Genetic engineering
Department of Biology
College of Science
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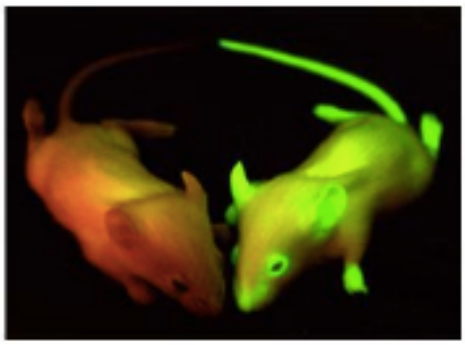
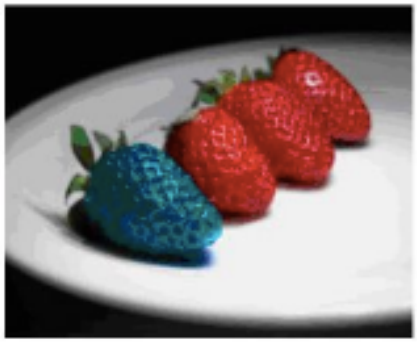
Lab 1

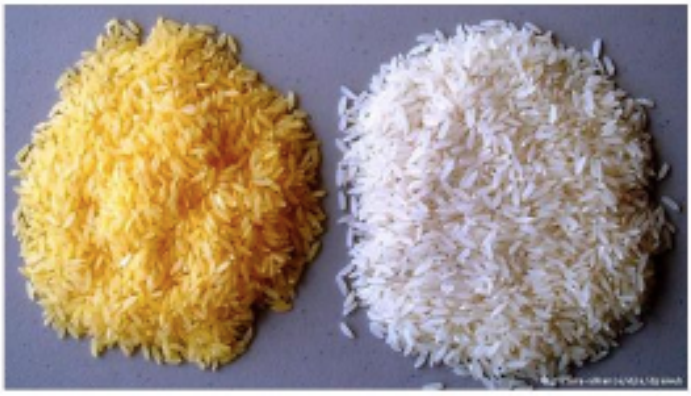
Genetic engineering

What is genetic engineering?

Genetic engineering is the direct modification of an organism's genome, which is the list of specific traits (genes) stored in the DNA. Changing the genome enables engineers to give desirable properties to different organisms. Organisms created by genetic engineering are called genetically modified organisms (GMOs). The group of applied techniques of genetics and biotechnology used to cut up and join together genetic material and especially DNA from one or more species of organism and to introduce the result into an organism in order to change one or more of its characteristics.







History of GMO Development

1973: created first genetically modified bacteria
1974: created GM mice
1982: first commercial development of GMOs (insulin-producing bacteria)
1994: began to sell genetically modified food
2003: began to sell GMOs as pets (Glodfish)

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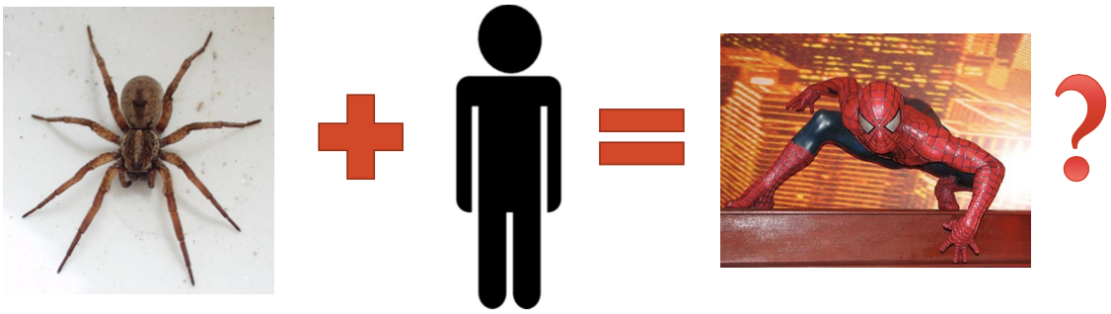
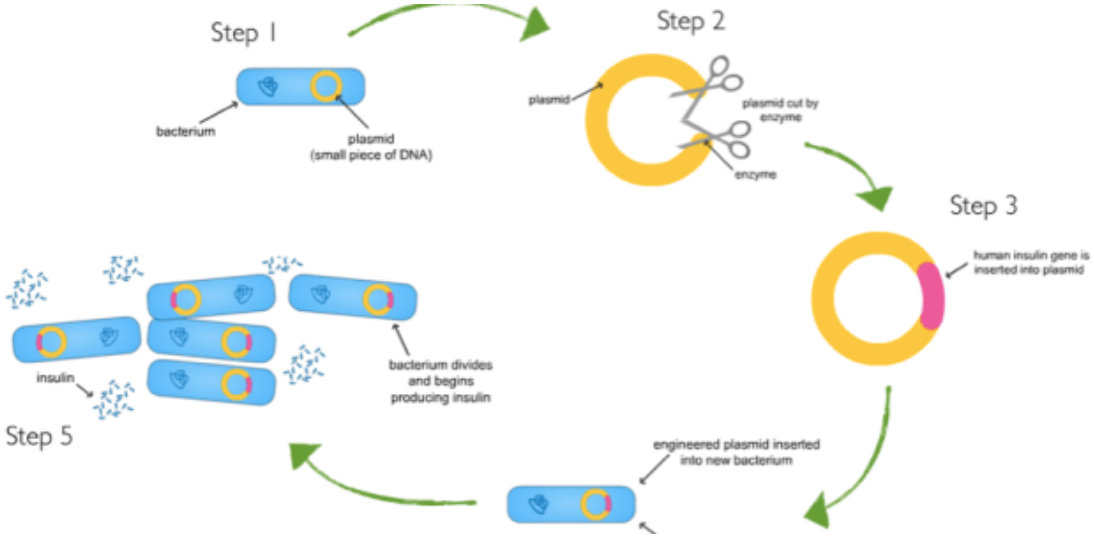
Could Spiderman Be Real?



Basic steps in genetic engineering
The process of genetic engineering requires the successful completion of a series of five steps.

Step 1: DNA Extraction.
Step 2: Gene Cloning. ...
Step 3: Gene Design. ...
Step 4: Transformation. ...
Step 5: Backcross Breeding.



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Equipment’s in genetic engineering lab

*Micro centrifuge eppendrof tubes to a maximum of 15,000 rpm.

* PCR to amplify DNA molecules

*Micropipettes in different sizes to transfer the appropriate amount of volumes

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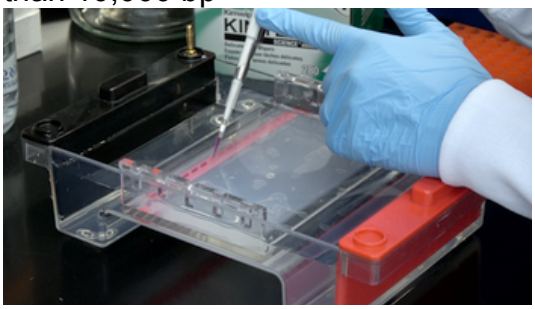
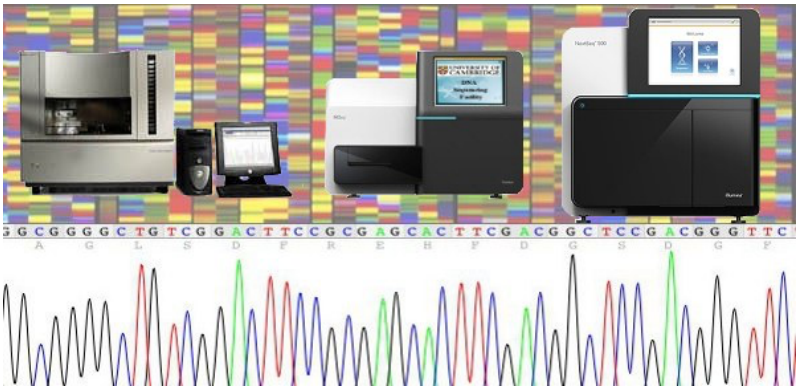
*Gel electrophoresis to separate N.A and protein with molecular weight less than 10,000 bp



*DNA sequencer to determine sequence of nucleotide in DNA strand



*Different size of eppendrof tubes to keep and holder samples in experiments

*Low deep freezer -80°C Long time storage of cells (mammalian and bacterial cells) at -80°C as a glycerol stocks.

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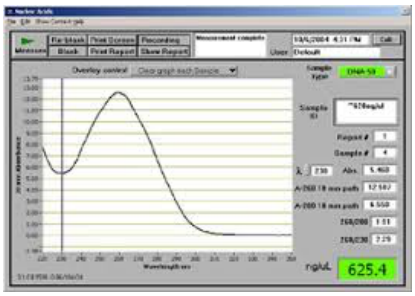
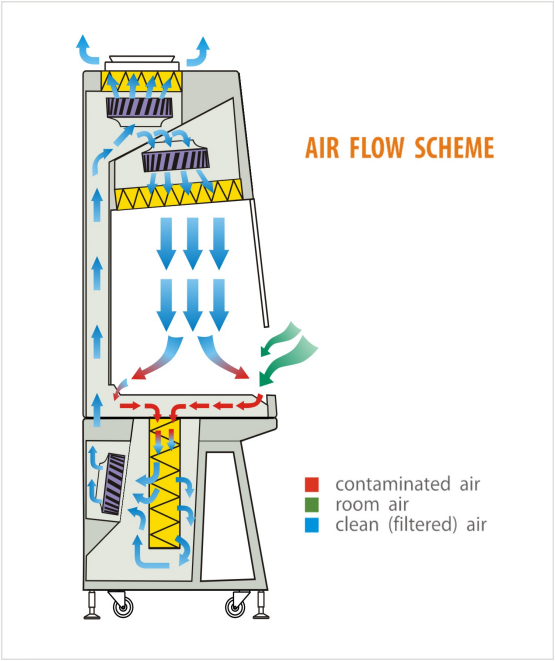
*Nanodrop to measure N.A concentration and purity



*Biosafety cabinet class II



*PCR workstation should be enclosed, sterilized and have a space work.

*Vortex shaker to mix reaction continent

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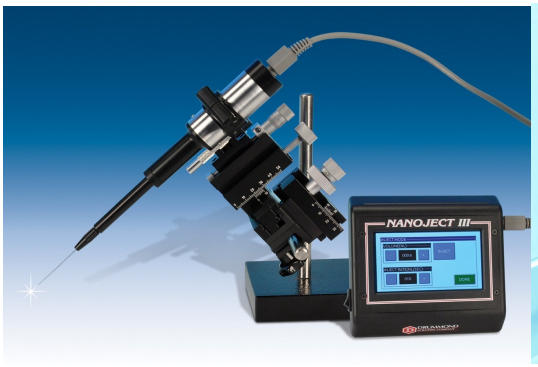
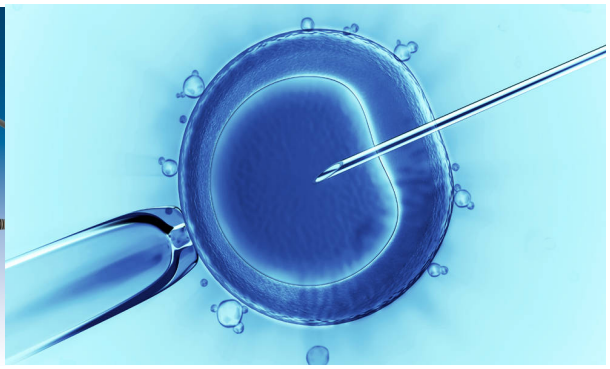
*Microinjection system used to penetrate the cell membrane and/ or the nuclear envelope microinjection can be also used in the cloning of organisms.





*Gene gun or biolistic particle delivery system: originally designed for plant transformation, this device is able to transform almost any type of cells, including plants and is not limited to genetic materials of the nucleus: it can also transform organelles in plastids.

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