

Genetic Engineering



Genetic Engineering

- Genetic engineering (genetic engineering) - a set of techniques, methods and technologies to produce recombinant RNA and DNA isolation of genes of an organism (cells) of the genetic manipulation and introducing them into other organisms.

- Genetic engineering is not science in the broadest sense, but is a tool for biotechnology, using the methods of biological sciences, such as molecular and cell biology, cell biology, genetics, microbiology, virology.



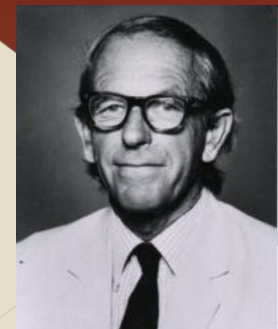
History and the current level of technology

- ◉ In the second half of the XX century, there were several important discoveries and inventions underlying genetic engineering. After many years of trying to "read" that biological information that is "written" in the genes. This work was started by the English scientist F. Sanger and the American scientist William Gilbert (Nobel Prize in Chemistry in 1980). As is known, the genes contain information instruction for the synthesis of RNA molecules in the body, and proteins, including enzymes. To make the cell to synthesize new, unusual for her substance, it is necessary that it synthesized the corresponding sets of enzymes. And for this, or purposefully change the genes contained in it, or to enter into it new, of missing genes. Changes of genes in living cells - this mutation. They are under the influence of, for example, mutagens - chemical poisons or radiation.

Walter Gilbert



Frederick Sanger



Human genetic engineering

- When applied to human genetic engineering could be used to treat genetic diseases. However, technically, there is a significant difference between the treatment of the patient and the change of the genome * of its children.



Knockout mice

*** Genome - the set of all genes of an organism, with the complete set of chromosomes.**

Application in research

- Artificial expression. KO is a logical addition to the artificial expression, that is, adding to the body of the gene, which had not previously been. This method of genetic engineering can also be used to study the function of genes. In essence the process of introducing additional genes is the same as in and out, but not replaced existing genes and not damaged.

Application in research

- Visualizing gene products. Used when the objective is to study the localization of the gene product. One way is to replace the labeling of the normal gene fused to a reporter on the element, such as the green fluorescent protein gene

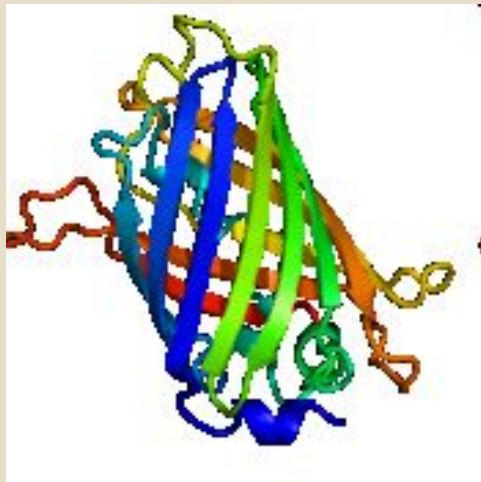


Diagram of the green fluorescent protein.

Application in research

- Investigation of the mechanism of expression. In such experiments, the task is to examine the conditions of gene expression. Expression patterns depend primarily on a small piece of DNA, which is located in front of the coding region, called a promoter, and is used for transcription factor binding *. This site is introduced into the body by following his own instead of a reporter gene, for example, GFP ** or an enzyme that catalyzes the reaction is easily detected.

**Thank you for your
attention!**