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Short Communication

# Brief Note on Reproductive and Therapeutic Cloning

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## DESCRIPTION

A clone is a genetically identical copy of an organism that can occur naturally or be created in a laboratory. Organisms such as bacteria (and some plants) use asexual reproduction to produce offspring that are genetically identical to the parent. Clones can also be created using modern genetic technology. Cloning is classified into three types-gene cloning, reproductive cloning, and therapeutic cloning. Gene cloning is essentially Recombinant DNA (rDNA) technology in which a piece of foreign DNA is inserted into a vector that a host cell can copy. Therapeutic cloning is the process of creating patient-matched stem cells for disease treatment. Reproductive cloning is the process of cloning an entire organism[1].

### Reproductive cloning

It entails implanting a cloned embryo into a real or artificial uterus. The embryo becomes a foetus, which is then carried to term. For more than 40 years, reproductive cloning experiments were carried out using the embryo splitting method, in which a single early-stage two-cell embryo is manually divided into two individual cells and then grows as two identical embryos. The entire nucleus of an organism is removed from a somatic (body) cell, and the nucleus is then inserted into an egg cell that has had its own nucleus removed (enucleation).

When the somatic nucleus is inside the egg, it is stimulated with a mild electrical current and begins to divide. As a result, a cloned embryo is formed, which is essentially an embryo of an identical twin of the original organism. The Somatic Cell Nuclear Transfer (SCNT) process has been significantly refined, and procedures to prevent egg damage during nuclear extraction and somatic cell nuclear insertion have been developed. Using polarized light to visualize the nucleus of an egg cell makes it easier to extract the nucleus from the egg, resulting in a healthy, viable egg and increasing the success rate of SCNT [2,3].

### Therapeutic cloning

Therapeutic cloning is the use of cloned embryos to extract stem cells from them without ever implanting the embryos in a womb. Therapeutic cloning allows for the cultivation of stem cells that are genetically identical to those of a patient. The stem cells could be stimulated to differentiate into any of the human body's more than 200 cell types. The differentiated cells could then be transplanted into the patient to replace diseased or damaged cells without the risk of immune system rejection[4].

These cells have the potential to treat a wide range of conditions, including Alzheimer's disease, Parkinson's disease, type 2 diabetes, stroke, and spinal cord injury. Furthermore, stem cells could be used for *in vitro* (laboratory) studies of normal and abnormal embryo development, as well as drug testing to determine toxicity or birth defects. Although stem cells have been generated from cloned embryos of animals such as mice, producing stem cells from cloned primate embryos has proven exceedingly difficult. Maintaining embryo viability has been a challenge in the production of stem cells from human embryos.

## CONCLUSION

Therapeutic cloning begins with the same process as adult DNA cloning and allows the resulting embryo to grow for days before the stem cells are extracted and motivated to grow into human tissue or complete human organs for transplantation or treatment of certain diseases. This implies that cloning will theoretically solve fertility problems. Genetic cloning enables scientists to remove small amounts of cells from specific organs and use them to generate and harvest fully functioning new organs, allowing a large number of people to benefit from organ donation.

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