APPLICATIONS OF GENETIC ENGINEERING

Presentation by

Dr. Girima Nagda

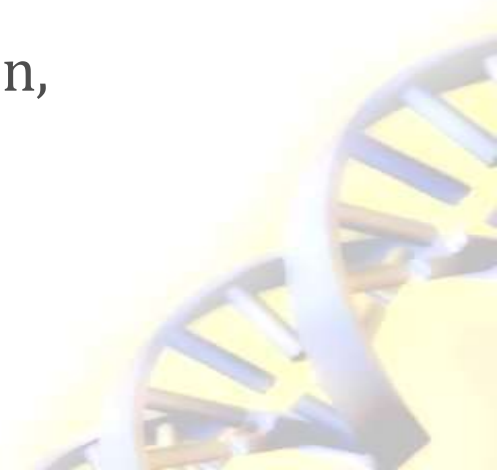
(Assistant Professor)

Department of Zoology, University College of Science,

Mohanlal Sukhadia University, Udaipur (Raj.)

APPLICATIONS OF RDNA TECHNOLOGY

- Agriculture: growing crops of your choice (GM food), pesticide resistant crops, fruits with attractive colors, all being grown in artificial conditions
- Pharmacology: artificial insulin production, drug delivery to target sites
- Medicine: gene therapy, antiviral therapy, vaccination, synthesizing clotting factors
- Other uses:fluorescent fishes, glowing plants etc



APPLICATIONS OF GENETIC ENGINEERING

- PHARMING
- GENE PHARMING IS A TECHNOLOGY THAT SCIENTISTS USE TO ALTER AN ANIMAL'S OWN DNA, OR TO SPLICE IN NEW DNA, CALLED A TRANSGENE, FROM ANOTHER SPECIES.
- IN PHARMING, THESE GENETICALLY MODIFIED (TRANSGENIC) ANIMALS ARE MOSTLY USED TO MAKE HUMAN PROTEINS THAT HAVE MEDICINAL VALUE. THE PROTEIN ENCODED BY THE TRANSGENE IS SECRETED INTO THE ANIMAL'S MILK, EGGS OR BLOOD, AND THEN COLLECTED AND PURIFIED.

APPLICATIONS OF RECOMBINANT DNA TECHNOLOGY

1)Large-scale production of human proteins by genetically engineered bacteria.

- Recombinant human insulin
- Recombinant human growth hormone
- Recombinant blood clotting factors (VIII, IX, tPA)
- Recombinant hepatitis B vaccine, HPV vaccine
- Cytokines and growth factors (IF, IL)
- Monoclonal antibodies
- Recombinant enzymes
- Recombinant HIV protein for ELISA testing
- Albumin, fibrinolytic and thrombolytic agents

PRODUCTION OF HUMULIN

www.healthtap.com

Used by diabetics

APPLICATIONS OF RECOMBINANT DNA TECHNOLOGY

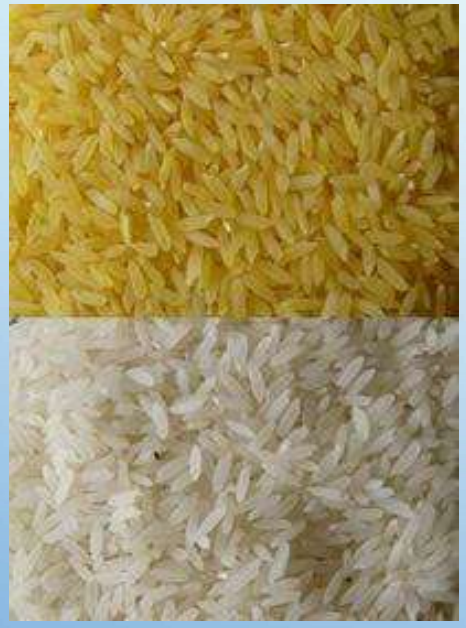
2) Gene therapy for genetic diseases

3) Food production

4) Plant: genetically modified corn

Transgenic Plants:

PLANT APPLICATION



GOLDEN RICE – A POSSIBLE SOLUTION TO VITAMIN A DEFICIENCY.

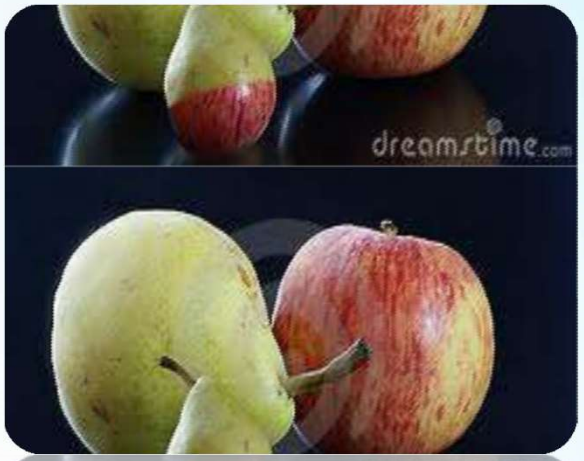
- THE FLAVR SAVR TOMATO WAS A TOMATO ENGINEERED TO HAVE A LONGER SHELF LIFE.

- In 1995, Bt Potato was approved safe by the Environmental Protection Agency.

- BT-COTTON IS A GENETICALLY MODIFIED COTTON WHICH IS RESISTANT TO PESTS.

- **Golden Rice genetically modified to contain beta-carotene (a source of Vitamin A).**

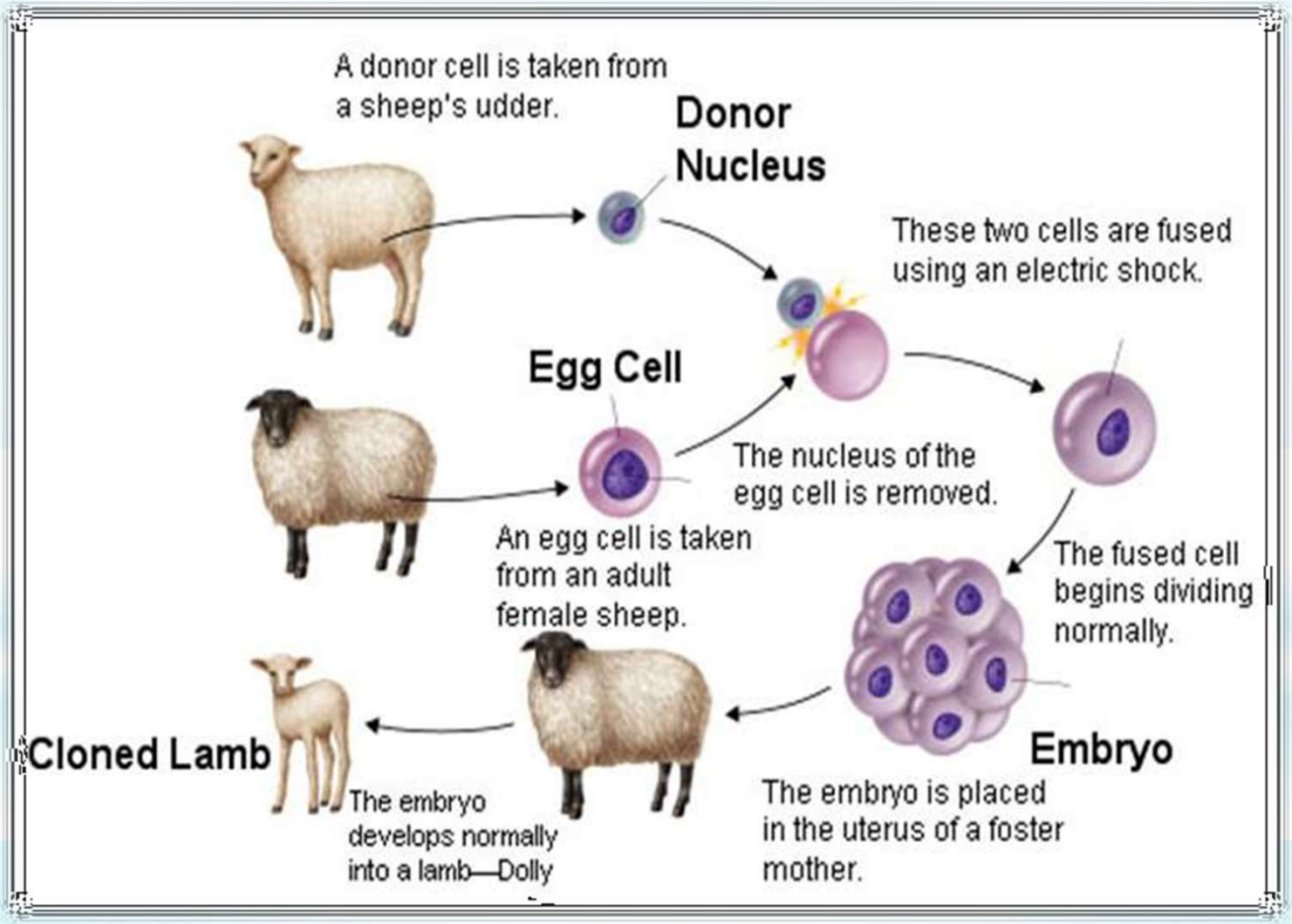
- Transgenic fruit obtained from pear and apple.



- **A Blue Rose is a genetically modified Rose.**

TRANSGENIC ANIMALS:

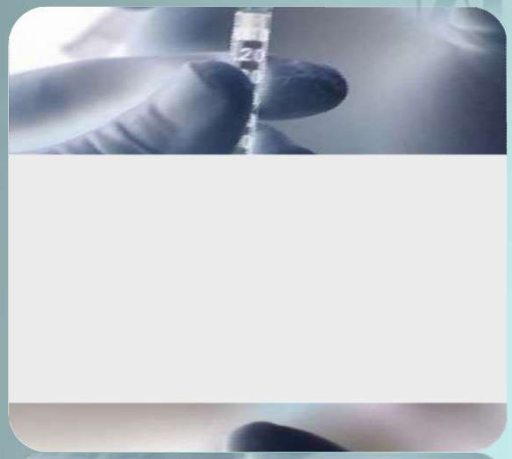
Dolly: The Sheep



- Dolly the sheep is the world's most famous clone.
- Dolly was born 5 July 1996 to three mothers (one provided the egg, another the DNA and a third carried the cloned embryo to term).

The Zorse is a cross between a zebra and a domestic horse.
The crosses were originally done in England and Africa to try to produce a domestic horse like animal that was resistant to diseases spread by a fly in Africa.

MEDICINE:



Vaccination generally involves injecting weak live, killed or inactivated forms of viruses or their toxins into the person being immunized.

Gene therapy is the genetic engineering of humans by replacing defective human genes with functional copies.

Agriculture:

Benefits of geneti·cally modified plants:

1. Improved nutritional quality.
2. Better Nitrogen Fixation.
3. Disease resistant Plant.
4. Enhanced efficiency of minerals used by plants to prevent early exhaustion of fertility of soil.
5. Reduced post harvest losses.

THANK YOU