NIHR | University College London Hospitals Biomedical Research Centre

Genetic Engineering

How is genetic engineering different to synthetic biology?

What are CAR T-cells programmed to do?

Number the 7 steps in the creation of a CAR T-cell

- [ ] A DNA printer is used to create the genetic code
- [ ] A synthetic biologist writes a new genetic code
- [ ] CAR T-cells are inserted into the patient's blood
- [ ] A vector is used to infect the T-cell and transfer in the code
- [ ] Millions of the patient's T-cells are collected
- [ ] Chemotherapy is used to destroy the patient's existing T-cells
- [ ] The synthetic biologist models what the new code will do

What are the advantages of CAR T-cell therapy?

What are the disadvantages of CAR T-cell therapy?

How is genetic engineering different to synthetic biology?

GE uses genes from an existing organism
SB creates genes using computer programming and DNA printing

What are CAR T-cells programmed to do?

1. Recognise and kill cancer cells using modified antibodies
2. Make copies of themselves when they find the cancer cell
3. Survive in the patient's body

Video Location 4:55

Number the 7 steps in the creation of a CAR T-cell

4 A DNA printer is used to create the genetic code

2 A synthetic biologist writes a new genetic code

7 CAR T-cells are inserted into the patient's blood

5 A vector is used to infect the T-cell and transfer in the code

1 Millions of the patient's T-cells are collected

6 Chemotherapy is used to destroy the patient's existing T-cells

3 The synthetic biologist models what the new code will do

Video Location 4:13

What are the advantages of CAR T-cell therapy?

Answers could include:
- Cells survive for years in the body
- Cells can attack if the cancer comes back
- Very high survival rate compared to other treatments
- Treatment specific to the cancer

Video Location 6:32

What are the disadvantages of CAR T-cell therapy?

Answers could include:
- Treatment is currently very expensive
- Bespoke treatment can't be used on other patients
- Currently only works on some blood cancers

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