ANIMAL CLONING

The animal cloning refers to the procedure of creating a new animal genetically identical to parent through asexual reproduction.

The process of reproduction occurs through two ways namely sexual reproduction and asexual reproduction. The sexual reproduction involves the fusion of two haploid gamates (Male and female) to form zygote (diploid). On the other hand the asexual reproduction deals with formation of embryo from diploid somatic cells. The process of cloning (asexual reproduction) occurs naturally in plants but not common in animals. The artificial cloning of animals involves a method called somatic cell nuclear transfer (SCNT).

The first cloning was done in tadpoles in the year 1952. In farm animals, first animal clone of sheep named "Dolly" was created successfully by Ian Walnut and co-workers in the year 1997 in Rosalyn Institute of Edinburg.

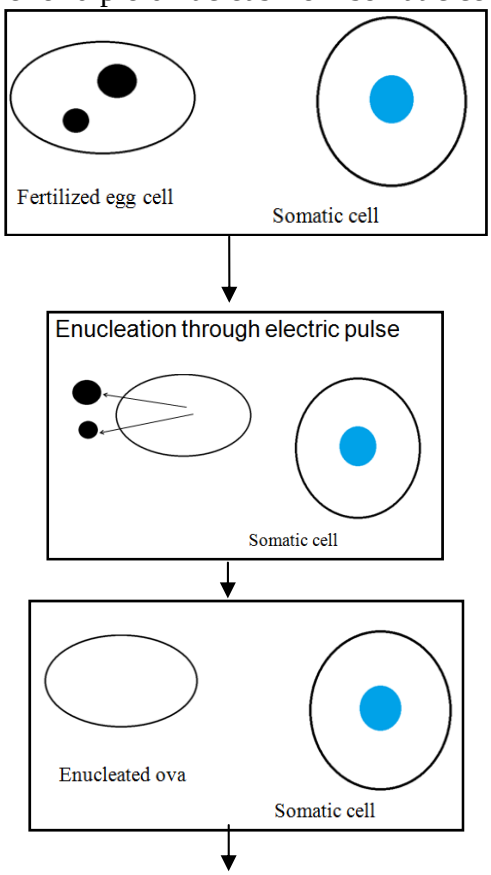
In India the first water buffalo clone was made in NDRI in the year 2009. The name of the buffalo clone was Samrupa. But the cloned calf did not survive for longer period of time. The second clone of buffalo was obtained the same year 2009. This clone was named as Garima.

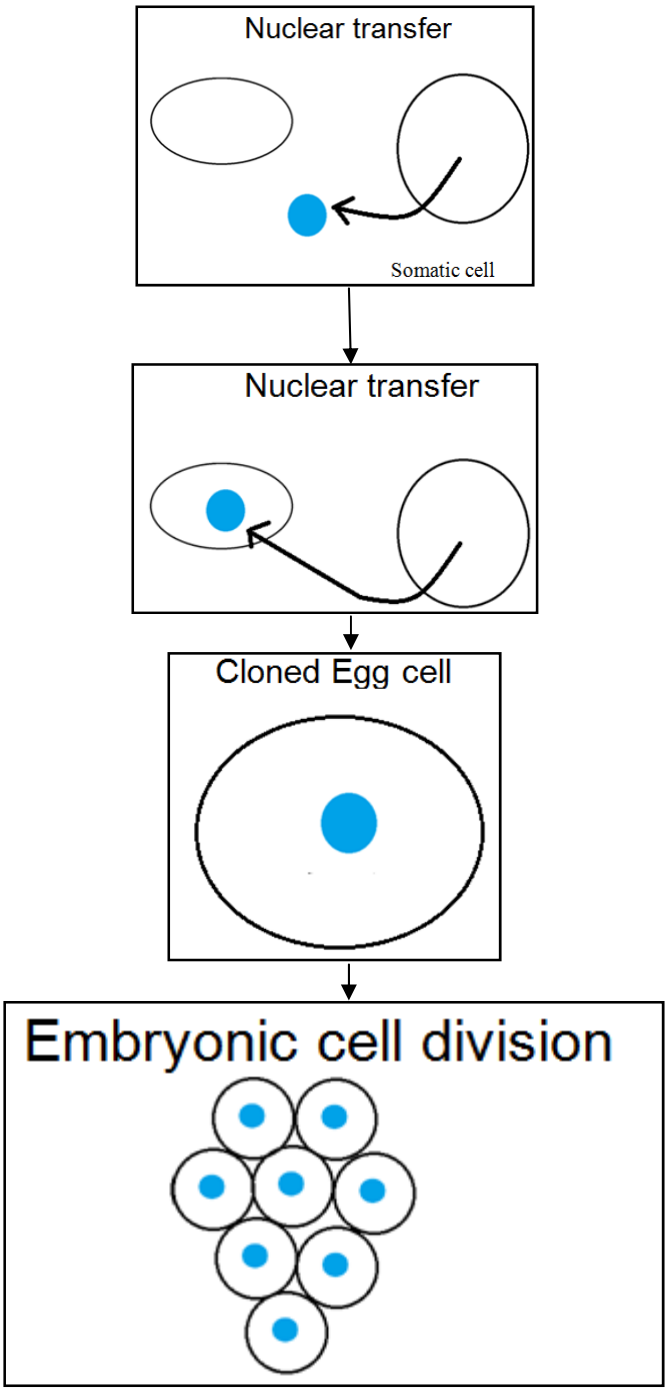
The first clone of Pashmina Goat named "Noori" was created in the year 2012 in the Sher-e-Kashmir University of Agricultural Science and Technology, Kashmir (SKUAST(K)).

SOMATIC CELL NUCLEAR TRANSFER (SCNT)

The process of cloning called SCNT involves three basic steps:

1. Fertilized ova and somatic cell is taken.
2. Enucleation of Ova.
3. Nuclear Transfer of diploid nucleus from somatic cell to enucleated ova.





1. The two cells are taken. One fertilized egg and one somatic cell (Diploid cell). The fertilized egg is obtained mainly through *in-vitro* fertilization.
2. When the fertilized egg are subjected to electric pulse for a short period of time both the nuclei of egg (male and female pronuclei) gets extruded from the egg cells. The empty egg cell that does not contain the nuclei is called enucleated egg.
3. The nucleus of somatic cell is taken out of the cell and inserted to the enucleated egg cell. The egg cell now becomes cloned egg containing the diploid nucleus. This egg cell now behaves as zygote and goes further for embryonic development leading to the formation of cloned animal. When the embryo reaches the stage of blastocyst, it is transferred to uterus of recipient mother.

Advantages of cloning

1. Conservation of endangered species.
2. Production of Transgenic Animals.
3. Cloning of animals with superior quality traits.
4. Organ cloning of damaged organs.
5. Therapeutic cloning
6. Cloning of pet animals.

Disadvantages of cloning

1. Expertise is required.
2. Early ageing of cloned animals made from somatic animals.
3. Ethical issues.