Gene Manipulation

Gene manipulation is also sometimes called *the genetic engineering*. It is a general term for any method which manipulate with the genetic material. Gene manipulation includes *gene splicing*, use of *recombinant DNA*, forming of the *monoclonal antibodies* or *PCR* (polymerase chain reaction).

At first the gene manipulation was used in the agriculture – to improve the quality of the plants. It was discovered in 2001 in native Mexican corn. The use in human genetic is still very complicated. Nowadays we use especially the bacteria **to produce some human hormones**. The gene that codes the hormone is isolated and put into the genome of the bacteria – the most common is *E. coli*. Then they are cultivate on the suitable cultures. The bacteria becomes capable of the hormone production – *insulin*, *human interferon*, *human growth hormone* and other.

Another method is the recombinant DNA which allows us to **produce the antibodies**. Thanks to recombinant DNA we can also analyse the human genes in detail. We use the ability of produce the large number of clones. These clone we then screen by **the probe**. The probe is a radioactively RNA or DNA fragment.

The gene manipulation allowed us to create the **genes maps**.

The Process of the Gene Manipulation

1. To **isolate DNA** from the organism.
2. To put the DNA into the DNA **vector**.
3. To **transfer** the vector by transfection or transformation into the host.

Isolation of the DNA

We can get the part of the DNA thanks to *restriction endonucleases - type II*. The DNA strand is broken up in the specific places which are bordered by short nucleotide sequences. Both strands are cut out. Then we can recognize them and categorize by their size by agarose gel **electrophoresis**.

Joining the DNA

The *DNA ligase* governs the properties of the segment. The cohesive ends are created and the insertion can takes place.

Transfer into the Host

It is absolutelly necessary to choose the right vector for the DNA. It must accept the foreign DNA and continues its cell cycle. The most common are bacteria – especially *E.coli*. The transformation of DNA from a virus is called **transfection**. We have ensured that the integration into the host genome will be successful. The most important is to maintain the ability to replicate DNA.

The Complications of Use

The use of gene manipulation is difficult. It is a process that can change the human genes. So it brings many **ethical problems**. The **safety** is still discussable. The scientists are worried about the genetic diversity, because all of the modified organisms will be the same.

Links

Related articles

- Vector
- Replication
- Transfection
- Crossing-over

External links

- Genetic manipulation (http://encyclopedia2.thefreedictionary.com/Genetic+manipulation)