



FACULTY OF ENGINEERING & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY

# Cloning of Sheep

First scientists removed mammary cells from sheep 1's udder.

The mammary cells are left alone for five days in the lab so that they would become totipotent.

Then an oocyte (egg cell) is removed from another sheep (sheep 2)

The nucleus from the oocytes is extracted in the lab.

Then the oocyte is fertilized with sheep 1's cells by a mild shock which acts as fertilization.

Then the embryo is implanted into the womb of sheep 3. Sheep 3 then gives birth and you have your clone.

## **Pros and Cons:**

Extinct animals can be get back to life

Humans could be brought back to life

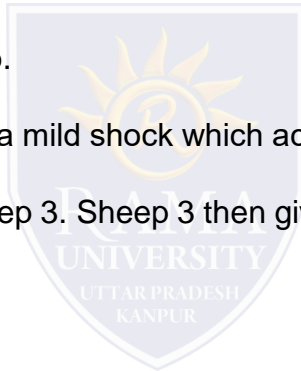
Using Therapeutic cloning you could get your damaged cells or even organs fixed

You could have a genetically perfect child in the future using cloning.

There would be a lack of uniqueness between children and animals due to them all being genetically, extremely similar.

Currently cloning has a success rate of 5%

It raises ethical issues.



# IMPORTANT POINTS CONCERNED WITH CLONING

A transgenic animal is one that carries a foreign gene that has been deliberately inserted into its genome.

Transgenesis is the process by which mixing up of genes takes place.

Foreign genes are inserted into the germ line of the animal, so it can be transmitted to the progeny.

Transgenic technology has led to the development of fishes, live stock and other animals with altered genetic profiles which are useful to mankind.

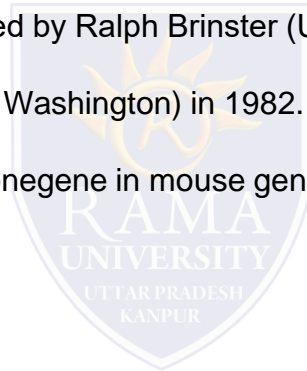
First transgenic animal was a 'Supermouse' created by Ralph Brinster (U  
Pennsylvania) and Richard Palmiter (University of Washington) in 1982.

It was created by inserting a human growth hormone gene in mouse genome.

The offspring was much larger than the parents.

Mouse – common transgenic expt.

Other animals include pig, goat, cow, sheep, fish etc.

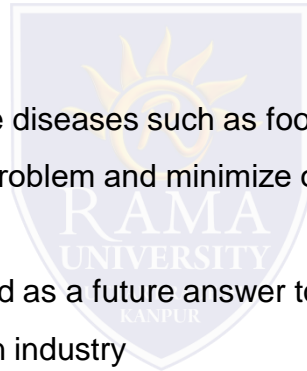


Protecting Endangered Species. Despite the best efforts of conservationists worldwide, some species are nearing extinction. The successful cloning of Dolly represents the first step in protecting endangered wildlife.

Improving food supply. Cloning could provide a means of cultivating plants that are stronger and more resistant to diseases, while producing more.

The same could happen to livestock as well where diseases such as foot and mouth disease could be eradicated. Cloning could therefore effectively solve the world's food problem and minimize or possibly eradicate starvation.

Reverse the aging process. Cloning is being touted as a future answer to reverse the effects of aging. The antiaging market is a prime target because it is already a multibillion industry



## 1. The Element of Uncertainty

While the cloning of Dolly was seen as a success story, many embryos were destroyed before the desired result was achieved. Dolly was the single successful outcome. Regardless of success in other

## 2. Inheriting diseases

Cloning creates a copy of the original. A human clone would therefore inherit the genetic traits of its predecessor. This includes genetic abnormalities and Diseases.

Dolly the sheep for example exhibited signs of what some suggested, were premature aging, although this was firmly denied by her 'developers'.

## 3. The Potential for Abuse

