CLONING:

(ARTIFICIAL CLONING OF ORGANISM)

Er. Shivika Chadha*

ABSTRACT:

Cloning by nuclear transfer using mammalian somatic cells has enormous potential application. However, somatic cloning has been inefficient in all species in which live clones have been produced. High abortion and fetal mortality rates are commonly observed. These developmental defects have been attributed to incomplete reprogramming of the somatic nuclei by the cloning process. Various strategies have been used to improve the efficiency of nuclear transfer, however, significant breakthroughs are yet to happen. This paper include studies conducted and to gain a better understanding of nuclear reprogramming. Because cattle are a species widely used for nuclear transfer studies, and more laboratories have succeeded in cloning cattle than any other specie.

Keywords: Molecular cloning ,organism cloning(artificial cloning of organism),creating recombinant DNA.

* Lecturer, Department of Bio Technology, Apex Group of Institution INDRI Road, KARNAL.

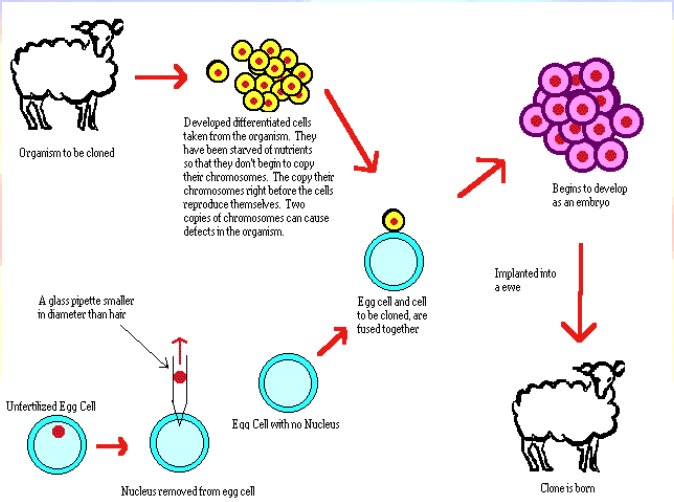
1. INTRODUCTION:

Isolate the nucleus from a non-reproductive cell of a adult donor. The nucleus holds the genetic material of the organism. This step is repeated many different times to gather many cell nuclei. A very small needle and syringe (suction device) is used to poke through the cell membrane to capture the nucleus and remove it from the cell.

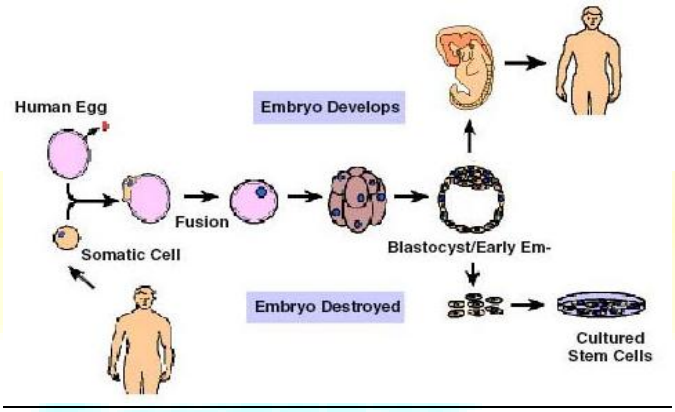
Retrieve unfertilized egg cells (reproductive) from a female. Many eggs are needed since not all of them will survive the next few steps of cloning.

Remove the eggs nucleus, which contains only one-half of the genetic material. A very small needle and syringe (suction device) is used to poke through the cell membrane to capture the nucleus and remove it from the cell.

Insert the nucleus, with its complete genetic material, isolated from the donor mammal in Step 1 into the egg cell that has no nuclear material. The egg's genetic material now contains all traits from the donor adult. This egg is genetically identical to the donor adult.



Place the egg into a female womb. Only a small percentage of eggs placed in the womb will start to mature. Those eggs that survive will continue to develop into embryos. The egg matures in the womb. When the offspring is born, it is a clone (genetically identical) of the donor.



SCNT CLONING OPTION

Cloning is done through a process called somatic cell nuclear transplantation (SCNT). This is the scientific term for cloning. All clones made through SCNT are made the same way; the only difference is what is done with the cloned embryos after they are created. Scientists may let the clone live—reproductive cloning; or kill the clone for her stem cells—therapeutic cloning.

Therapeutic cloning occurs when cloned embryos created through SCNT are allowed to grow for a few days and then killed for their stem cells.

- It could help advance embryonic stem cell research.
- Many scientists feel that therapeutic cloning isn't really cloning because the embryo is not allowed to live beyond 4-5 days, but the cloning process is exactly the same.
- Human life begins at conception. Even if the young life is only five days old, it is still a human being worthy of respect.
- Embryos created in this manner are not treated with dignity, not only because they are a cloned copy of another person, but also because they are not allowed to live beyond a few days.

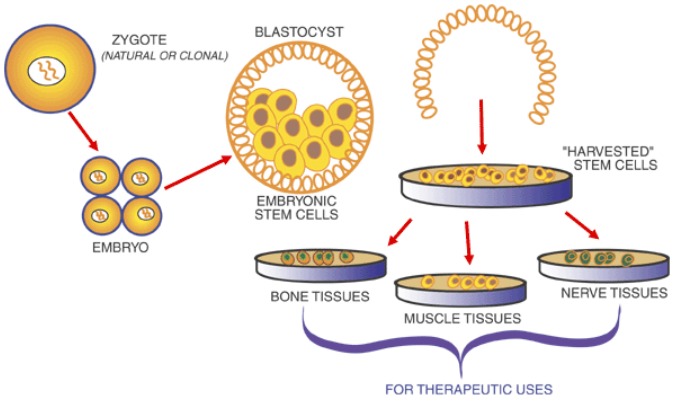
- Therapeutic cloning makes human life a commodity to be created, manipulated and destroyed merely for the sake of experimentation.

MOLECULAR CLONING:

Molecular cloning is a procedure to isolate a defined DNA sequence and obtain multiple copies of it in vivo - which means in a living cell, in our case a bacterial cell. So the term cloning refers to the amplifying of a DNA sequence, but it is also often used to describe the procedure of engineering a given DNA sequence and thereby altering it.

You ask yourself what a fluorescent protein is? Well, it is a protein, which is able to absorb light and emit light of lower energy and thereby glow. One protein with this feature is taken from a jellyfish and called Green Fluorescent Protein (GFP). It is the oldest and most broadly used fluorescent protein in biotechnology. Because it had such a great impact on this science and improved it a lot, this year's Nobel Prize in chemistry was awarded for the discovery of GFP and its applications. If GFP is made by a cell and you illuminate this cell with UV-light, you can see a green light coming from this cell.

Naturally there exist proteins, which are able to cut DNA. They are called restriction enzymes. They work by cutting the bonds between two nucleotides of the DNA strands and thereby create two new ends of the double helix. But restriction enzymes do not cut the DNA at random points, but they need signal sequences to get active. Those are called restriction sites and only at those sites the enzymes can bind and cut the DNA. So restriction enzymes provide a tool to cut DNA sequences in defined locations. Organism derived DNA sequences have a great number and variety of restriction sites. Over 3000 restriction enzymes have been studied in detail, and more than 600 of these are available commercially and are routinely used for DNA modification and manipulation in laboratories.



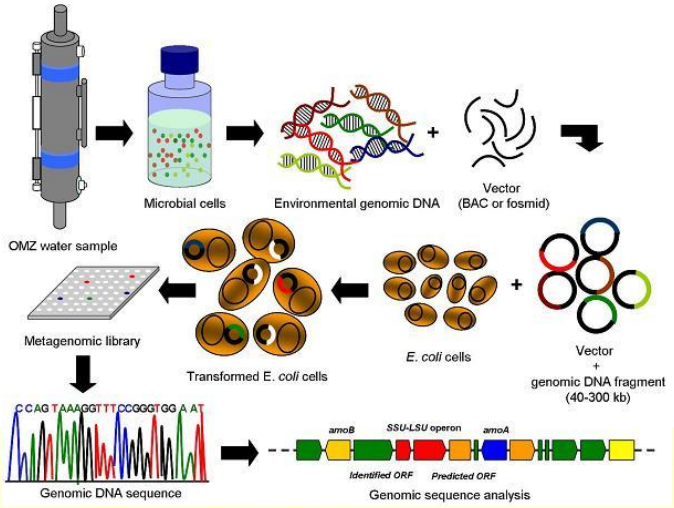
HUMAN CLONING - a term usually used by scientists to describe different processes to replicate biological materials. When the media report on cloning in the news, they often talk about only one type called reproductive cloning. There are different types of cloning however, and cloning techniques can be used for other purposes as well as the production ofgenetic twins of another organism.

ARTIFICIAL CLONING:

Cloning is a technology that has been developed so that farmers can raise exact copies of their 'best' animals. For example this means the fastest-growing pigs or the highest-yielding dairy cows. Unfortunately the so-called 'best' animals are all too often those who will develop the most health problems – pushed to their physical limits, they are condemned to a lifetime of suffering.

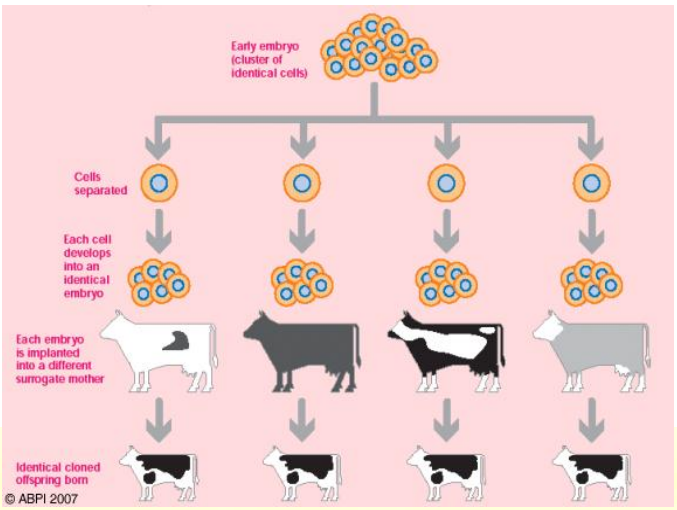
The Cloning = Cruelty campaign highlights the intrinsic animal welfare issues of selective breeding in animals for food – i.e. meat and dairy. Research also shows that many cloned farm animals are born with deformed organs and live short and miserable lives.

The cloning of farm animals can involve great suffering. A cloned embryo has to be implanted into a surrogate mother who carries it to birth. Cloned embryos tend to be large and can result in painful births that are often carried out by Caesarean section. Many clones die during pregnancy or birth. Of those that survive, a significant proportion die in the early days and weeks of life from problems such as heart, liver and kidney failure.



The metagenomic study of microbial populations that live in the OMZ involves the following steps:

1. The collection of a sample from a particular depth in the water column and the extraction of its genomic DNA.
2. The generation of separate and large DNA fragments (40-300kb) providing information of a single organism through cloning and sequencing.
3. The clones are then screened for a specific organism or function, e.g., via vector end sequencing.
4. The complete sequencing of the screened clones.
5. The analysis of the genomic sequences and the identification and mapping of genes.



EMBRYO CLONING

CREATING RECOMBINANT DNA:

Formation of recombinant DNA requires a cloning vector, a DNA molecule that will replicate within a living cell. Vectors are generally derived from plasmids or viruses, and represent relatively small segments of DNA that contain necessary genetic signals for replication, as well as additional elements for convenience in inserting foreign DNA, identifying cells that contain recombinant DNA, and, where appropriate, expressing the foreign DNA. The choice of vector for molecular cloning depends on the choice of host organism, the size of the DNA to be cloned, and whether and how the foreign DNA is to be expressed. The DNA segments can be combined by using a variety of methods, such as restriction enzyme. In standard cloning protocols, the cloning of any DNA fragment essentially involves seven steps:

(1) Choice of host organism and cloning vector,

(2) Preparation of vector DNA,

(3) Preparation of DNA to be cloned,

(4) Creation of recombinant DNA,

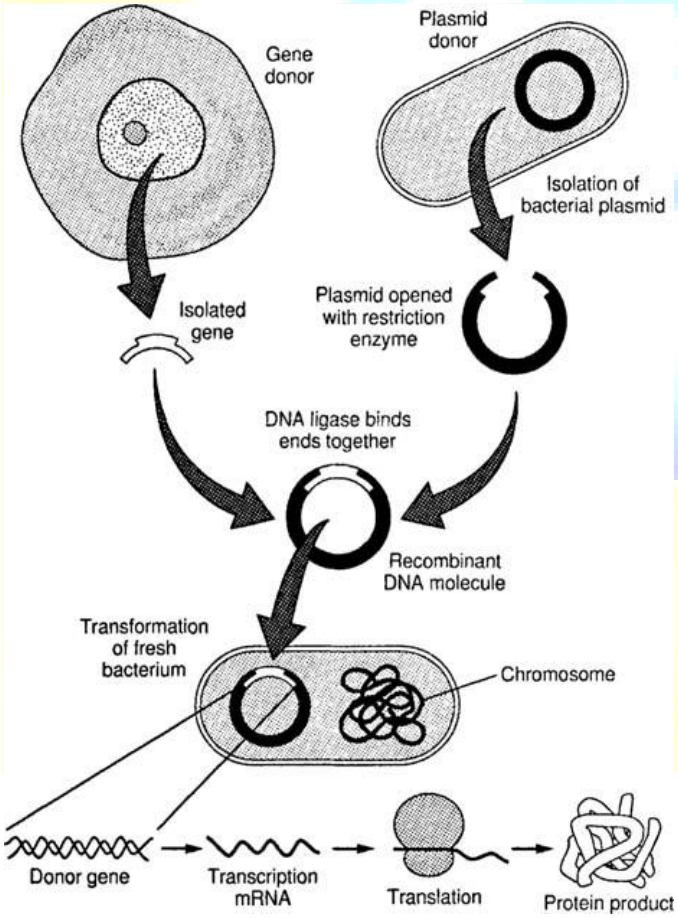
(5) Introduction of recombinant DNA into the host organism,

(6) Selection of organisms containing recombinant DNA,

(7) Screening for clones with desired DNA inserts and biological properties.

The basic process of recombinant DNA technology revolves around the activity of DNA in the synthesis of protein. By intervening in this process, scientists can change the nature of the DNA and of the gene make-up of an organism. By inserting genes into the genome of an organism, the scientist can induce the organism to produce a protein it does not normally produce.

The technology of recombinant DNA has been made possible in part by extensive research on microorganisms during the last century. One important microorganism in recombinant DNA research is Escherichia coli (E. coli). The biochemistry and genetics of E. coli are well known, and its DNA has been isolated and made to accept new genes. The DNA can then be forced into fresh cells of E. coli, and the bacteria will begin to produce the proteins specified by the foreign genes. Such altered bacteria are said to have been transformed.



CONCLUSION:

Cloning can be extremely helpful to everyone, but it is. Scientists are cloning the human embryos to get more stem cells and treat human disease. Right now we haven't made much progress in cloning. Scientists are constantly working at different things to clone and how that can be helpful to organisms. The meat from cloned animals is even accepted, by the FDA.The negative side of cloning is that the resulting products of cloning haven't lived very long; they usually have high rates of early mortality and occasionally signs of deformity at birth. There are also many religious controversies against cloning. The Catholic Church, Judaism, and liberal religions are against cloning, while Orthadox/Jewish religions have no apparent reason to be against cloning.

REFRENCES:

- http://contemporarybiotechissues.wikispaces.com/Cloning
- http://www.ciwf.org.uk/what_we_do/cloning/default.aspx?gclid=CPKwu8GezK0CFY4a6wodx3DHhg
- http://www.google.co.in/imgres?q=ORGANISM+CLONING&hl=en&sa=X&biw=1024&bih=430&tbm=isch&prmd=imvns&tbnid=dRmArnbnO_G5oM:&imgrefurl=http://universe-review.ca/F10-multicell.htm&docid=WcLl8T33uUY5gM&imgurl=http://universe-review.ca/I10-56-cloningc.jpg&w=543&h=398&ei=lL0PT_TLAsf3rQftiKHhAQ&zoom=1&iact=hc&vpx=721&vpy=125&dur=2583&hovh=192&hovw=262&tx=145&ty=142&sig=106501688962727611070&page=1&tbnh=81&tbnw=110&start=0&ndsp=16&ved=1t:429,r:15
- www.abpischools.org.uk/page/modules/genome/dna3.cfm
- http://www.is.northropgrumman.com/products/bacn/index.html
- http://www.cliffsnotes.com/study_guide/Recombinant-DNA-and-Biotechnology.topicArticleId-8524,articleId-8439.html
- Cloning animals by somatic cell nuclear transfer – biological factors X C Tian, Chikara Kubota, Brian Enright and Xiangzhong Yang.