

## Biotechnology

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### Statement

Biotechnology is a cross-sectional technology incorporating specialist areas such as biology and biochemistry as well as physics, chemistry, bio engineering, material science and information technology. One main purpose of biotechnology is the application of science and technology on living organisms.

Depending on the area of application we differentiate between red, green and white biotechnology. These refer to the areas of medicine, agriculture and industry respectively.

Medical biotechnology, also called red biotechnology, concerns the development of new procedures for diagnosis and treatment of diseases. The foundations for medical biotechnology were only laid a few decades ago. The discovery of the molecular structure of a DNA molecule in 1953 by James Watson and Francis Crick was an essential prerequisite for biotechnology. A further milestone was the decoding of the human genome in the year 2000.

Biotechnological procedures make it possible to intervene in and control early human life. This can apply to stem cell research as well as cloning and genetic engineering. The church is in favour of biomedical research for the purpose of the advancement of diagnosis and therapy, but is also aware of the complex questions around extended possibilities. The church adheres to the Godly commandment of preserving the creation. In the spirit of the gospel and in consideration of medical ethics we have to specifically consider whether human life is hindered in its development or even killed.

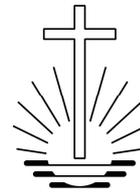
In order to give direction when evaluating these procedures, the biotechnological processes *The Use of Stem Cells, Cloning and Gene Therapy* will be examined from the point of view of our faith in the form of short statements.

Other, in part divergent ethical and theological deliberations can be found for example in the document by the Catholic Church, *Dignitas Personae* of 2008 or in the internet pages of protestant churches e.g. <http://www.ev-medizinethik.de>. Further Information concerning technical details can be accessed in specialist literature and on the internet (e.g.; [www.drze.de/im-blickpunkt](http://www.drze.de/im-blickpunkt), [www.biotechnologie.de](http://www.biotechnologie.de); in English: <http://en.wikipedia.org/wiki/Biotechnology>, [www.drze.de/in-focus](http://www.drze.de/in-focus), <http://www.biot.tk>).

### 1. The use of Stem Cells for the Treatment of Diseases and for Research Purposes

Stem cells are very immature cells. They have the ability to multiply almost indefinitely, as well as to develop into different types of more mature cells, e.g. blood, heart, nerve and muscle cells. Stem cells offer new therapeutic options for diseases, where mature cells are not functioning properly or have died off and can't regenerate.

**In order to evaluate the use of stem cells from the perspective of our faith their origin as well as their development potential are significant factors.** Here we have to differentiate between embryonic and adult stem cells. The fertilised egg cell and early



embryonic stem cells (e.g. at 8-cell stage) are totipotent, i.e. they have the ability to develop into a complete life form. Embryonic stem cells are otherwise pluripotent, i.e. they have the ability - given the right conditions - to create all types of body tissue.

**Embryonic stem cells can be extracted, for example, from**

- Embryos, created by artificial insemination which are not implanted
- Embryos which are created for the purpose of stem cell extraction
- Aborted embryos
- Embryos which have been created by cloning

These embryos are destroyed in the process of harvesting stem cells. So far, a process which allows the harvesting of embryonic stem cells and which at the same time preserves the integrity and development potential of the embryo has not yet been developed.

As explained in the statement for 'The Beginning and End of Human Life', the life of a human being begins with the fusion of egg and sperm cell (conception). The church categorically objects to killing this life in the context of biotechnological processes. The embryos deserve unreserved human dignity, irrespective of whether they have been fertilised naturally or inside a test tube.

**Adult stem cells** are extracted from born human beings, usually without significant effects on the donor. They can be harvested from

- Umbilical cord blood
- Bone marrow
- Blood (with the aid of blood separators)
- Different organs

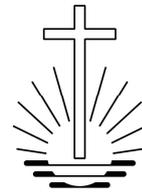
While adult stem cells have been used successfully for many years, the use of embryonic stem cells is still at an experimental stage.

In order to protect the human being as the image of God in the best possible way, the church respects human life from the moment of conception and objects to the killing of this life. This life deserves unrestricted human dignity. Therefore the killing of embryos for the purpose of research and therapy (embryo-destructive research) has to be rejected from the perspective of the New Apostolic faith. Pluripotent embryonic stem cells can theoretically be harvested in future without destroying embryos, we await further scientific developments in this area. The use of adult stem cells does not raise concerns from the church's perspective.

Some currently utilized vaccines use fetal cell lines in their manufacture. These cells originate from fetuses which have been aborted for other reasons. The church is aware of the ethical and moral issues involved. Nevertheless the church considers the use of such vaccines as unobjectionable.

## 2. Cloning

The term 'cloning' is understood to mean a form of asexual reproduction - as opposed to sexual reproduction - whereby the genome of an organism is doubled. A genetically almost identical - or even completely identical - 'copy' of the original is created.



In nature (lower order animals, plants) cloning is a common form of reproduction besides sexual reproduction. In humans the identical creation of multiples in the form of identical (monozygotic) twins occurs naturally, albeit only in the context of sexual reproduction. For technical details on the subject of cloning we refer to relevant pages on the internet. For this section we have used information from the following internet page:  
<http://www.drze.de/im-blickpunkt/forschungsklonen>.

When speaking of cloning we differentiate between two basic objectives:

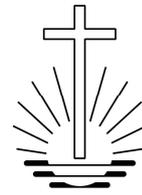
- **Research or therapeutic cloning:**  
The aim here is the harvesting of stem cells for the treatment of diseases. Ideally a problematic rejection reaction can be avoided when transplanting stem cells or cells and tissue grown from them, because the genetic characteristics of these stem cells are largely identical to the genetic characteristics of the patient who is being treated.
- **Reproductive cloning:**  
Here the aim is to create genetically identical descendants (animals, theoretically humans)

When performing research or therapeutic cloning different methods are employed:

- **Somatic-Cell Nuclear Transfer (SCNT) :**  
Here the nucleus of a body cell, which is to be cloned, is inserted into a denucleated egg (oocyte) donated by a woman.  
The cell nucleus can be isolated from virtually any body cell of a donor. An embryo develops from it which is in terms of the genetic material contained in the nucleus identical to the nucleus donor.
- **Embryo Splitting (Splitting already existing embryos):**  
Here twins or multiples are produced in an artificial way by the micro-surgical splitting of an embryo. Because cells are still totipotent at the beginning of embryonic development, two or more embryos are created which continue to develop in a suitable environment like an undivided embryo.

In technical terms research cloning and cloning with a reproductive aim are not fundamentally different. In both cases embryos are created. In the case of research cloning the embryo is not implanted into a uterus in order to enable it to be born. In fact it is destroyed at an early stage of its embryonic development (the blastocyst stage), in order to extract embryonic stem cells from it, which can be differentiated into specific cell types in the cell culture.

In 2008 procedures were described whereby human cells taken from adults were changed (reprogrammed) successfully in such a way that they exhibited some characteristics of embryonic stem cells. These cells are called induced pluripotent stem cells (iPS cells). The advantage of procedures involving iPS cells lies in the fact that they present less of a problem in respect of ethics and legality than cell lines harvested directly from embryos. Scientifically, however, the procedure involves certain risks which have to be reduced before it can be applied in therapeutic procedures. At present the area of iPS cells is the focus of intensive research.



The church rejects reproductive cloning, regardless of the type of method used, for ethical reasons, so as to respect the uniqueness of human life.

Therapeutic or research cloning is considered part of destructive embryo research, i.e. it implies the destruction of human embryos for research purposes. Therapeutic cloning can therefore not be endorsed from the perspective of our faith. The process of cell reprogramming or other procedures, where embryos or cells with the potential of developing into a human being are not destroyed, are unproblematic from the perspective of the church. Due to rapid accumulation of scientific knowledge and biotechnological possibilities in the field of cloning a revision of the evaluation from the perspective of our faith is by all means possible at short notice.

### 3. Gene Therapy

During gene therapy sections of genetic material are inserted into cells in order to change their function. The aim is to cure diseases, first and foremostly; and it is therefore the specific responsibility of physicians who feel equally committed to delivering the best possible treatment for the patient as well as ensuring compliance with ethical standards. Gene therapy is only possible in the case of very few diseases; it has however been difficult to control until now and is encumbered with significant complications.

In turn, genetic engineering facilitates the manipulation of cells to the point of 'optimization' of the human being. Theoretically it would be possible in future to modify humans by gene manipulation during the embryonic stage (reference 'designer baby')

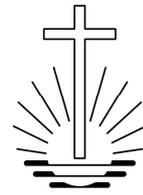
In the field of gene therapy several procedures are to be differentiated:

- **Somatic Gene Therapy:** with this therapy normal DNA sections are inserted into long-living body cells of patients with genetic defects in order to normalise cell function.
- **Germline Manipulation** constitutes genetic cell modification which is passed on from one generation to another. In many countries this is rejected because of unpredictable social and biological consequences for future generations. Furthermore germline manipulation creates the ethically questionable possibility of producing so-called designer babies (positive eugenics).

From the perspective of the New Apostolic Church there are principally no ethical objections to a medically justified somatic gene therapy. Germline manipulation, however, has to be rejected for ethical reasons in agreement with other Christian churches.

### Brief Statement

The New Apostolic Church endorses scientific research in accordance with the Godly commission: Fill the earth and subdue it. The framework of this commission is defined in the 10 commandments and the gospel of Jesus. This includes unreserved respect for human life in all its diversity.



Due to rapid developments in the field of biotechnology we can only provide an outline of the individual areas as a basis for decision-making.

The creation or the destruction of human embryos for scientific purposes has to be rejected. The production of genetically identical offspring (reproductive cloning) has to be rejected. The production of genetically identical tissue for therapy purposes (therapeutic or research cloning) is likewise rejected, if it involves the destruction of embryos.

Somatic gene therapy can be accepted/is acceptable in principal. The medical risk is of particular consideration here. Interference with the genome of germ cells which could have unforeseen consequences even for future generations is ethically irresponsible. We are not able to say for certain that germ cells are not compromised by some forms of gene therapy.

Zurich, 08. November 2012