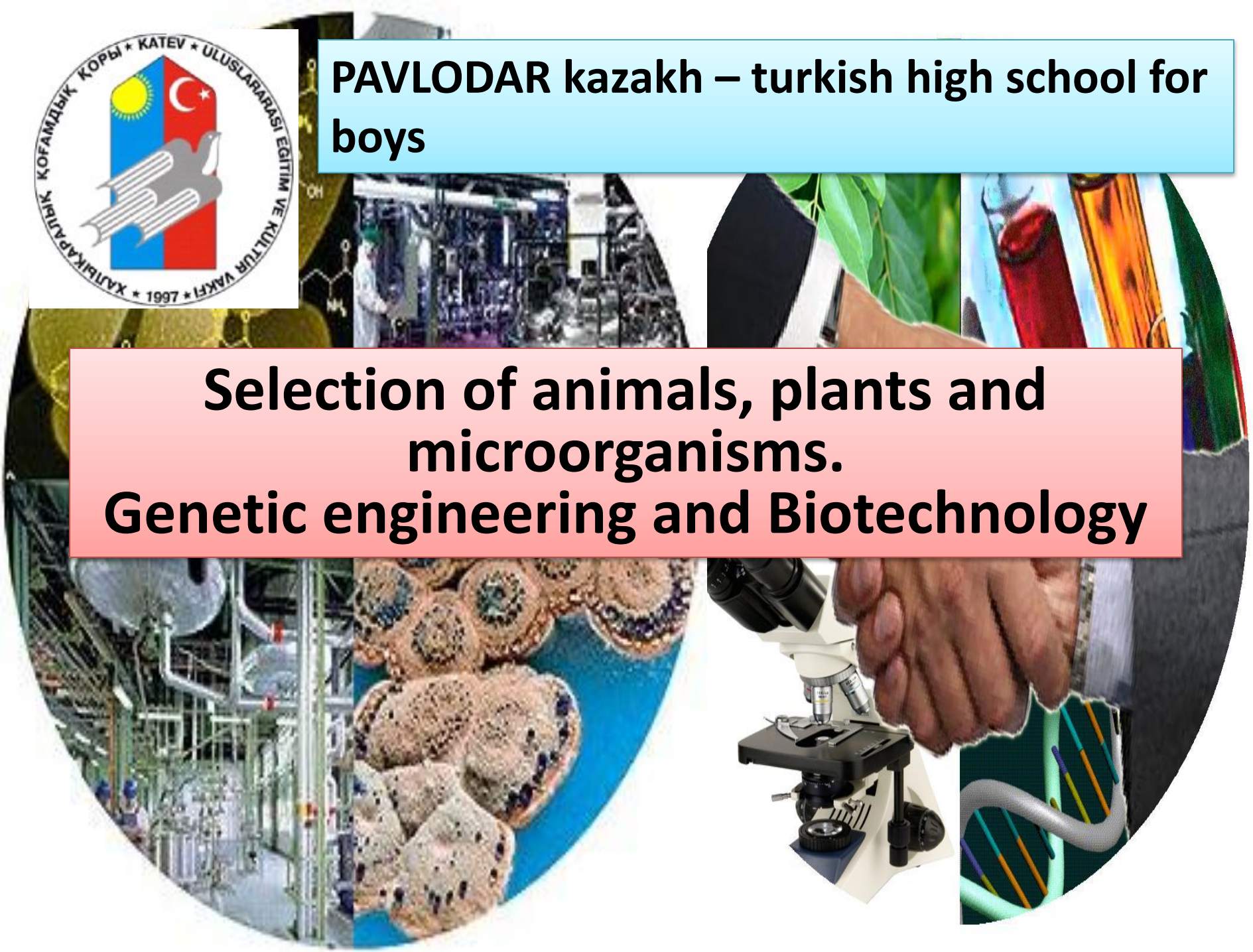
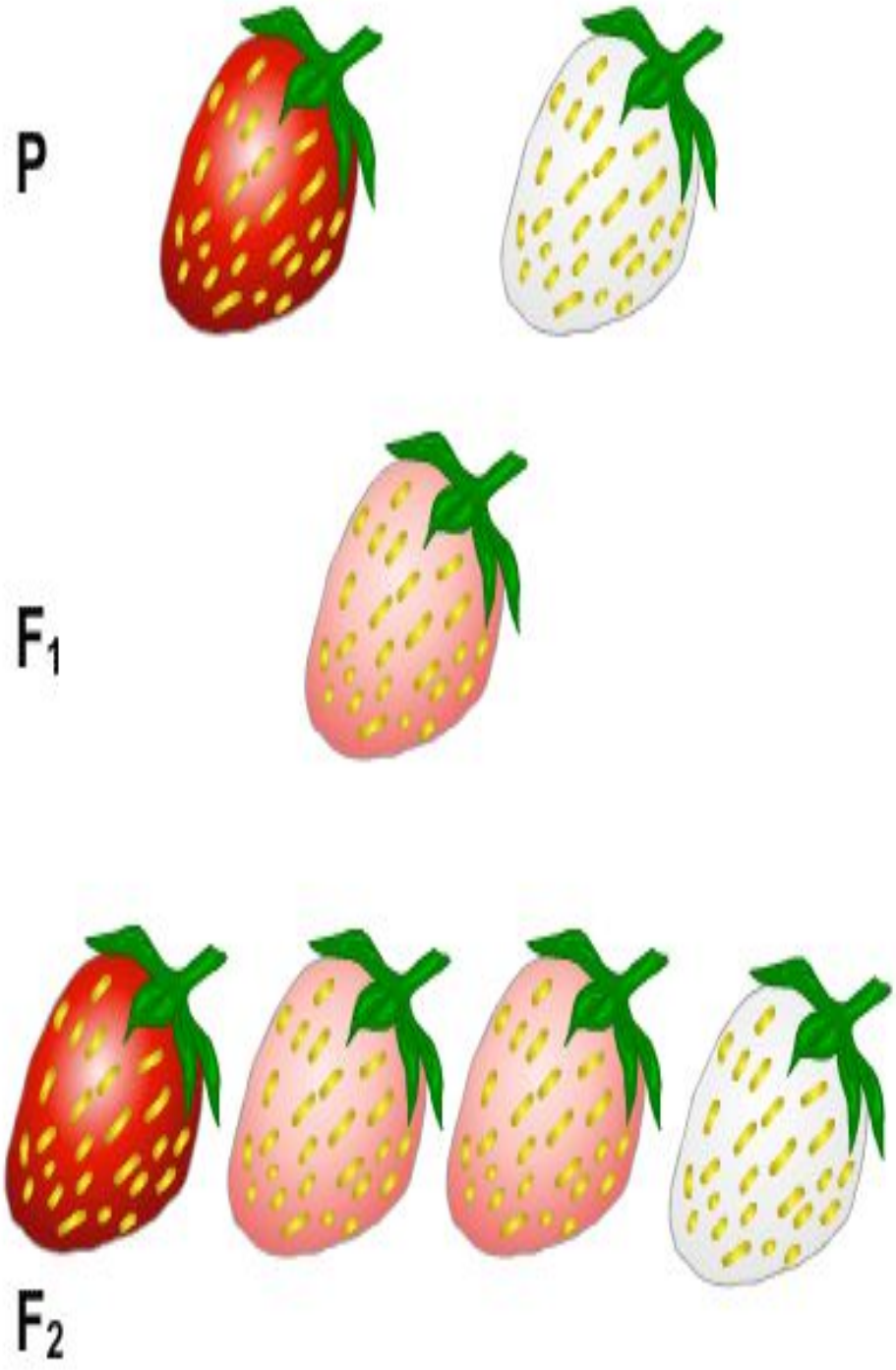
PAVLODAR kazakh – turkish high school for boys



Selection of animals, plants and microorganisms.
Genetic engineering and Biotechnology

SELECTION

- ***Selection*** (selectio - choose) - the science of creating new and improving existing breeds of animals, plant varieties, strains of microorganisms
- Selection is also called a branch of agriculture, which bred new varieties and hybrids of crops and breeds of animals



Selection of plants

- The main methods of selection in selection of plants are ***selection*** and ***hybridization***

- **<u>Hybridization (breeding)</u>** – the desired traits of parent plants are crossed and seen in offspring

Modes of breeding in plants

- There are 3 modes of breeding in plants:
- - Inbreeding
- - Outbreeding
- ***Inbreeding*** – the breeding of genetically closely related plants.
- This brings to desired traits of plant (AA), but after some generations it can bring to recessive homozygote trait (aa).

Modes of breeding in plants

- ***Outbreeding*** - getting progeny from manufacturers that are not related genetically
- The aim is to create offspring in which viability, productivity is higher and higher resistance to unfavorable conditions
- Offspring from such crosses are called **hybrids**, and they exceed the number of features both parental forms - a phenomenon called ***heterosis***

Selection of animals

- Basic principles of breeding animals do not differ from the principles of plant breeding
- However, the selection of animals has some ***features***:
- - they are characterized by sexual reproduction only
- - mostly very rare generational change (in most animals in a few years)
- - the number of individuals in the offspring is small

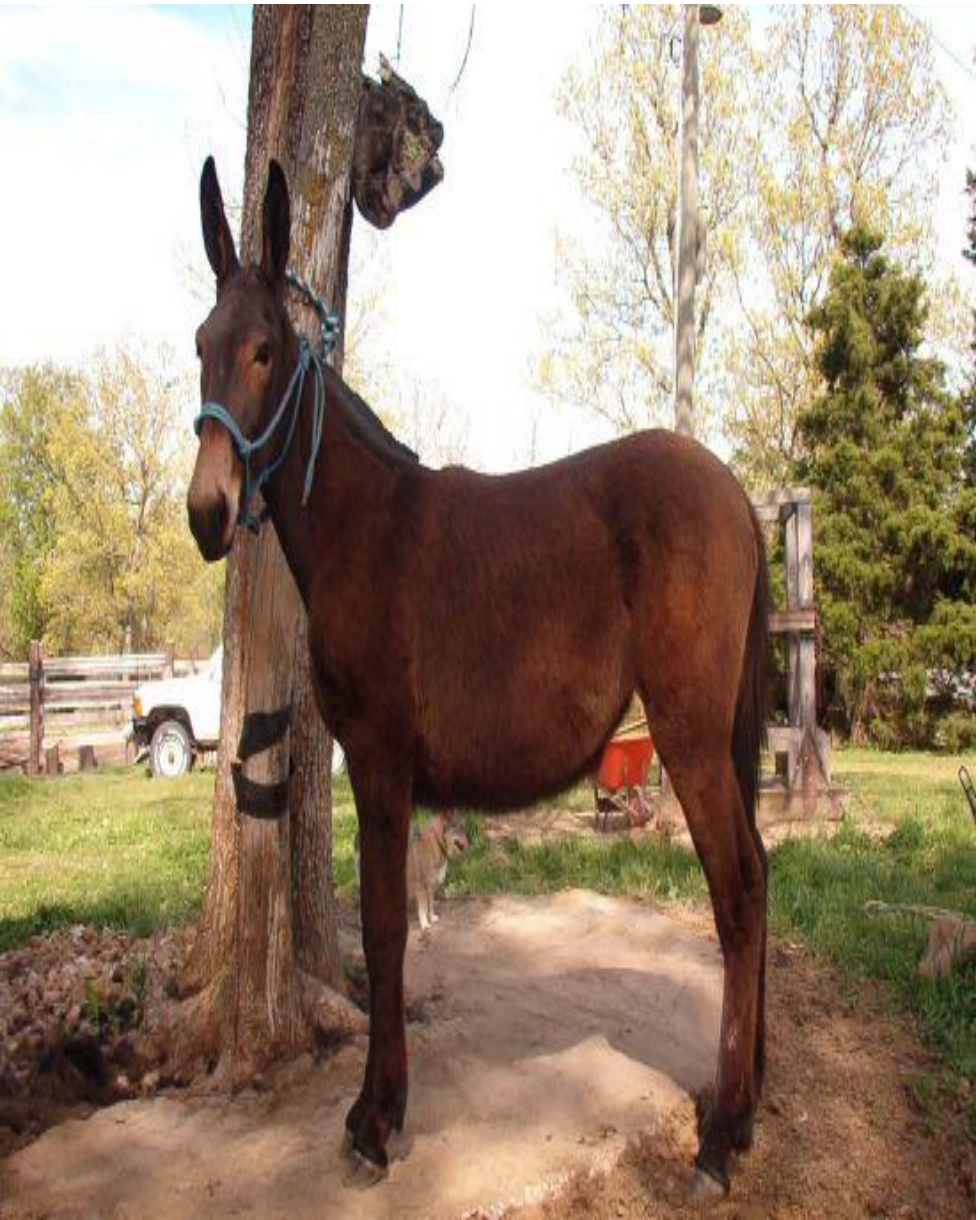
Selection of animals

- The best (human needed) characteristics of domestic animals are:
- - milk yield
- - milk fat
- - meat quality
- - quality of wool
- - egg-laying qualities

Modes of breeding in animals

- There are 2 ways of breeding in animal selection:
- - inbreeding
- - outbreeding
- ***Outbreeding*** - unrelated cross between individuals of the ***same species*** or ***different species*** of animals, with a further strict selection leads to the maintenance of useful skills and to strengthen them in a number of next generation

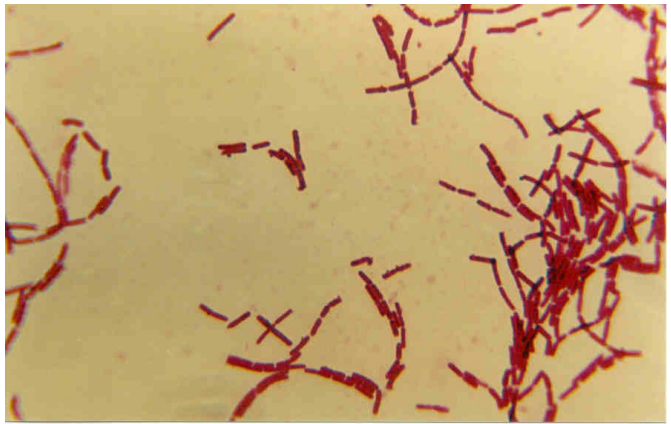
Modes of breeding in animals

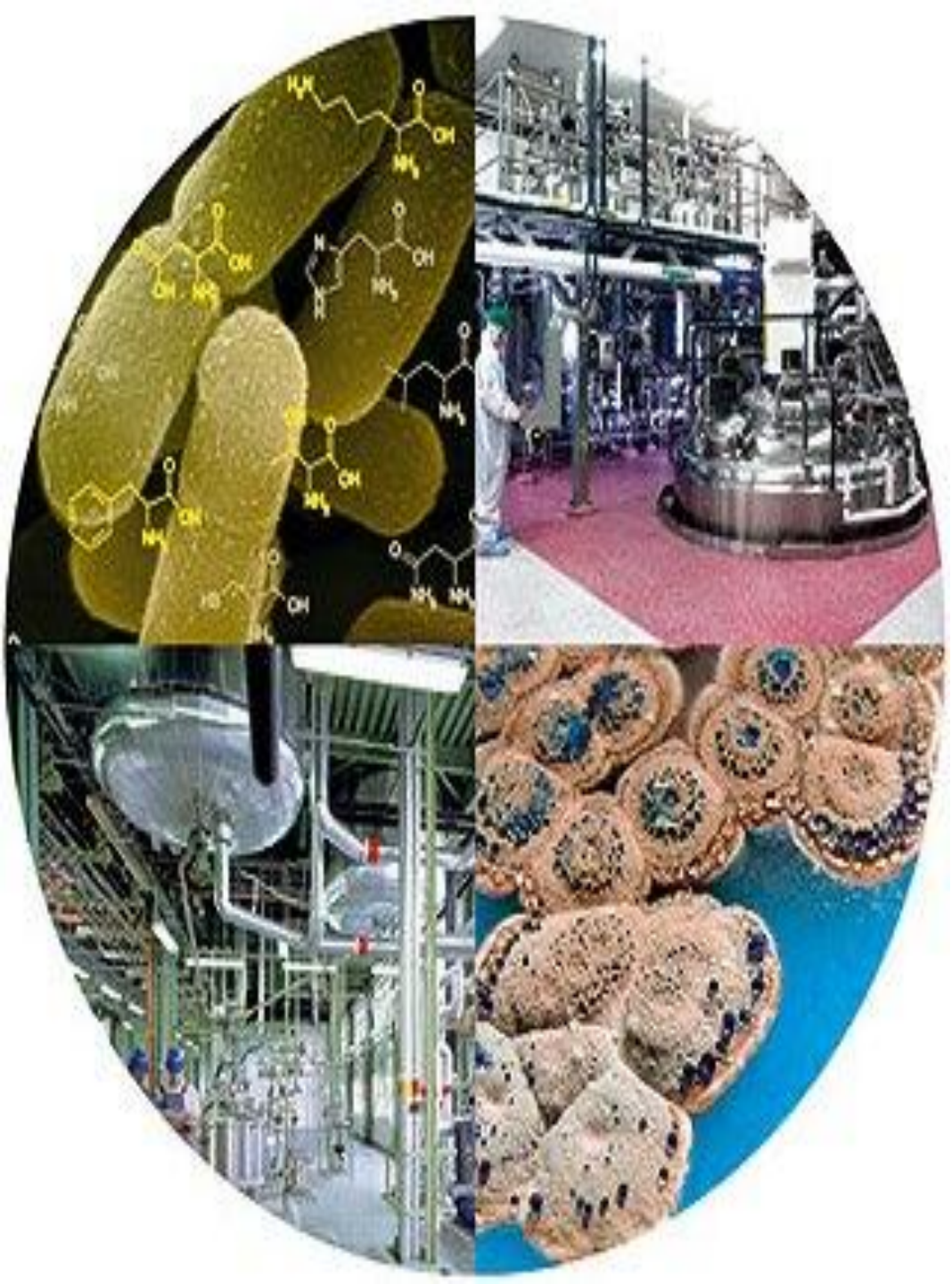


- In domestic animals, the phenomenon of ***heterosis*** is seen
- Hybrids of the first generation are stronger and more viable
- For example, a ***mule*** - a hybrid of a mare and a donkey
- This is a strong, hardy animal that can be used in much more difficult circumstances than the parent form

Selection of microorganisms

- Modern methods of microorganisms selection studies the opportunities of producing economically important substances - organic acids, drugs and protein

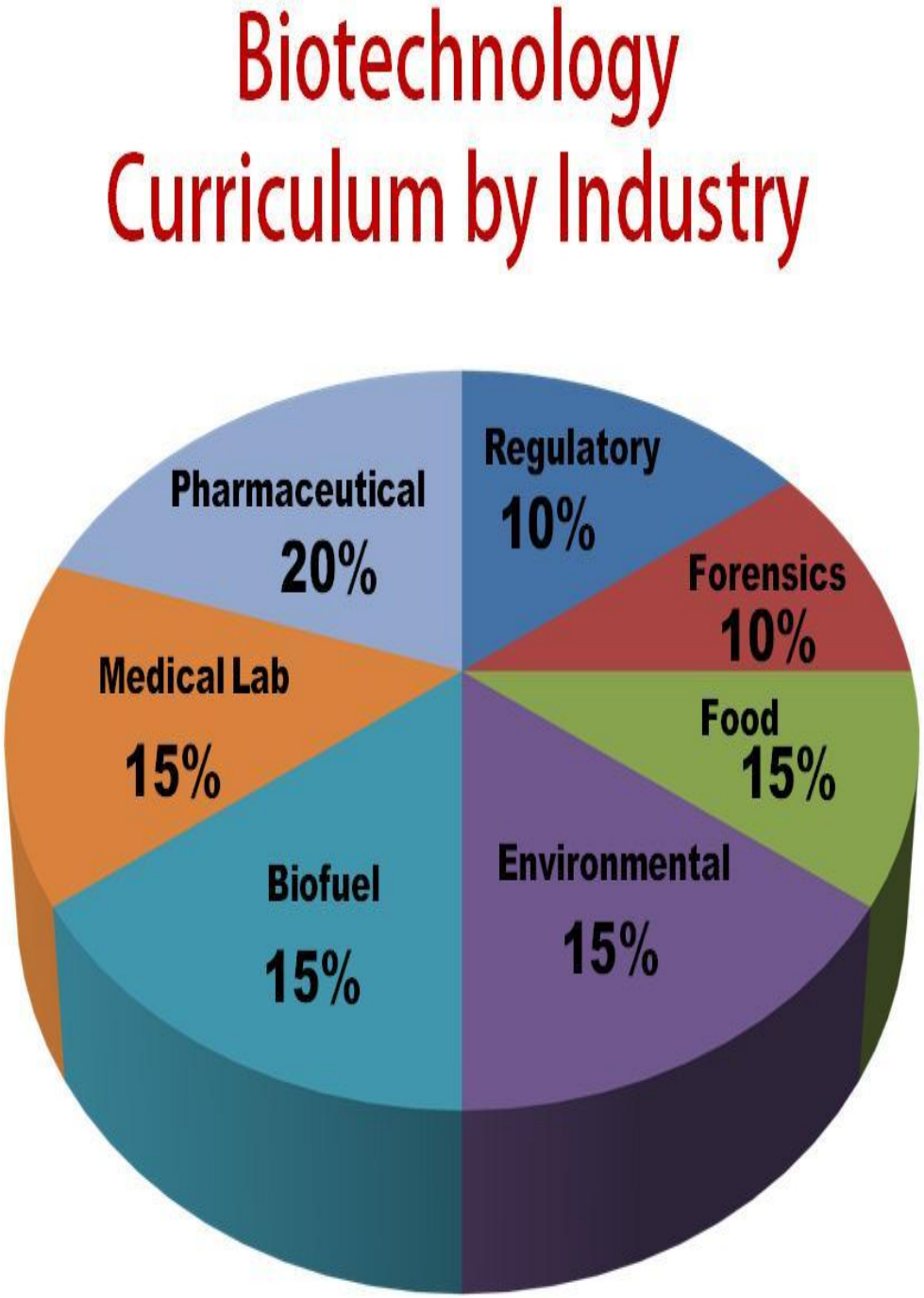




Biotechnology

- **Biotechnology** is the use of living systems and organisms to develop or make useful products, or "any technological application that uses biological systems or living organisms to make products or processes for specific use

Biotechnology

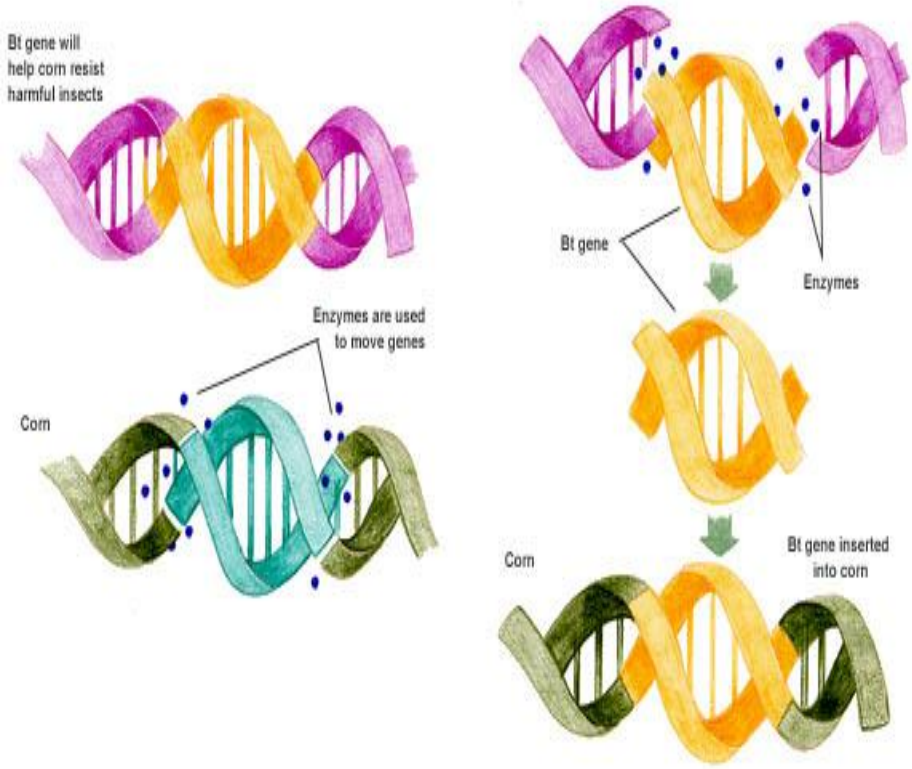


- The aim of biotechnology is to increase the production of proteins, aminoacids, vitamins and antibiotics by microorganisms
- The microorganisms are also used in cleaning of environment from wastes, making in biodiesel from plants

Genetic Engineering

- The genetic engineering is one of the branch of biotechnology
- The process of manipulating genes for practical purposes is called **genetic engineering**

- Genetic engineering involves building **recombinant DNA**—DNA made from two or more different organisms

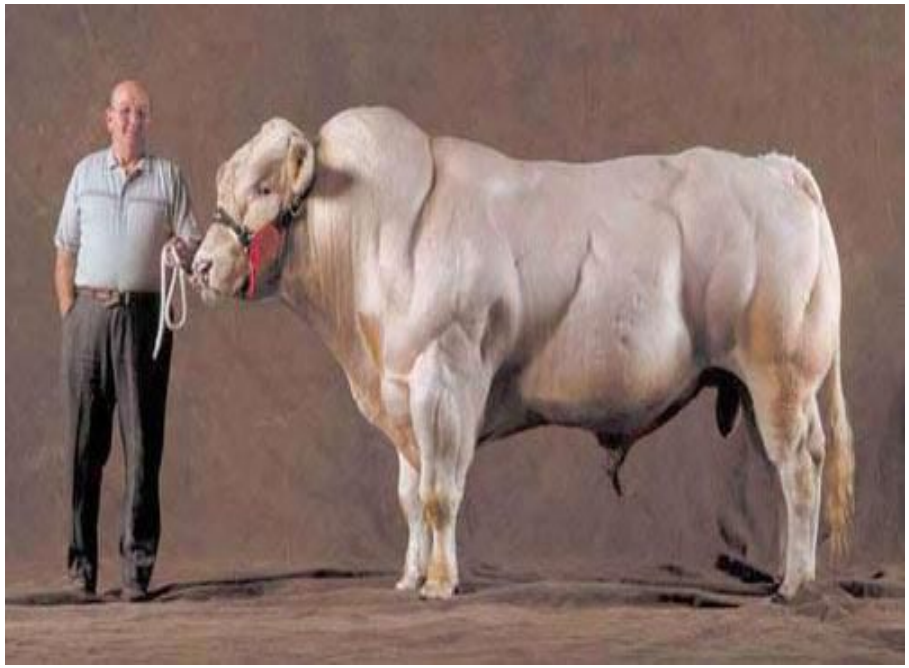


Genetically Engineered Medicines

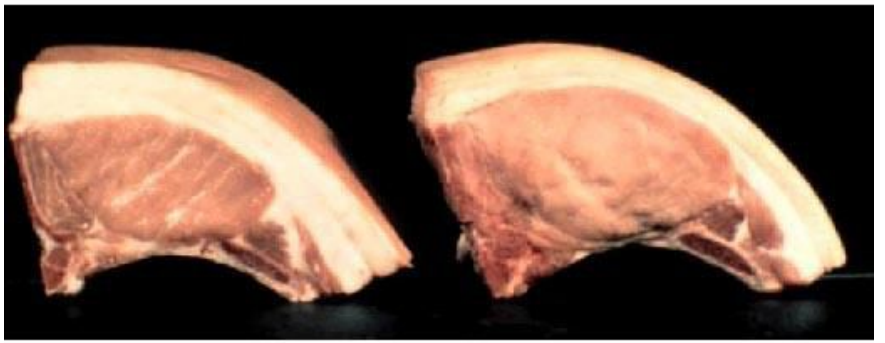
Product:	Used for treatment of:
• Erythropoetin	Anemia
• Growth factors	Burns, ulcers
• Human growth hormone	Growth defects
• Insulin	Diabetes
• Interferons	Viral infections and cancer
• Taxol	Ovarian cancer

Genetic engineering in animals

- To produce animals with much milk, meat, wool and etc
- Resistant to diseases
- Strong
- Less eating
- Fast growing

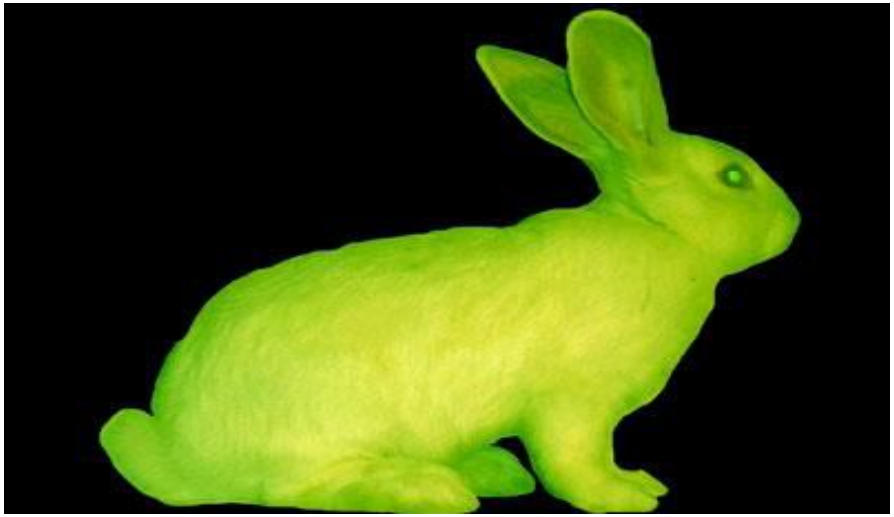


TRANSGENIC PIGS
more lean - less fat



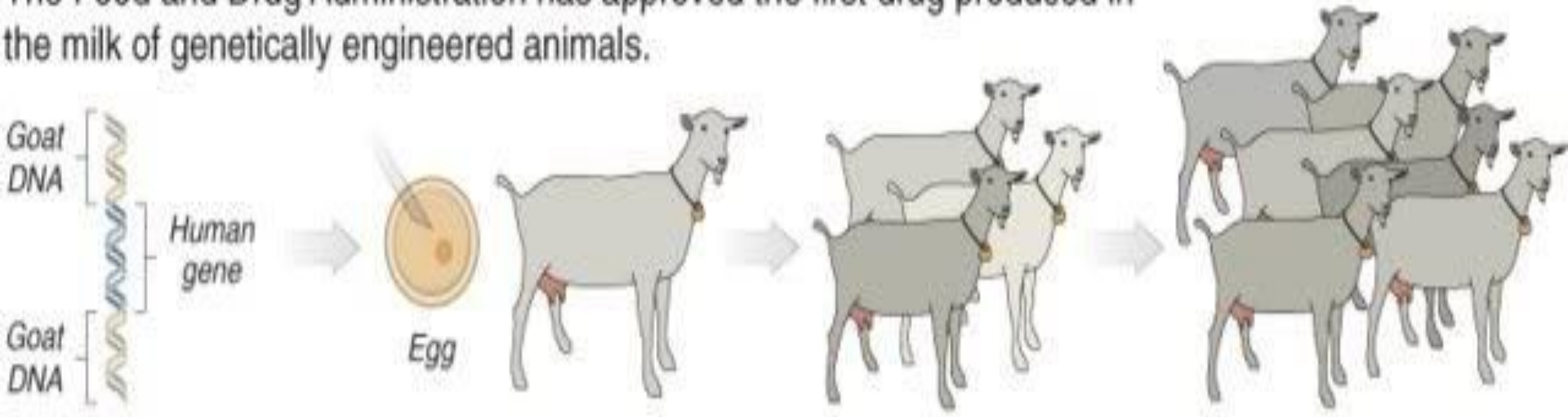
Control Transgenic

Esthetics



Bioengineering on the Farm

The Food and Drug Administration has approved the first drug produced in the milk of genetically engineered animals.



MODIFYING THE DNA
A human gene that produces the blood protein antithrombin is inserted into a short strand of goat DNA.

IMPLANTING THE DNA
The modified DNA is injected into the nucleus of a fertilized goat egg, which is then implanted into a female.

TESTING THE OFFSPRING
Kids born from the modified eggs are tested for the presence of antithrombin in their milk. Promising kids are bred normally to create a herd of modified goats.

EXTRACTING THE PROTEIN
Milk from the herd is filtered and purified. Annually, each goat can produce as much antithrombin as 90,000 human blood donations.

Sources: GTC Biotherapeutics

The production of medicines by domestic animals