



# Stem cells, ethics and future medicine



Some of our SciBar participants prepared this glossary, independently of Sue Kimber. Your feedback on the level of information and usefulness of the SciBar glossaries is most welcome.

**Blastocyst** An early embryonic stage: there are less than 100 cells in a human blastocyst. Research is not permitted on human blastocysts older than 14 days in accordance with the Human Fertilisation and Embryology Act.

**Cell division** Most cells in the adult body, e.g. those in heart muscle or the brain, are not dividing. But other cells such as those in skin or lining the intestine are constantly worn away and need to be replaced by new cells. These new cells are produced by stem cells, which do divide.

**Chondrocyte** A mature cartilage cell. Normally, cartilage in joints and covering the ends of bone is capable of only limited repair (unlike skin). Use of stem cells might allow better repair of cartilage, which could be important for arthritis treatments.

**Cord blood** Blood remaining in the umbilical cord and the placenta after a baby's birth. It is the baby's blood and is rich in stem cells.

**Differentiated cell** A body cell that has a particular structure and is highly specialised for its function is said to be 'differentiated' eg. nerve cell. Normally, such cells do not divide.

**Embryonic stem (ES) cells** Derived from an embryo usually at the blastocyst stage. ES cells cultured in Petri dishes and exposed to certain chemicals can differentiate into cells of different types, e.g. nerve or cartilage cells. Human ES cells are usually obtained from embryos produced during IVF treatment but which are not going to be used. This has raised ethical issues for some people.

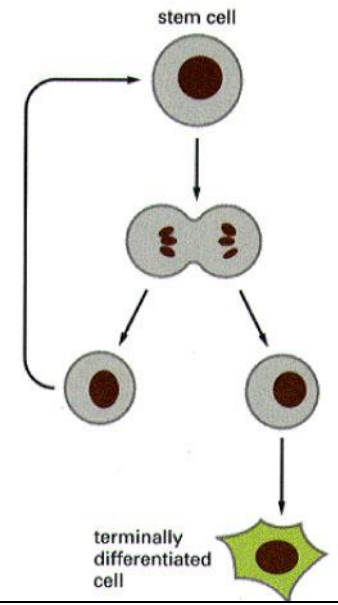
**Fibroblasts** Unspecialised cells which can be obtained from skin samples and grown in Petri dishes. They may be used in stem cell therapy if they can be 're-programmed' to behave like stem cells or they can be used as 'feeder layers' to help maintain stem cells in dishes.

**Growth factors & cytokines** Protein molecules, of many types, which can influence cell division and cell differentiation.

**Human Fertilisation and Embryology Authority** An independent regulator that oversees research on embryos and licenses IVF clinics, including the storage and disposal of eggs, sperm and embryos.

**Stem cells** Able to renew themselves through unlimited cell division ('self renewal') and produce precursors of differentiated cells (see opposite). They can be derived from embryos (ES cells) or from adult tissues. Some stem cells can only make one type of differentiated cell but 'pluripotent' stem cells have the potential to divide to produce most adult cells.

**Tissue** Group of similar cells, carrying out similar functions, which together have a consistent structure eg. cartilage.



### Useful weblinks:

Useful overviews of stem cell research (including reprogramming adult cells), ethical issues and potential uses of stem cells:  
[www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Human-Fertilisation-and-Embryology-Act/Stem-cell-basics/index.htm](http://www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Human-Fertilisation-and-Embryology-Act/Stem-cell-basics/index.htm)  
 Next SciBar: 12 March 2012. Harvesting solar energy. Time: 6.30pm as usual.