

iGEM

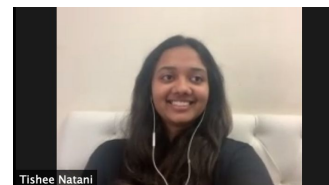
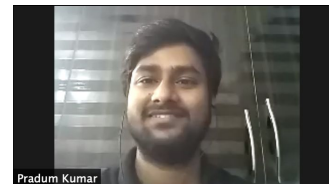
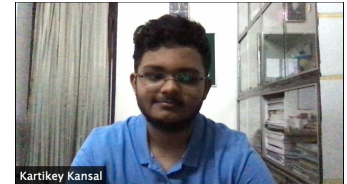
Webinar Series

Classes 9th & 10th

Who we are?

We are a bunch of undergraduate students from IIT Roorkee conjoining from various disciplines to participate in the **world's largest Synthetic Biology competition, iGEM** (International Genetically Engineered Machine), hosted by MIT, Boston, USA.

We aim to solve one of the major problems the healthcare industry faces today using the tools of Bioengineering and Machine Learning.



What is iGEM?



- World's Largest **Synthetic Biology Competition**
- Started in **Massachusetts Institute of Technology** in 2003
- Engineering + Biology → Solve local and global problems



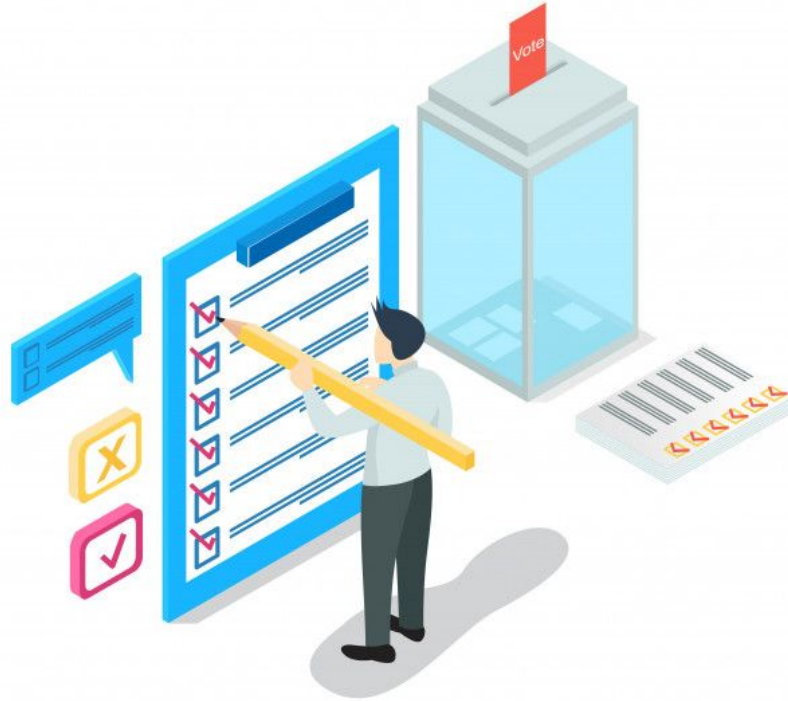
47+
Countries

350+
Teams

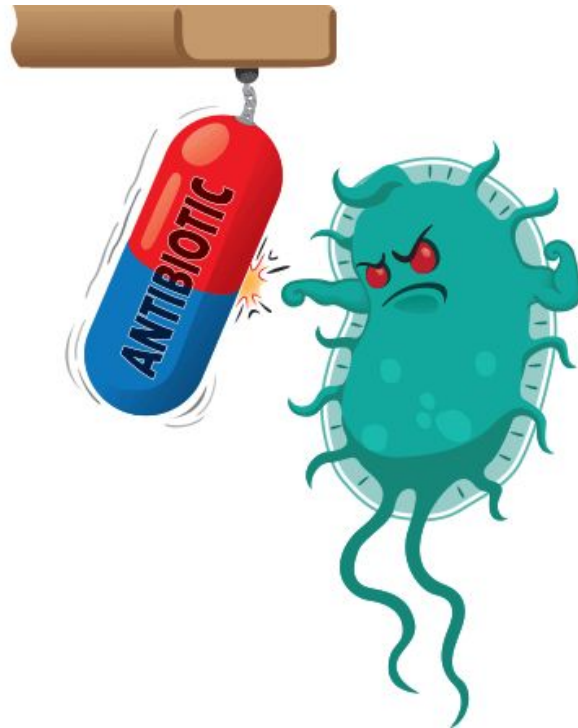
4000+
Participants



Pre - Webinar Survey



Antibiotic Resistance

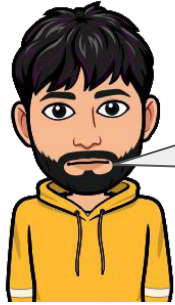


Imagine it's 2050!



Oops!, I got hit by a wire, I need to see a doctor!

Imagine it's 2050!



I got hit
by a
metal
wire



I have given you a
tetanus shot and
you should complete
this antibiotic
course. You will
recover shortly.

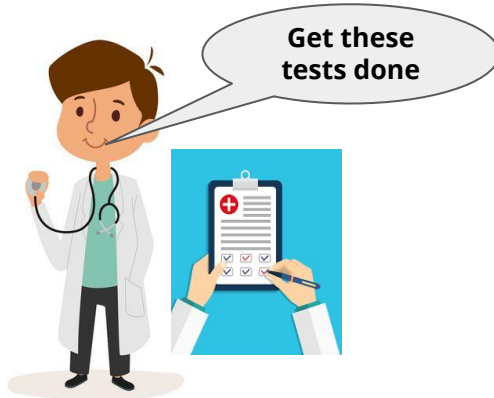


I think my
health is
getting worse



I think I need to
see the doctor
again!

Imagine it's 2050!



After the pathological review...



You are suffering from
a drug-resistant
infection

**ANTIBIOTIC
RESISTANCE**

That's why the
antibiotics didn't work
on you!

Problem : Antibiotic Resistance

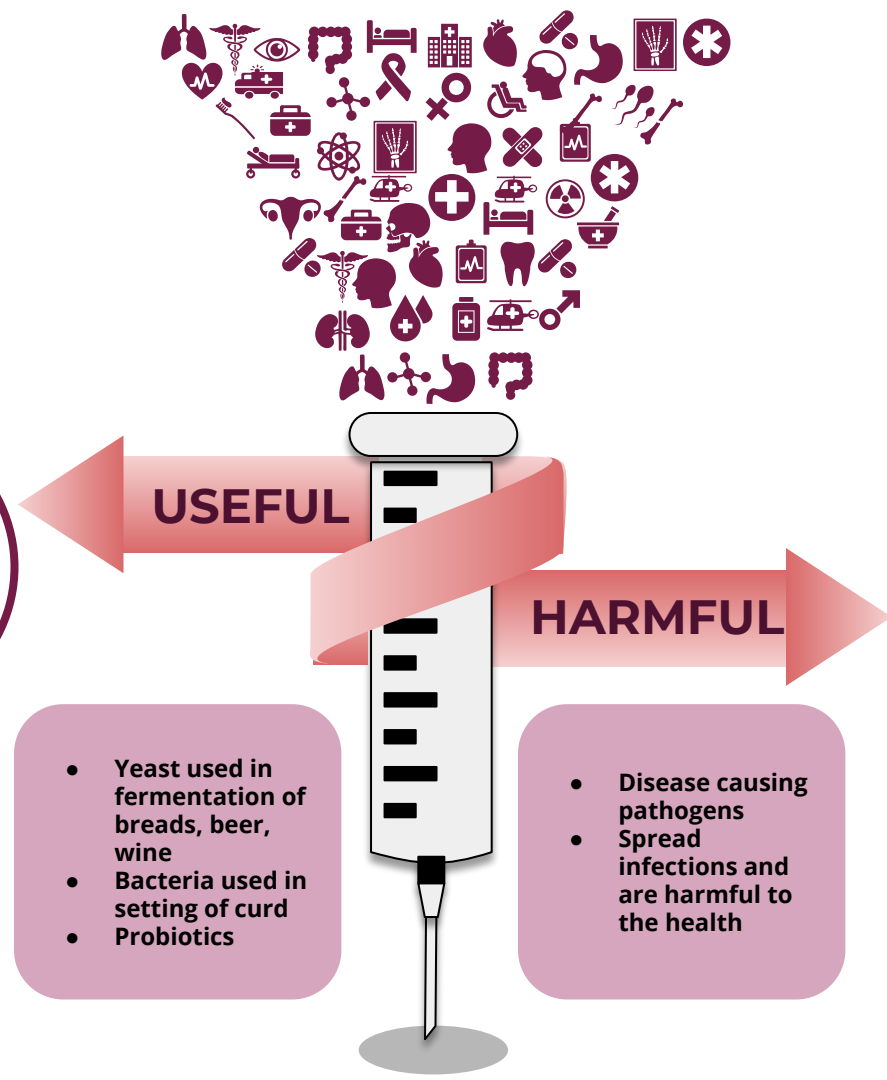
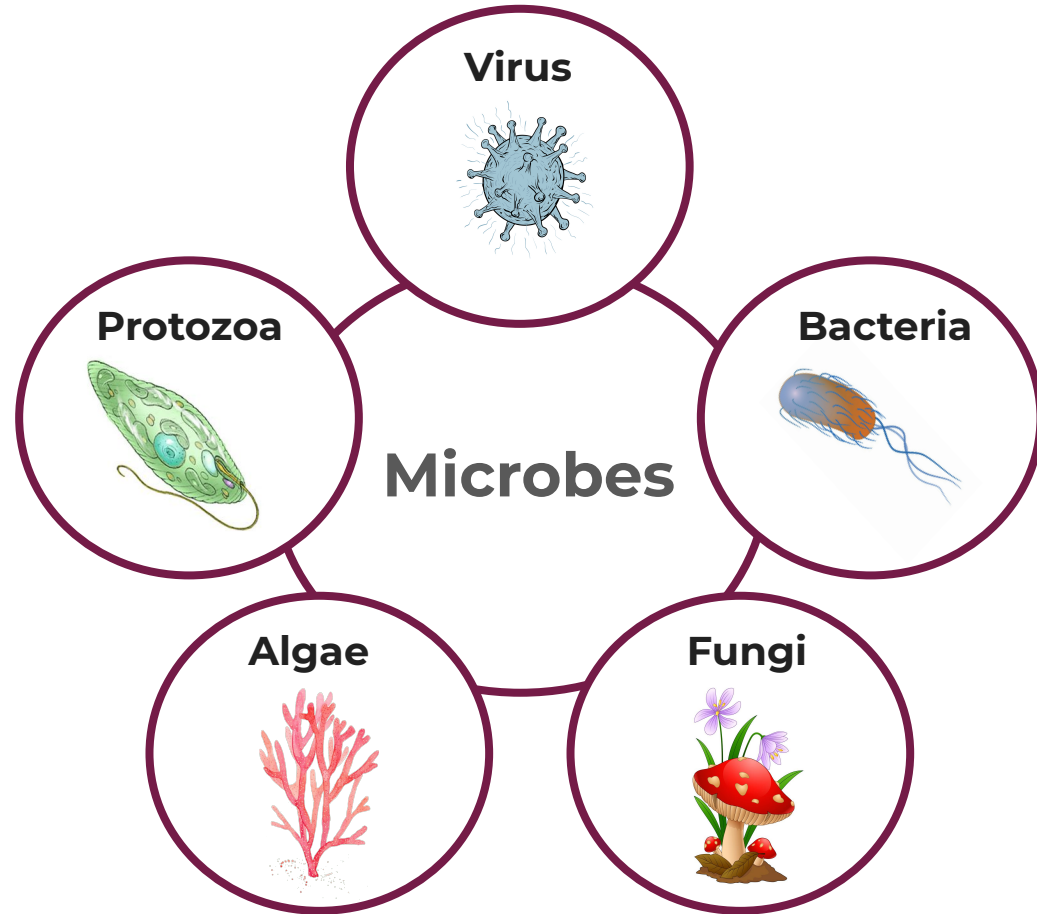
Even a small cut can prove **life threatening!!**



**WHO has
predicted 10
million such
deaths by 2050
due to the
problem of AMR!**



Microbes and their types



What are antibiotics?

- A type of antimicrobial substance active against bacteria
- Most important type of antibacterial agent for fighting bacterial infections
- Antibiotic medications are widely used in the treatment and prevention of such infections. They may either kill or inhibit the growth of bacteria



Bacterial infections

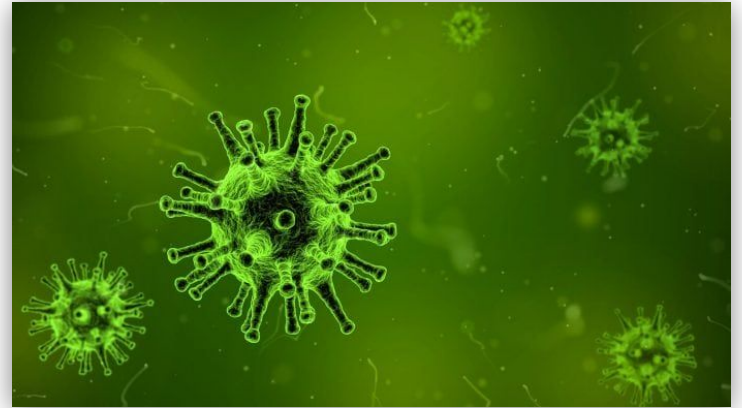
- Strep throat
- Tuberculosis
- Urinary tract infections



vs

Viral infections

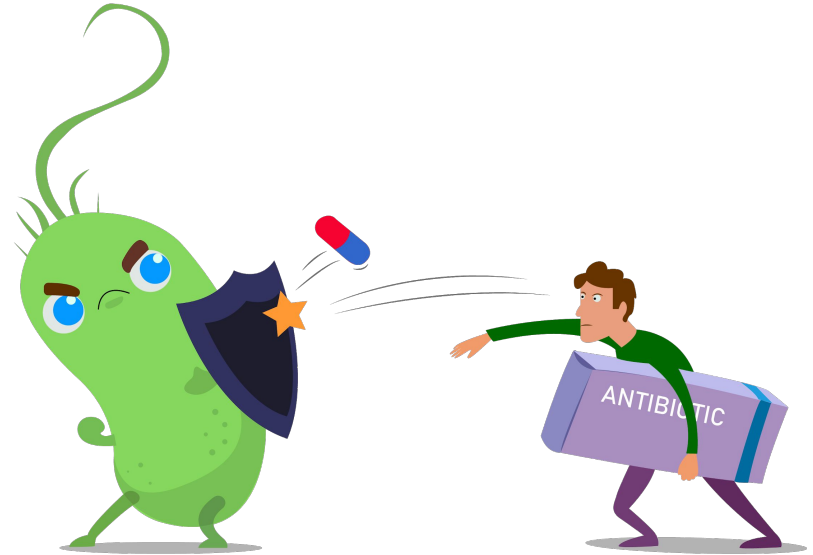
- Chickenpox
- AIDS
- Common colds



Antibiotics work only on Bacterial Infections

What is Antibiotic Resistance

- The bacteria grow strong in nature and can no longer be killed by the antibiotics.
- Such antibiotic-resistant bacteria are called **SUPERBUGS**.



Antibiotics STOP working on Bacterial Infections

What will happen when Antibiotics don't work?

Common infections
can't be treated and
can be fatal



No surgeries can
take place



Cancer
Chemotherapy can't
take place



Preterm births
cannot happen



Post - Antibiotic Era

A single cut by metal could be
fatal.



I got hit
by a metal
wire

What can we do?

Use Antibiotics Responsibly!

4 R's of correct antibiotic usage.

DO's

- ✓ Right Drug
- ✓ Right Time
- ✓ Right Duration
- ✓ Right Dose



DON'Ts

- ✗ Don't take antibiotics without a prescription
- ✗ Don't share your antibiotics
- ✗ Don't leave your antibiotic course incomplete
- ✗ Don't take antibiotics for cold and flu

Synthetic Biology

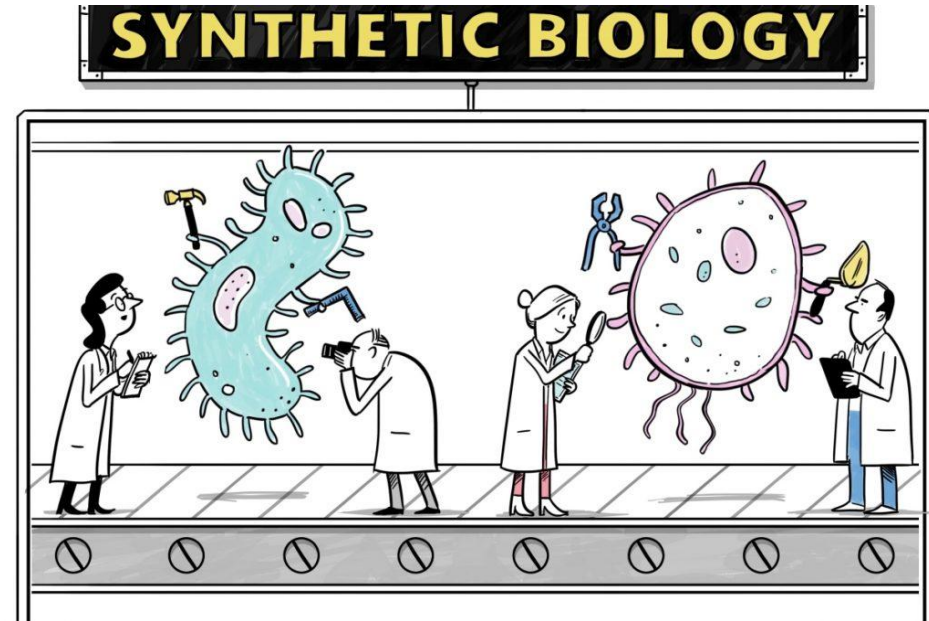
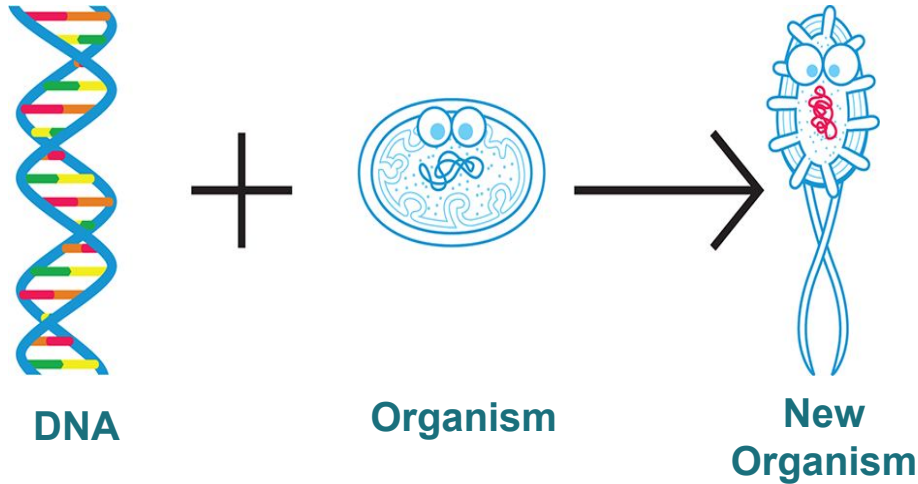


**What I cannot create
I do not understand**

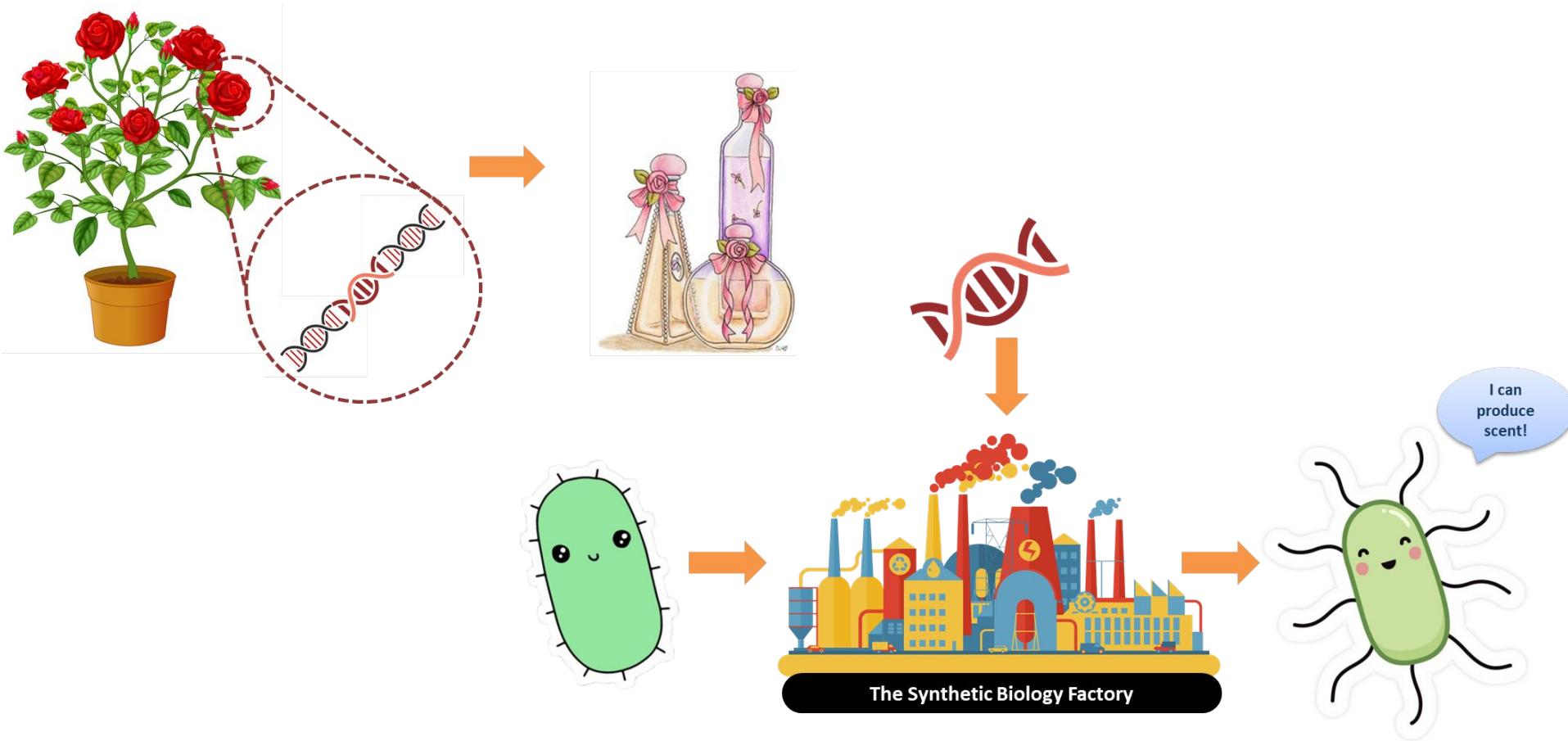
-(Richard Feynman)

Welcome to the world of SynBio!

Combining Engineering and Biology

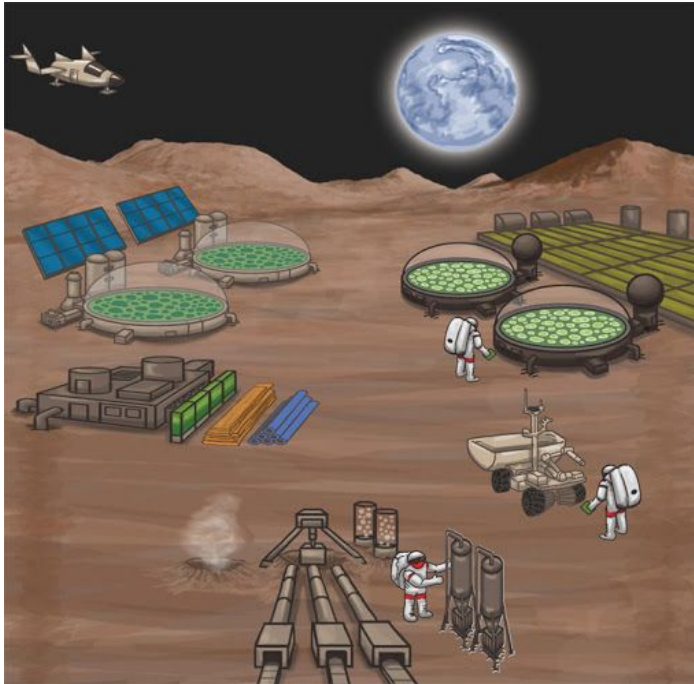


The SynBio Factory



The Transit of Synthetic Biology

With NASA's Curiosity Rover safely landed on Mars and ready to search for signs of life, back on Earth attempts are underway to engineer bacteria that could thrive on the Red Planet.



Synthetic Biology is blooming in the field of space exploration as well!



Elon Musk ✓
@elonmusk



In principle, I think synthetic RNA (and DNA) has amazing potential. This basically makes the solution to many diseases a software problem.

2:36 AM · 7/2/20 · [Twitter for iPhone](#)

92 Retweets 778 Likes

Key Takeaways

In this presentation, you learnt about:

- Antibiotic Resistance, **another pandemic that awaits us!!**
- Your role in tackling antibiotic resistance
- The basic concept of Synthetic Biology
- The role of Synthetic Biology in solving major problems faced by mankind



Post - Webinar Survey



QnA Session

