

Biotechnology: Applying technology to living organisms in order to produce something **we need or want**.

1. **Genetic Transformation:** changing an organism's genetic makeup by removing or modifying its genes or by introducing genes from another organism.
2. **GMO (genetically modified organisms):** living organisms that have had their DNA changed through genetic transformation to give them traits that they would not otherwise naturally have.

Examples:

- I. Scientist inserted genes from the arctic flounder into the salmon's DNA, so that the salmon can resist the cold and reproduce in cold water.
 - II. Bt Corn: Scientist inserted a gene that enables corn to secrete a substance to kill an insect that would otherwise destroy the corn crops.
3. **Cloning:** the process of produce a genetically identical living organism.
Example: Dolly the sheep (1998): first successful clone
 4. **Cell Culture:** Growing or producing cells in labs, outside their natural environments.
Purpose: medicinal advances
 - a. to make vaccines to prevent certain illnesses and disease
 - b. produce embryos to treat infertility
 - c. use **stem cells** (cells that can become any type of specialized cells) to replace tissue and organs
 5. **Pasteurization:** A process by which food is heated for a period of time to kill any harmful bacteria, but can at the same time kill some good bacteria and vitamins. *Example:* *pasteurized milk*
Purpose:
 - a. Provide healthier food
 - b. Make food last longer
 6. **Vaccines:** A substance prepared in the labs that helps to prevent an organism from getting certain illnesses or disease.
There are 2 types of vaccine:
 1. **Live Vaccine: The entire bacteria** or virus is grown in the lab, but is then treated with chemical products so that they will be harmless; **OR** the entire bacteria or virus is first genetic transformed to make them harmless, then they are cultured inside the lab.
 2. **Inactive Vaccine: Only the disease causing** part of the bacteria or virus is removed and treated with chemical products so that they become harmless.

Both these types of vaccine, when injected in your body, will help your immune system to develop antibodies to fight against the disease or illness, but they are not strong enough to actually give you the actual disease or illness. The immune system may take several days to respond (that's why you may not always feel well after getting a vaccination), but your health is not harmed.

7. **Assisted Reproduction:** Medical procedures used to help women become pregnant. Couples may have problems getting pregnant because the sperm dies before making it to the cervix, or the male has a low sperm count (very little amount of sperm in their semen).

Types of Fertility Treatments:

- a) **Artificial Insemination:** Injecting sperm in the woman's uterus on the day of ovulation.
- b) **In Vitro Fertilization:** Sperms and ova (eggs) are place in a test tube for fertilization to happen; after 2 to 7 days of growth, the embryos are transfer into the uterus.
- c) **Fertilization by microinjection:** the sperm is directly injected into the ovum using a microsyringe and then transferred to the uterus.

