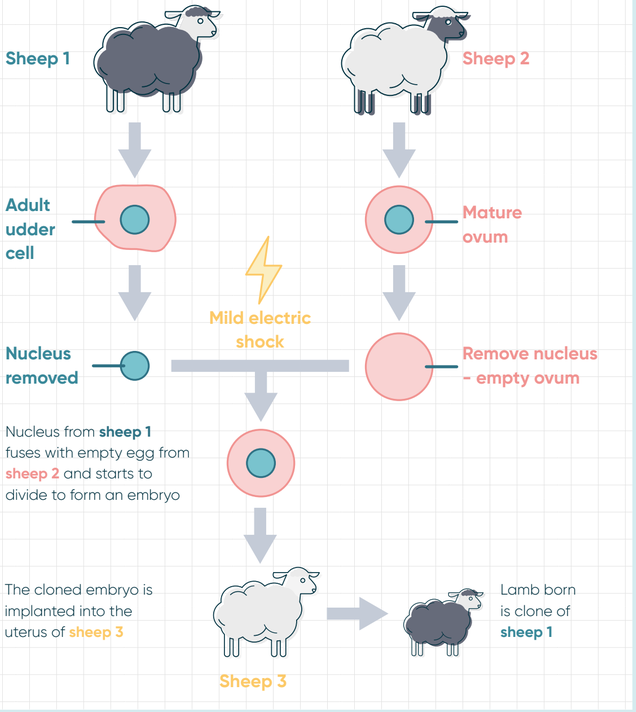
Cloning

A clone is a group of cells or organisms which are genetically identical and have all been produced from the same original cell. Identical twins are natural clones, but over the last 50 years we have developed the ability to produce clones artificially. There are three main types of cloning, each with the potential to deliver great medical breakthroughs – but there are some ethical dilemmas attached.

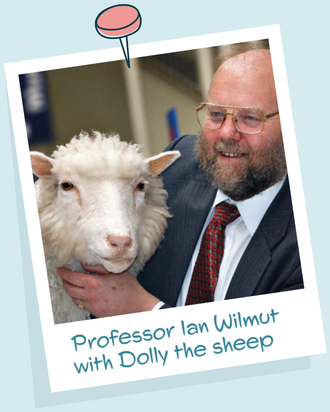
Somatic cell nuclear transfer (SCNT): reproductive cloning

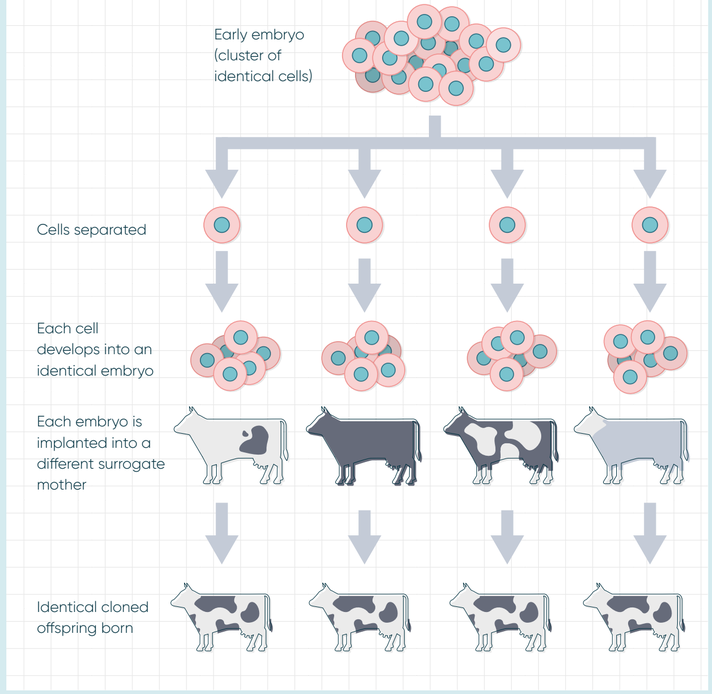
In reproductive cloning, SCNT is used to create a cloned individual. In SCNT, the nucleus from a normal body cell of an adult animal is removed and placed into an empty ovum from another adult animal. A tiny electric shock is used to trigger development. The developing embryo is then placed into a surrogate mother. The first and most famous reproductive clone of a large mammal was Dolly the sheep. The medical hopes for this technology have been to produce clones of organisms which have been genetically modified to make therapeutic proteins for people, or as potential organ donors for human patients. Techniques developed for SCNT are also used to help overcome human infertility problems.



Embryo cloning (artificial twinning)

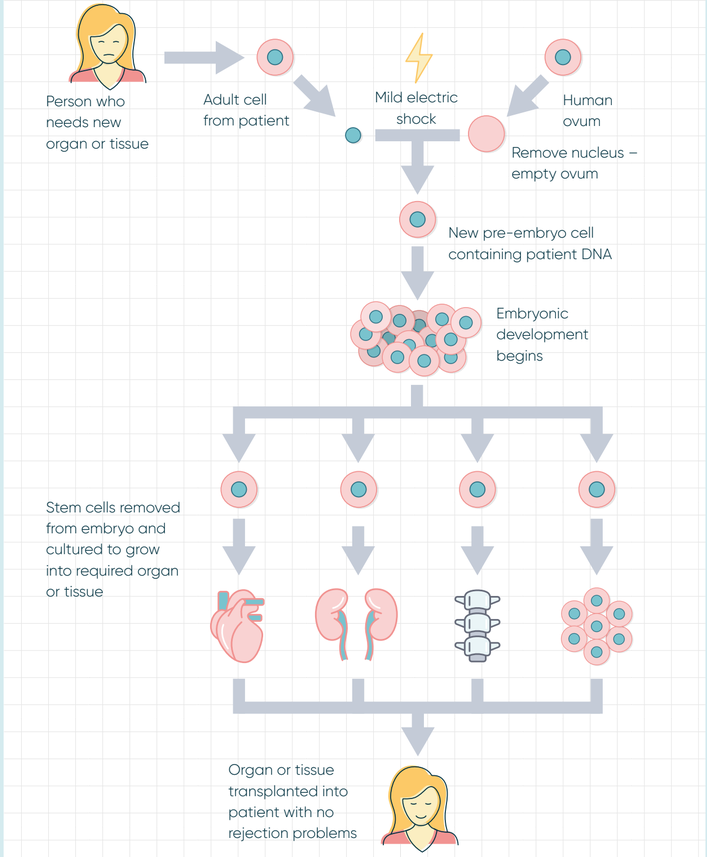
Individual cells are taken from an early embryo and encouraged to develop into more identical embryos – a form of artificial twinning. The medical applications of this technique are based around making many identical copies of original embryos which have been genetically modified. They may have been engineered to produce human proteins, as potential organ donors, or to produce a clone for testing potential medicines.


Professor Ian Wilmut with Dolly the sheep



Somatic cell nuclear transfer (SCNT): therapeutic cloning

In therapeutic cloning, SCNT is not used to produce a new animal or plant. The idea is to produce new tissues or organs for people who are seriously ill with problems ranging from diabetes and Parkinson's disease to heart attacks and spinal injuries. It results in the production of stem cells which might then be used in treatments – for example, such as treatment of traumatic injuries, or correction of genetically predisposed conditions. They could also be used to learn more about the molecular causes of diseases, and to test new therapeutic drugs. This technique still has enormous medical potential.



Use QR code to find out more about cloning on the ABPI Schools website

www.abpischools.org.uk

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