

## **Human Cloning – Some Ethical Questions**

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The Italian scientist Severino Antinori and his team intend to clone humans already next year, to help sterile couples. A storm of protests worldwide was the reaction. Even the most fervent representatives of modern reproduction technologies are shocked. Until now up to 97% of all cloning experiments on mammals are a "disaster" – producing monstrously big and misshaped creatures.

In the shadow of this loud public debate another way of human cloning is silently making its way – called "therapeutic cloning". The British Parliament allowed therapeutic cloning of humans up to the 14<sup>th</sup> day in January 2001. Scientists want to get embryonic stemcells from cloned embryos (which then will be killed, and never implanted into an uterus). Embryonic stemcells are not (yet) differentiated (e.g. into a muscle- or an eye-cell). They can be made to develop into muscle-, nerve- or skin cells – a big potential for the transplantation medicine.

For cloning human embryos scientists experiment mostly with the "Dolly" procedure: Human (adult) cells are cultivated and specially treated in vitro. One of these cells is then fused with an eggcell, of which the nucleus has been removed. The "new" nucleus is "turned back" in its development; it is undifferentiated again and can develop into an embryo. Stem cells are gained from this embryo, cloned in millions, and developed into the desired tissue. This research is at its very beginning; nobody knows if it ever will work.

### **Alternatives: They exist.**

Undifferentiated stem cells not only exist in embryos, but also in adults. According to Mae Van Ho, Director of I-SIS (Institute of Science in Society, GB):

"Mammals appear to contain some 20 major types of somatic stem cells. Stem cells have been described that can generate all the cells in the brain, the liver, pancreas, bone and cartilage. These adult stem cells are increasingly found to have the potential to become practically as many different cell types as embryonic stem cells. Furthermore, it appears that differentiated adult cells can be made to revert to cells remarkably similar to stem cells, and to have the ability to multiply for long periods in cell culture. Some of the findings are highlighted below:

- Mouse bone marrow stem cells can give rise to skeletal muscle and brain cells. Liver /pancreas stem cells can give rise to blood cells and brain cells. Brain cells can give rise to all previous cell types including the peripheral nervous system and smooth muscle. Brain cells have been found to differentiate to muscle, blood, intestine, liver and heart.
- Catherine Verfaillie of the University of Minnesota in Minneapolis is reported to have isolated bone marrow cells from children and adults that can become brain, liver, and muscle cells as well. These were found in adults between 45 and 50 years old. This research has not yet appeared in print.
- Scientists from the National Neurological Institute and Stem Cell Research Institute in Milan, Italy, succeeded in growing skeletal muscle from stem cells originating from an adult brain, both in culture and in animals receiving the transplanted stem cells (Galli, R. et al (2000), Nature Neuroscience 3, 986-991).

- A researcher in Britain, Dr. Ilham Abuljadaye, has just announced an efficient method for creating large quantities of adult stem cells from white blood cells, and her findings have been independently replicated, though not yet published. The method involves inducing the white blood cells to de-differentiate in the test-tube into stem cells ("Stem cell discovery reverses time" The Times, 15 Jan 2001, <http://www.thetimes.co.uk/article>). This means that it will be feasible to prepare stem cells from the patient who is in need of cell or tissue transplant, greatly simplifying the procedure, avoiding immune reactions and reducing cost.
- Two research teams at University College London found that adult rat cells can be made to divide hundreds of times when provided with the right mixture of nutrients, and without taking on the undesirable characteristics of cancer cells, such as uncontrollable growth (Cohen, P. (2001), New Scientist 18 Jan. latestnews@newscientist.com). Adult human cells may have the same capacity. Another possibility is that the patient's own stem cells could be stimulated to multiply and replace cells and tissues within the body itself (McKay, R. (2000), Nature 406,361-364.)"

Another exciting perspective is the use of eggcell-factors – proteins which seem to be able to reprogramm adult somatic cells (invitro or in the body) into the embryonic state and thus provoke regeneration of the injured tissues. Here, too, research is right at the beginning.

Regine Kollek, molecular biologist and professor for medical ethics at the Uni-versity of Hamburg (D), concludes: "Nearly weekly we're confronted with new scientific evidence about the astonishing flexibility of adult stemcells, and the fact that they can be isolated and cultivated. These are, among others, the innovative instruments of the future. We do not need to fall back on such an archaic technology as the cloning of human embryos."

### **Further reasons against the cloning of human embryos:**

**Resource woman:** Where to get the eggcells from. The success rate of cloning is very small. It needed 277 cloned sheep eggs for the creation of Dolly. The efficiency could not be enhanced since then. This means: For the production of a human embryonic stemcell 280 eggcells are needed. Where from? During invitro-fertilisation some "surplus" eggcells are created, but not nearly enough. Eggcells are already today a scarce commodity. And why should hundreds and hundreds of women undergo very painfull hormon-treatment and eggcell-punctation to supply enough eggcells for embryonic cloning?

**Human dignity** – Also for embryos? Scientists claim that with the green light for abortion the human embryo long ago lost its "dignity". Every year 250'000 abor-ted embryos – and who cares? But there is a big difference, according to Regine Kollek: An abortion does not necessarily negate the fundamental protection of the embryo. Its the cumulation of a deep conflict between the life-interests of a woman and those of the embryo; in a situation, where a woman cannot be forced to continue pregnancy. The cloning of embryos is different: its the production of human embryos in stock. Human embryos – potentially unique human beings – are being reduced to a biological resource.

**Slippery slope:** With this first step of cloning human embryos the door is opened for all succeeding steps in the direction of human cloning. If therapeutic cloning is allowed for severe diseases, why not for other 'diseases' as well, e.g. nanism or baldness? If the cloning in vitro is allowed, why kill the embryos and not give them a life chance and help

desperate couples as well? And why not be careful to give the embryo the best starting chances in life by choosing the right cloning person? Etc. etc. The erosion of ethical norms does not happen all at once, but step by step; each step implicating the next few steps.

**The commercial interests** behind the advances in this area are enormous. Now is the time to get patents on human genes, stemcells, on cloning procedures, and even on human embryos. There is an aggressive race about these patents; the one who is first getting the exclusive control over his patented product – in this case human material. Its probably the biggest sell-out in human history – the privatisation of human parts, from gene to embryo. Some years ago the US firm SyStemix got a patent on human blood-stemcells – and was bought right away by the Swiss company Sandoz (today Novartis) because of this patent. Apparently not even patents on human embryos are tabu anymore, as a Greenpeace search revealed. The Australian firm Amrad has a patent including human-animal-embryos. Human embryos as patented property of a private company? A disgusting perspective. Its this commercial war about human patents that shows clearly how much the human embryo is already reduced to some cell-collection, to an industrial resource, which can be cloned, manipulated and hence also patented.

The team around the Italian Antinori surely goes too far. But while extremist Antinori is deuced worldwide, the 'therapeutic cloning', semantically made harmless by the little word "therapeutic", appears to become the "normal". This is an well known process: With the scandalising of the extremes the less obvious becomes normal. In Switzerland, Germany and other countries the cloning of and experimenting with human embryos is forbidden. This is good so. Only because research is at a very early stage and because today it may seem to be the easiest and cheapest way to get stemcells by embryonic cloning, there is no reason to brake this important tabu.

**Further literature:**

- R.Kollek and S.Hartung ' Klonen in der biomedizinischen Forschung: Möglichkeiten und Perspektiven, Grenzen und Risiken', 1998 (kollek@rrz.uni-hamburg.de).
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- I-SIS, The Unnecessary Evil of 'Therapeutic' Human Cloning, Jan. 2001, m.w.ho@onetel.net