EDUCATIONAL PACKAGE

On synthetic biology and vaccines

MYCOSYNVAC

Biofaction

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 634942 (MycoSynVac).

SYNTHETIC BIOLOGY

IMMUNE SYSTEM

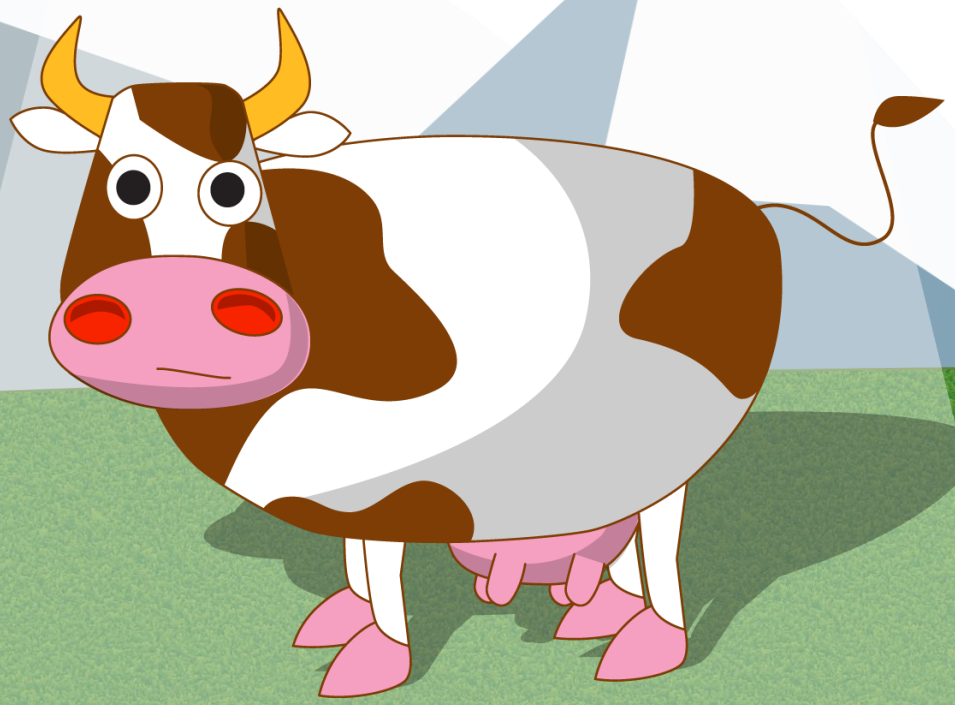
BACTERIA

VIRUS

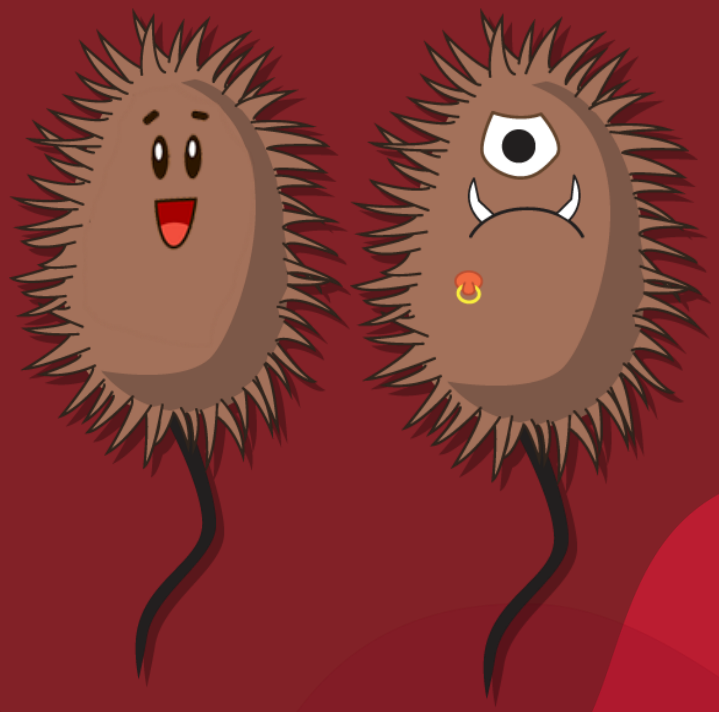
ANTIBIOTICS

VACCINES

ANTIBIOTIC RESISTANCE

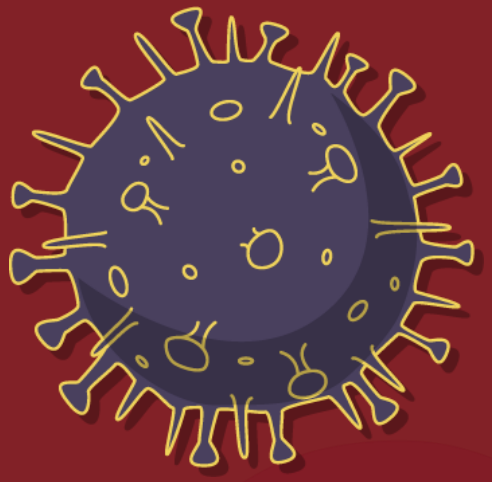


BACTERIA



- Single celled organism
- No nucleus
- Many bacteria are important for health
- Some are pathogenic
- Antibiotics may cure bacterial infections
- Bacteria can grow resistant to antibiotics
- Vaccines may protect from bacterial infections
- Live almost everywhere

VIRUS

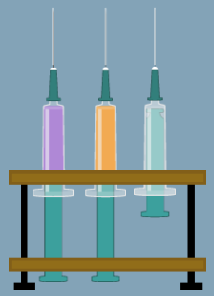


- Consists only of shell and DNA or RNA
- Species dependent (only some are pathogenic for humans)
- Smaller than bacteria
- Requires host cell to reproduce
- Occurs in almost every ecosystem
- Vaccines may protect from viral infection

TREATMENTS

- Antibiotics

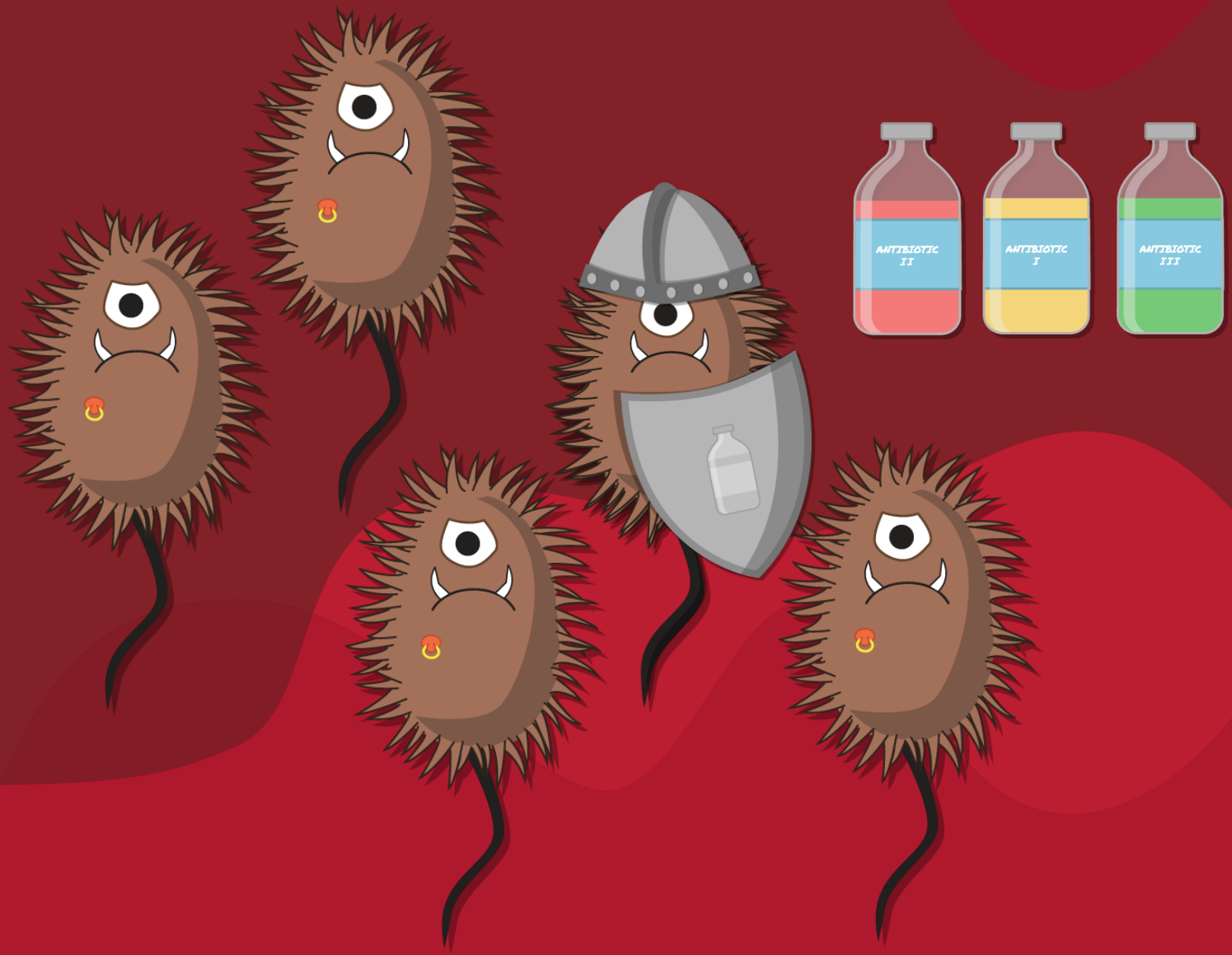
cure only bacterial infections



- Vaccinations

may protect against bacteria and viruses

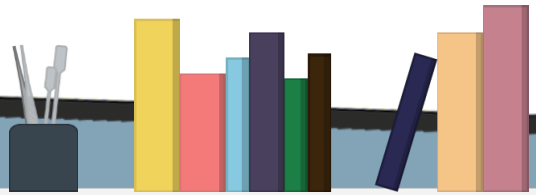
ANTIBIOTIC RESISTANCE



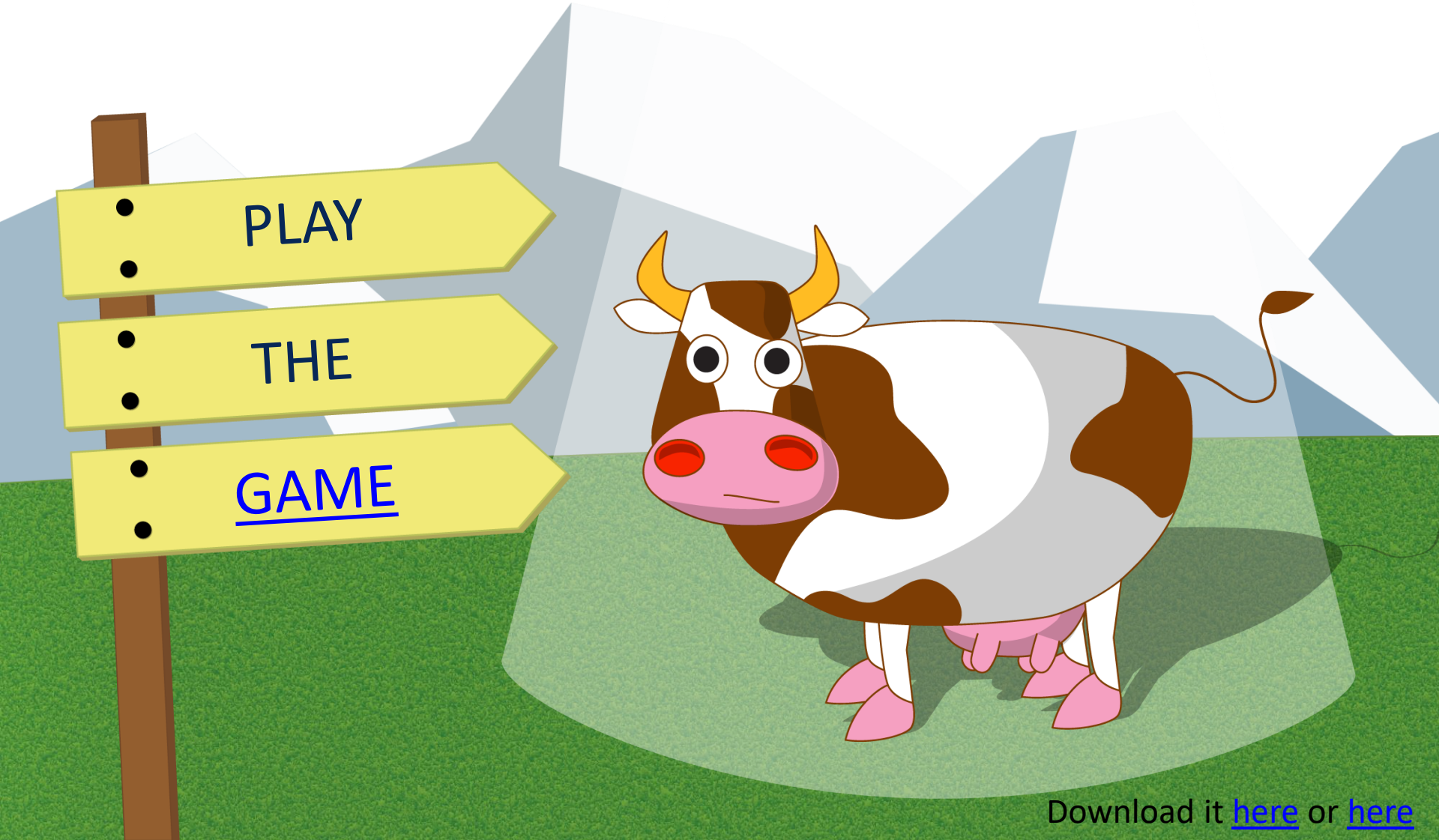
SYNTHETIC BIOLOGY

Synthetic biology is a field of science that aims to redesign living organisms to give them new abilities and new purposes.

Synthetic biology uses DNA engineering to modify or even create new biological systems which will offer unprecedented solutions to solve problems in medicine, manufacturing and agriculture.



Battle for Cattle



Download it here or here

ANTIBIOTICS

PATHOGENIC STRAIN

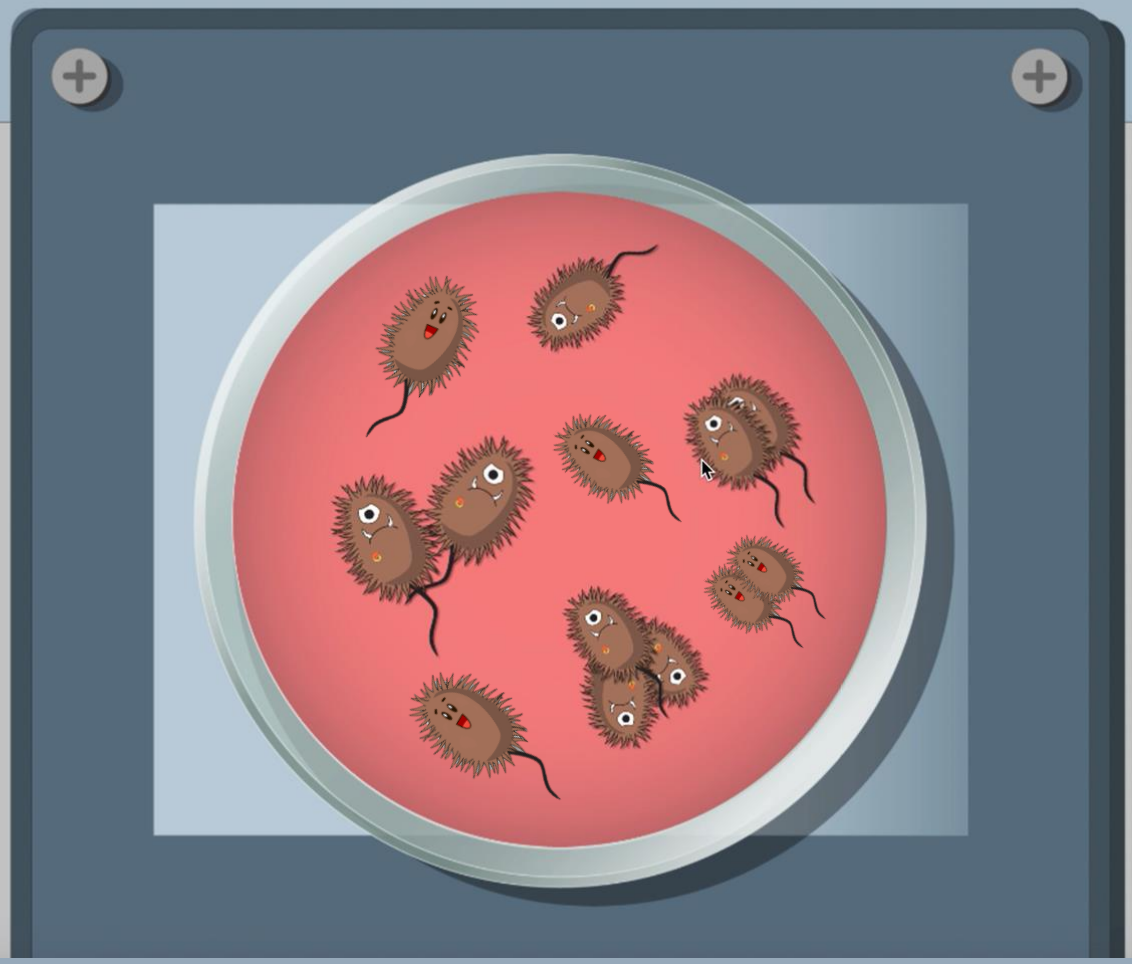
ESCHERICHIA COLI

DOMAIN: BACTERIA

GENOME: 4.6 MILLION BASE PAIRS

DISEASES: INTESTINAL INFECTIONS AND PNEUMONIA

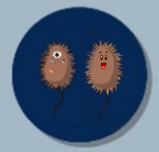
INFECTIOUS TO HUMAN: YES



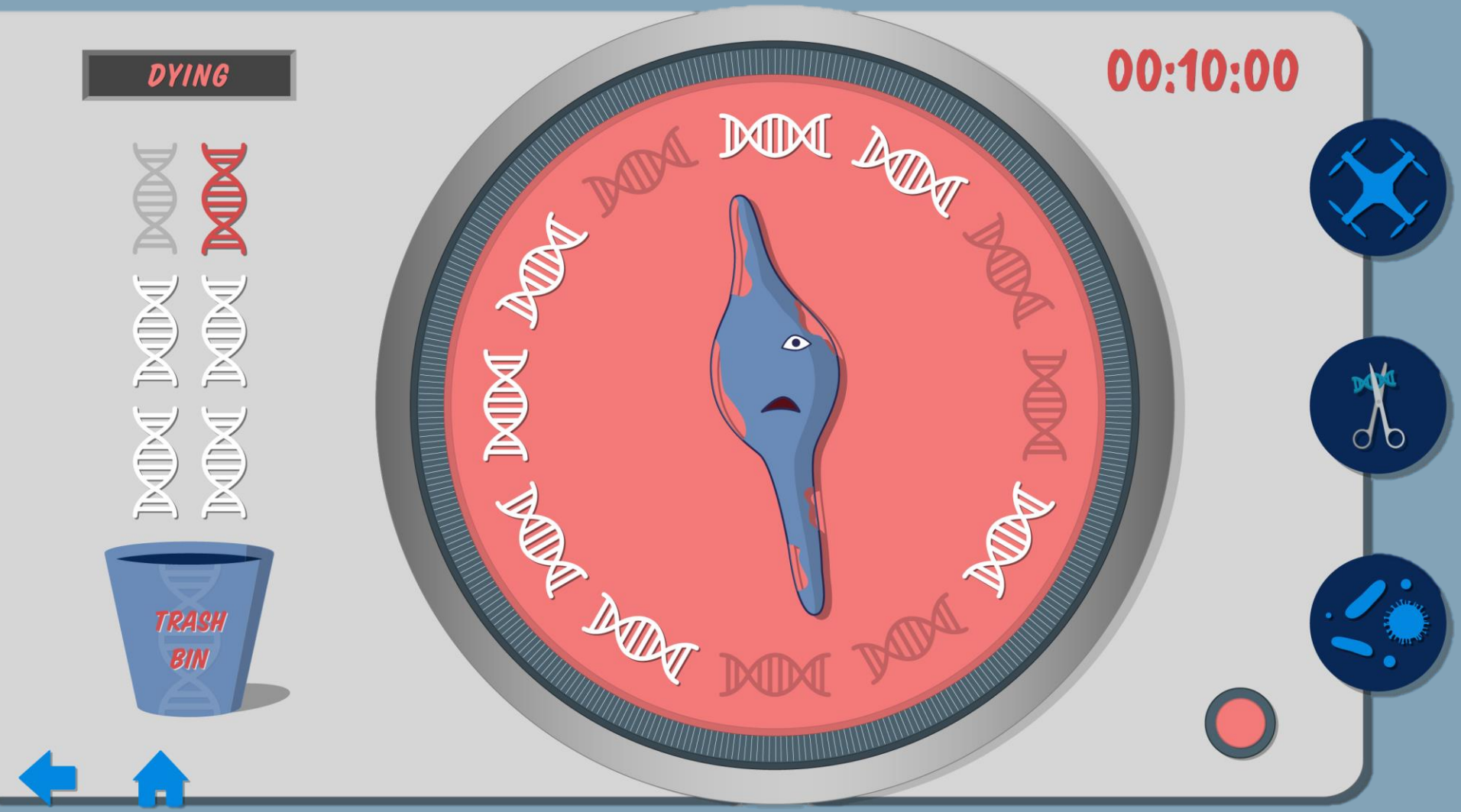
NON PATHOGENIC STRAIN

normal microbiota of the gut

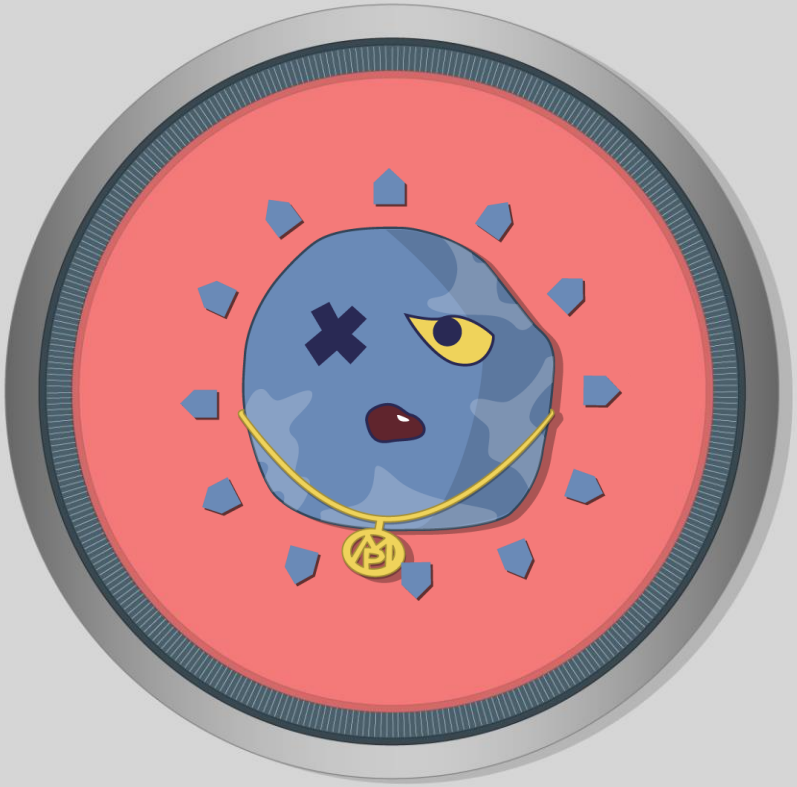
Non-infectious for human

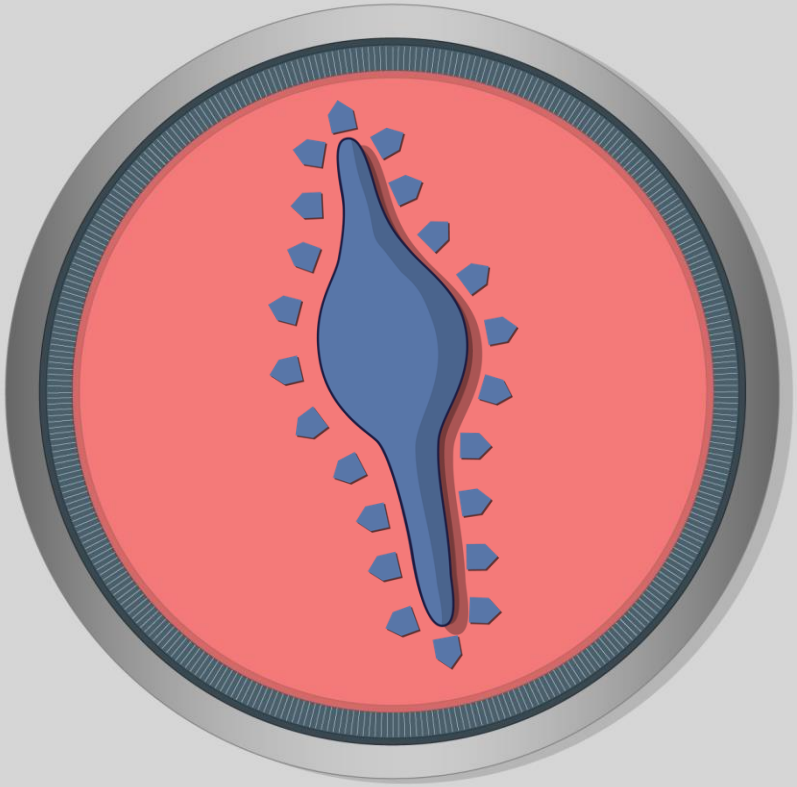


SYNTHETIC BIOLOGY VACCINES



SYNTHETIC BIOLOGY VACCINES



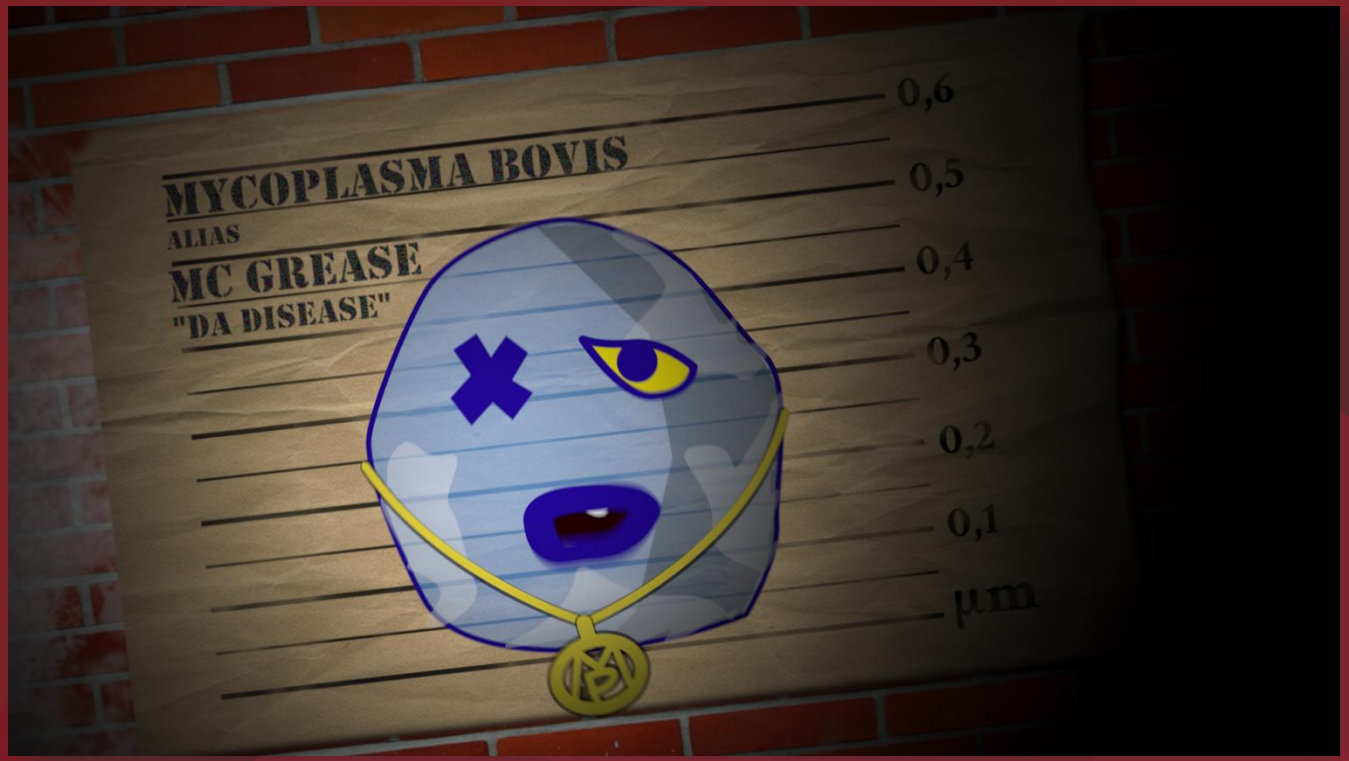


IMMUNE SYSTEM

DISCUSSION

- Bacterial infections can be treated with antibiotics.
- Bacteria can grow resistant to antibiotics.
- Viral infections cannot be treated with antibiotics.
- Vaccinations may protect from viral and bacterial infections.
- To make a vaccine you need antigens and a harmless host.

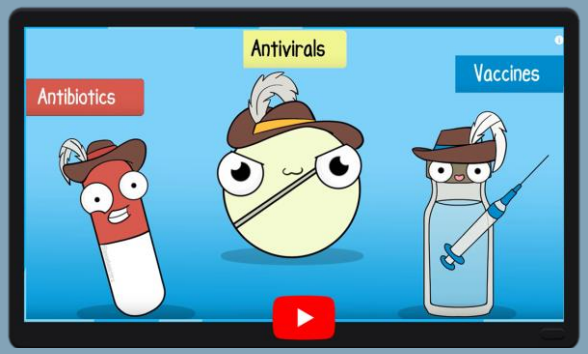
MC GREASE DA DISEASE



Click on this link to play the video

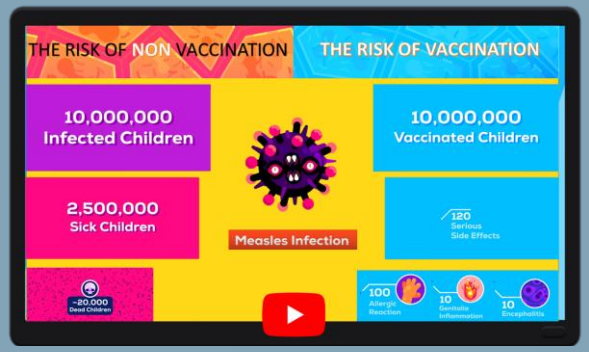
ADDITIONAL MATERIAL

video that explained the difference between vaccines and antibiotics



[link]

video that explained the risk of vaccination Vs the risk of non-vaccination



[link]

video that explained European vaccine action plan

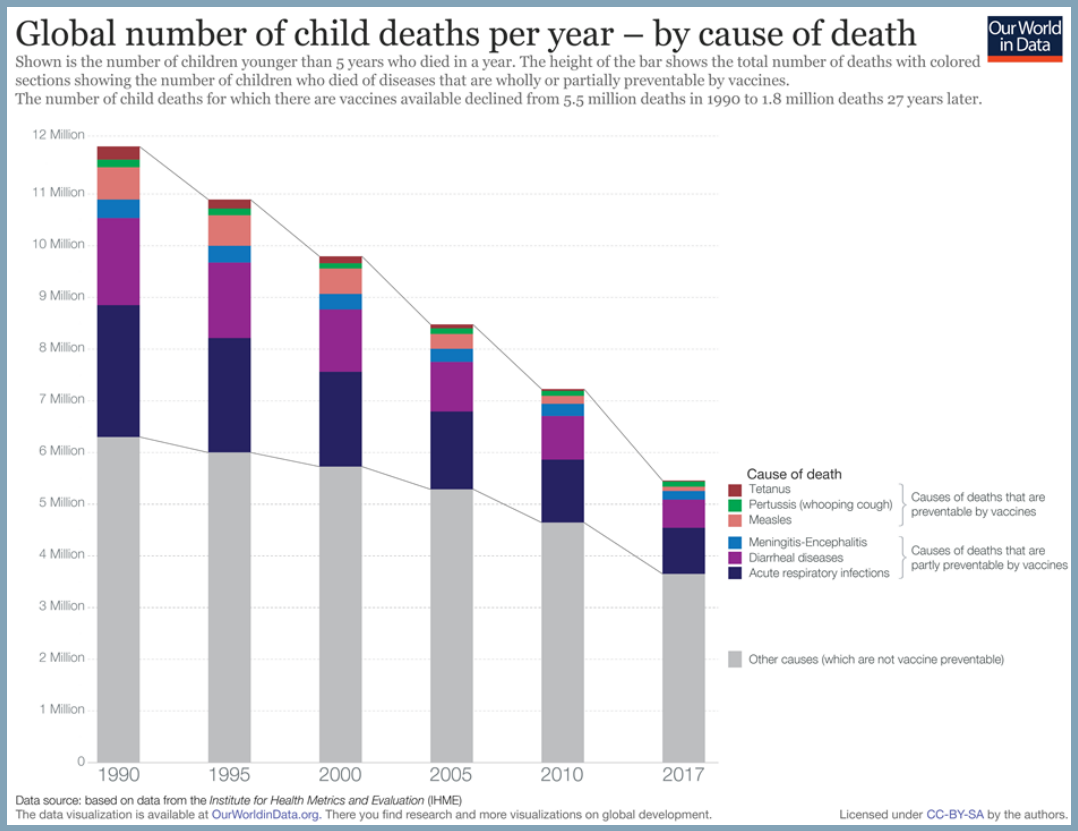
[link]

video that explained Synthetic biology

[link]

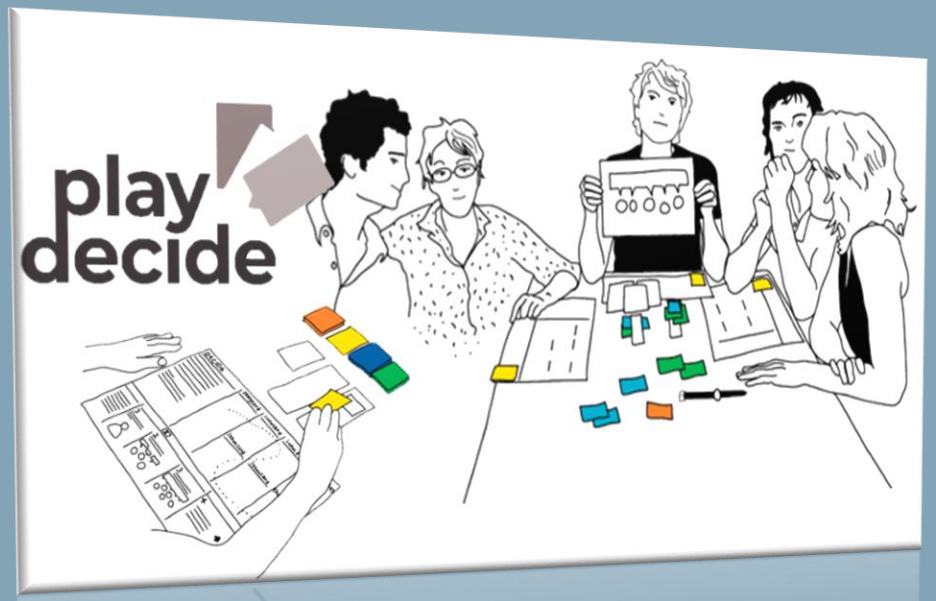
ADDITIONAL MATERIAL

The impact of vaccination on global health



For more information this is website

ADDITIONAL MATERIAL



Learning while playing:

Help to consolidate new information through a role playing discussion game

Vaccines, key tools for prevention

Genome editing