



Advances in Genetics

SPI 0707.T/E.3 Distinguish between the intended benefits and the unintended consequences of a new technology.

What You'll Learn

- EVALUATE the importance of advances in genetics.
- SEQUENCE the steps in making genetically engineered organisms.

Why It's Important

- Advances in genetics can affect your health, the foods that you eat, and your environment.

Why is genetics important?

- The principles of heredity are being used to change the world.
- <http://www.telegraph.co.uk/science/science-news/10574603/Gene-therapy-heralds-cure-for-blindness.html>

Genetic Engineering

- RECALL – Chromosomes are made of **DNA** and are in the **nucleus** of a cell.
- RECALL – Sections of DNA in chromosomes that direct cell activities are called **genes**.
- Through **genetic engineering**, scientists are experimenting with biological and chemical methods to change the arrangement of DNA that makes up a gene.

Genetic Engineering

- Genetic engineering already is used to help produce large volumes of **medicine**.
- Genes can also be inserted into cells to change how those cells perform their normal functions.
- See Figure 11.

Recombinant DNA

- Making recombinant DNA is one method of genetic engineering.
- Recombinant DNA is made by inserting a useful segment of DNA from one organism into a bacterium.
- <https://www.youtube.com/watch?v=x2jUMG2E-ic&safe=active>
- Large quantities of insulin can be made by some genetically engineered organisms.

Gene Transfer

- Another way we use genetic-engineering is gene transfer.
- This procedure is used to replace abnormal genetic material with normal genetic material.
 - First, normal DNA or RNA is placed in a virus.
 - Then, the virus delivers the normal DNA or RNA to target cells.
- Gene transfer might help correct genetic disorders such as cystic fibrosis.
- Cancer, heart disease, and certain infectious diseases could also be treated.

Genetically Engineered Plants

- People have been improving plants for thousands of years.
- Until recently, these improvements were the results of selecting plants with the most desired traits to breed for the next generation. This is known as _____.
- Although a plant can be bred for a particular phenotype, the genotype and pedigree of the plants are also considered.
- <https://www.youtube.com/watch?v=I3fCD0uUJk0>

Genetically Engineered Plants

- Genetic engineering can produce improvements in crop plants, such as corn, wheat, and rice.
- One type of genetic engineering involves finding the genes that produce desired traits in one plant and then inserting those genes into a different plant.
- Scientist have made genetically engineered tomatoes with a gene that allows the tomatoes to be picked green and transported great distances before they ripen completely. Then, ripe, firm tomatoes are available at a local market.

Genetically Engineered Plants

- The effects of consuming genetically engineered plants are unknown, therefore, some produce products are labeled so people know their origins.
- https://www.youtube.com/watch?v=KNQOcAd_Kw8&safe=active

Exit Ticket

- Make a stance for or against GMF. Use text evidence to support your argument.