Transgenics

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A transgenic animal is an animal that has had its DNA modified to contain one or more genes from another organism. This process is often used in scientific research to study the function of genes or to produce animals with desired traits, such as increased resistance to disease or improved growth rates.

In a transgenic animal, the inserted gene(s) are present in every cell of the animal's body, including its gametes (sperm and eggs). This means that the modified gene(s) can be passed on to the animal's offspring, creating a line of animals with the same genetic modification.

## Examples

| Transgenic Animal | Protein Produced | Production Method | Benefit |
| --- | --- | --- | --- |
| Goats | Antithrombin III | Microinjection of recombinant DNA into fertilized eggs | Goats can produce large quantities of antithrombin III in their milk, which can be purified and used as a treatment for blood clots. |
| Rabbits | Factor VIII | Injection of recombinant DNA into fertilized eggs | Rabbits can produce human Factor VIII in their milk, which can be used to treat hemophilia. This method is more cost-effective than traditional methods of producing Factor VIII. |
| Mice | Human albumin | Insertion of human albumin gene into mouse DNA using a viral vector | Mice can produce human albumin in their blood, which can be used to treat liver disease and other conditions. This method does not require human blood donations. |
| Cows | Alpha-1 Antitrypsin | Microinjection of recombinant DNA into fertilized eggs | Cows can produce large quantities of alpha-1 antitrypsin in their milk, which can be used to treat emphysema and other lung diseases. |
| Sheep | Alpha-galactosidase | Injection of recombinant DNA into fertilized eggs | Sheep can produce human alpha-galactosidase in their milk, which can be used to treat Fabry disease. |
| Pigs | Hemoglobin | Injection of recombinant DNA into fertilized eggs | Pigs can produce human hemoglobin in their blood, which can be used as a blood substitute for transfusions. |
| Chickens | Human growth hormone | Injection of recombinant DNA into fertilized eggs | Chickens can produce human growth hormone in their eggs, which can be used to treat growth disorders. |
| Silkworms | Spider silk proteins | Injection of recombinant DNA into fertilized eggs | Silkworms can produce spider silk proteins in their silk, which can be used to make high-strength fibers for medical and industrial applications. |
| Fish | Human insulin | Injection of recombinant DNA into fertilized eggs | Fish can produce human insulin in their muscle tissue, which can be used to treat diabetes. |
| Algae | Human lactoferrin | Insertion of human lactoferrin gene into algal DNA | Algae can produce human lactoferrin, which has antibacterial and antiviral properties and can be used as a dietary supplement. |