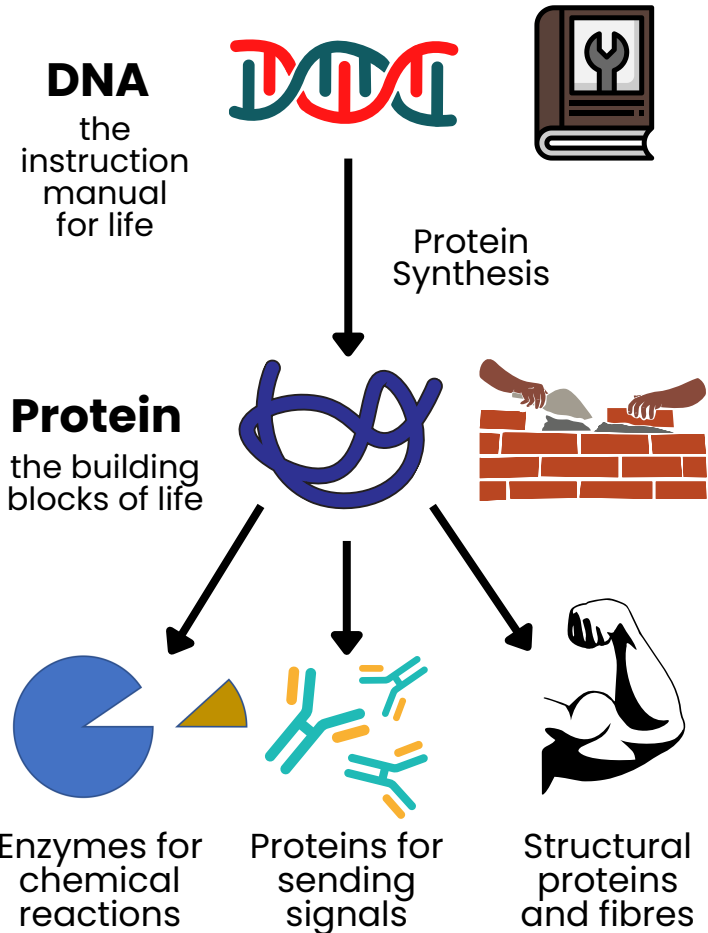


Life at the Molecular Life

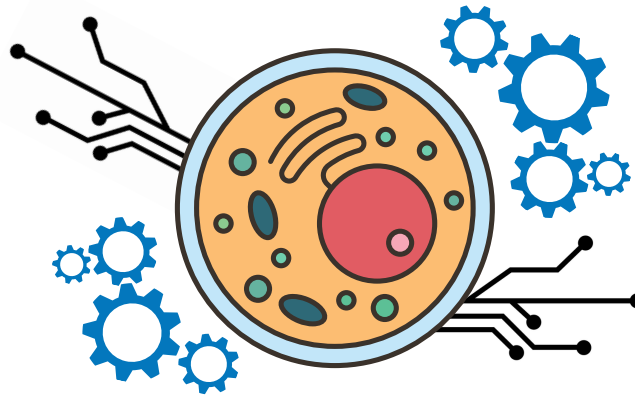
We all have DNA, but what does it do? Why is it important?



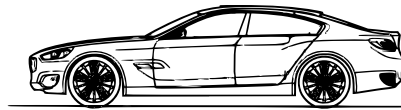
DNA gives cells their functions, telling them what to do and gives them the tools (proteins) to do it. What happens when we change a cell's DNA?

Synthetic Biology

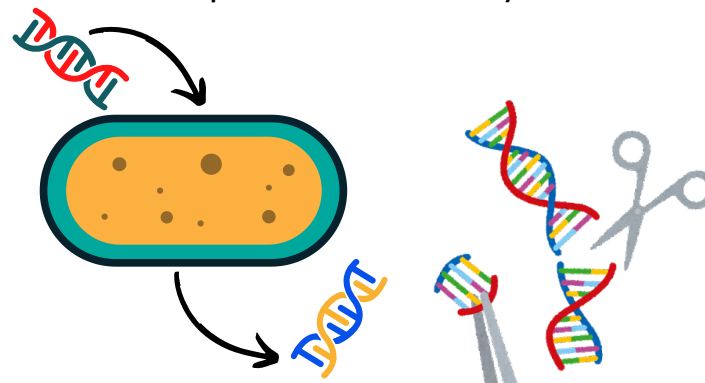
Decades of research and new technologies are now allowing us to build and modify life, demanding a new type of Biology:



Life is complicated, but thinking like a "DNA engineer" can help!



Cells are like little machines, take out or improve the parts you don't like and put in new ones you do!

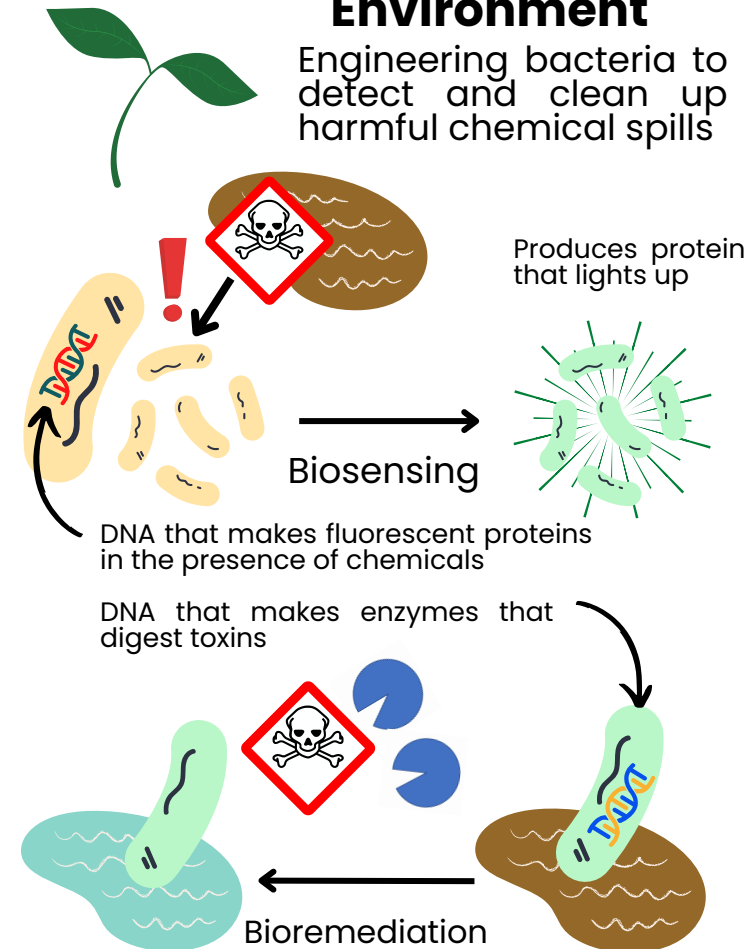


Custom Life

By adding, removing or improving DNA, we can give organisms new functions or make them better at what they already do, like tuning a car. Engineered organisms can then help us solve real world problems.

Environment

Engineering bacteria to detect and clean up harmful chemical spills



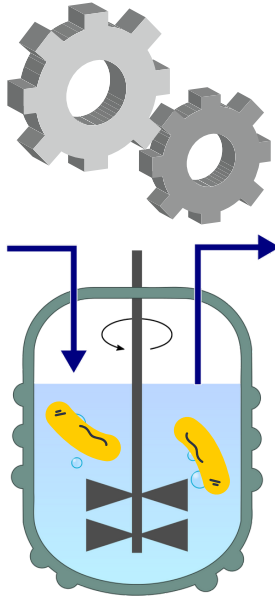
Manufacturing

Engineered organisms can produce many things using far less space and energy than industrial chemistry.

These include:

- Biofuels
- Medicines
- Spider Silk
- Artificial Meat
- Even Coffee!

We already use bacteria to make insulin and biodetergents!

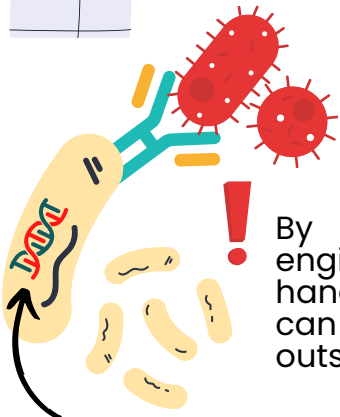
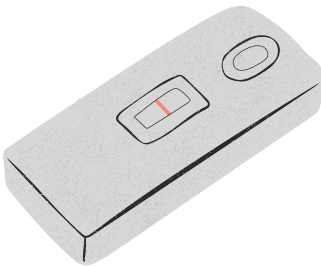


Diagnostics

Many diseases are impossible to detect with chemical tests.

By packaging an engineered bacteria into handheld devices, we can detect diseases even outside the hospital!

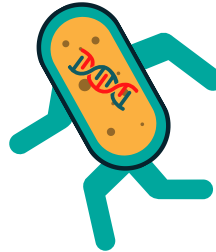
DNA that makes proteins that bind to disease-causing microorganisms.



Safety

Engineering DNA has never been easier, but with great power comes great responsibility.

Just as cells can be engineered to make live-saving drugs, they can also make deadly toxins.



An organism engineered to grow fast to soak up pollutants may spread out of control or pass its modified DNA on to other bacteria.

How can we prevent accidents and stop potential misuse?

Safety Measures

- Engineering bacteria to switch off or "suicide" upon lab escape
- Not sharing results that could be misused e.g., to make pathogens more deadly
- Educating scientists and public awareness
- Health and Environment Risk Assessments



Building on decades of research and new technologies, Synthetic Biology has the potential to change the world.

What will **you** build?



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Synthetic Biology

An Introduction

