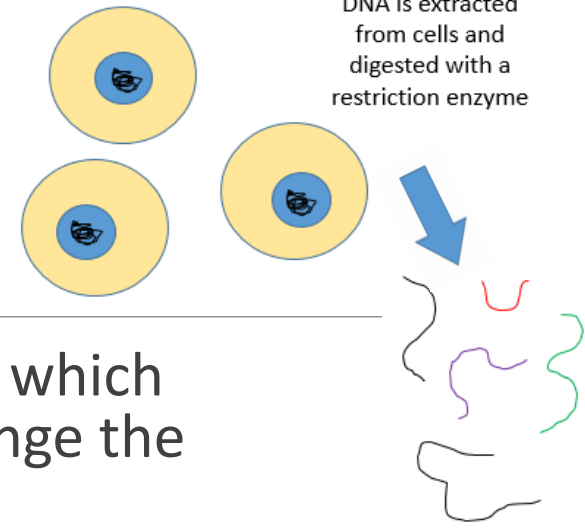
Genetic Engineering

Genetic engineering is the process through which genes are manipulated to purposefully change the genetic material and enhance organisms.

It sometimes uses bacteria because of their plasmids.

- Easy to map and modify since they are small pieces of DNA
- Cells understand how to read them and follow their instructions

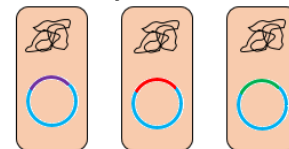
Scientists can cut them open and insert a new gene from another organism then the bacteria can transfer its modified plasmid into another cell, carrying the new gene.



DNA fragments are inserted into cloning vectors



Bacterial cells are transformed with vectors



GMOs

Genetic engineering produces **genetically modified organisms** (GMOs)

- Organisms that have had their genes changed in a way that does not happen naturally.

Examples of GMOs

- Plants that have a higher nutritional value, can survive with less water, grow larger, or can tolerate exposure to herbicides.
- Genetically engineered *E. coli* detect cancerous tumor in mice liver and cause their urine to change color as a warning.
- Glow in the dark cats that help them resist feline AIDS.

Watch [this video](#) about genetically modified foods.

What are your thoughts on genetically modified organisms?

