

# What Is Animal Biotechnology?

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**B**iototechnology provides new tools for improving human health and animal health and welfare and increasing livestock productivity. Biotechnology improves the food we eat - meat, milk and eggs. Biotechnology can improve an animal's impact on the environment. And biotechnology enhances ability to detect, treat and prevent diseases.

Just like other assisted reproduction techniques such as artificial insemination, embryo transfer and in vitro fertilization, livestock cloning improves animal breeding programs allowing farmers and ranchers to produce healthier offspring, and therefore producer healthier, safer and higher quality foods more consistently.



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## What Is Animal Biotechnology?

Animals are playing a growing role in the advancement of biotechnology, as well as increasingly benefiting from biotechnology.

Combining animals and biotechnology results in advances in four primary areas:

1. Advances in human health
2. Improved animal health and welfare
3. Enhancements to animal products
4. Environmental and conservation benefits

Animal biotechnology includes all animals: livestock, poultry, fish, insects, companion animals and laboratory animals.

Applications developed through research have led to the emergence of three scientific agricultural animal biotechnology sectors:

1. Animal genomics
2. Animal cloning
3. Genetic engineering of animals

## The Technology Sectors in the Animal Biotechnology Industry

**Animal genomics:** Genomics defines and characterizes the complete genetic makeup of an animal.

By understanding the genomes of animals, we can better understand the basis for disease resistance, disease susceptibility, weight gain, and determinants of nutritional value.

**Animal cloning:** Using somatic cell nuclear transfer, livestock breeders can create an exact genetic copy of an existing animal – essentially an identical twin. Cloning does not manipulate the animal's genetic makeup nor change an animal's DNA: it is simply another form of sophisticated assisted reproduction.

**Transgenic animals:** A transgenic animal is one which has had genetic material from another species added to its DNA. This breakthrough technology allows scientists to precisely transfer beneficial genes from one species to another.

### Animal Biotechnology to Advance Human Health

Animals have been used for years to produce medicines for humans. Animal-made pharmaceuticals (AMPs) transform biotech animals into “factories” to produce therapeutic proteins in their milk, eggs, and blood, which can be used in the development of biopharmaceuticals. In addition, biotechnology can be used to produce human-compatible transplant organs, tissues and cells in pigs that can be vital to enhancing human health.



### Biotechnology to Improve Animal Health

For decades, farmers have been improving livestock herds through enhanced animal husbandry practices and more modern technologies, such as artificial insemination, embryo transfer, *in vitro* fertilization, genetic mapping and cloning. Through biotechnology, farmers can enhance breeding, resulting in healthier herds.

Additionally, the animal health industry has developed treatments that can prevent and treat disease. New vaccines, diagnostic tests and practices can help farmers treat animal diseases, while reducing food borne pathogens at the farm level.

### Biotechnology to Develop More Nutritious Food

Improved animal health conditions from vaccines, medicines and diagnostic tests result in safer foods for consumers. In addition, food quality may be improved by introducing desirable traits through new genes into farm livestock and poultry. In the future, meat, milk and egg products from animals can be nutritionally enriched with the use of biotechnology.



### Conservation of Environment and Animals

Biotechnology can help produce environmentally friendly animals, as well as conserve endangered species. Farm animals and their feeds have been improved through biotechnology to reduce animal wastes, minimizing the impact on the environment.

Today's reproductive and cloning techniques offer the possibility of preserving the genetics of endangered species. Genetic studies of endangered animals can also result in increased genetic diversity which can result in healthier populations of species.