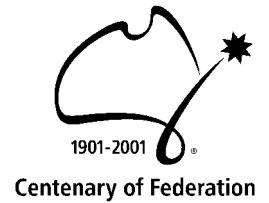


Questacon

Click go the Shears



Australian scientists are using Gene Shears to fight disease.

WHAT'S THE PROBLEM?

Many diseases that affect animals and plants are caused by a viral infection. Examples of such a disease is HIV/AIDS in humans. In an infected cell, a portion of the virus DNA causes production of a particular protein resulting in the symptoms of the disease.

A GREAT AUSSIE SOLUTION

In 1986, Australian scientists Jim Haseloff and Wayne Gerlach of the CSIRO Division of Plant Industry were researching the structure of a plant virus when they made a surprising and very significant discovery. They found that they could design and create bits of genetic material, called hammerhead ribozymes, that could selectively cut out bits of unwanted or harmful DNA. This snipping action led researchers to call them Gene Shears.



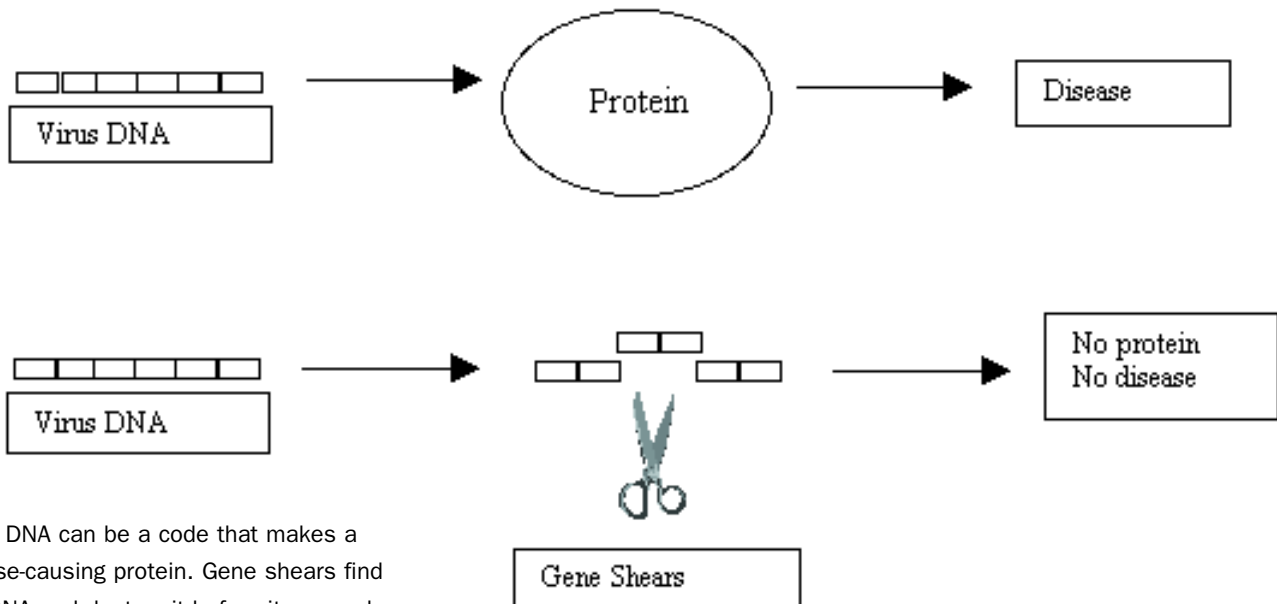
Genes are made of DNA, which is a molecule that looks a bit like a twisted ladder. This shape is called a double helix.



The importance of this research was quickly realised, and in 1989 Gene Shears Pty Ltd was formed by CSIRO to commercialise the use of the technique and to fund further research.

HOW DOES IT WORK?

Our individual genes are a bit like secret codes. Living cells decode the genes. The message received through these codes provides a base for the production of specific proteins.



Some DNA can be a code that makes a disease-causing protein. Gene shears find that DNA and destroy it before it can make the protein.

The Gene Shears technology involves firstly decoding a gene in an organism that produces a harmful protein. A hammerhead ribozyme is then specially designed to match to that gene code. An army of these specific ribozymes are sent into the cells of the organism. These ribozymes will find the matching code of the harmful protein and snip it out of the message, making it impossible to produce the disease-causing protein.

THE FUTURE

Initially, this technology was only used on viruses, but it is now seen as a very powerful tool against any gene that codes for a harmful or undesirable characteristic in any organism. The technique has multiple uses in many areas of genetic research. In agriculture, Gene Shears may be used to minimise crop and livestock disease, thus benefiting the environment by reducing the use of pesticides. In medical and pharmaceutical research, Gene Shears are being used extensively in the fight against viruses such as HIV/AIDS. Researchers hope that in the future, it will be used as therapy against genetically inherited diseases.

FURTHER INFO, FACTS & FUN

- Gene Shears are being used to help clear blocked arteries! Angioplasty, the procedure used to clear arteries, often results in scarring which causes further blockage. Scientists are using Gene Shears to inhibit this natural wound healing tendency, thus preventing scar tissue blockages.
- All living things contain DNA. In each cell in our bodies, we have 2 metres of DNA—over 100 000 genes.
- For more info on Gene Shears, check out: <http://www.csiro.au>

For more info on great Australian Science check out:

Questacon's Innovative Australians <http://www.questacon.edu.au/innovaus>

CSIRO's Australia Advances <http://www.csiro.au/promos/ozadvances>

The Australian Academy of Science's Nova <http://www.science.org.au/nova>

The Australian Science Archive Project <http://www.asap.unimelb.edu.au/>