MEMO/05/429

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Advanced therapies: breakthrough in treating cancer or burned skin

Advanced therapies are highly innovative medical products based on genes (gene therapy), cells (cell therapy) or tissues (tissue engineering).

This memo provides the following information:

- What are concrete examples of advanced therapies?
- A special focus on tissue engineering
- What is the Commission proposal on advanced therapies, what is the objective?
- Why do we need a proposal?
- What did the Commission do to develop its proposal?
- What are the key measures proposed?
- What about ethical aspects?
- What will happen next? When will this proposal become law?

Concrete examples

Gene therapy product: a DNA plasmid, i.e. a piece of nucleic acid. That piece of DNA contains a human gene which induces, under certain conditions, the proliferation of arterial cells. The product is developed for treatment of **peripheral arterial diseases** and **critical lack of blood flow in limbs** due to death of arterial cells, *e.g.* to prevent amputation.

Cell therapy product: a product against **renal cancer**. Renal cancer cells are retrieved from the patient and processed to devitalise them. The resulting suspension, which does no longer contain living cancer cells, but only cell derivates (cell lysate), is reinjected into the patient. This cell lysate actively stimulates an immune response against the tumour.

Tissue engineered product: a **skin substitute**, indicated for treatment of venous ulcers and foot skin ulcers. Product is composed of a living, bi-layered skin tissue substitute, containing human dermal and epidermal cells as well as proteins. The upper layer replicates the architecture of the human epidermis. The product is applied as a patch, directly on the ulcer site. It merges with the natural skin and is gradually resorbed.

A special focus on tissue engineering

Tissue engineering is an emerging biotechnology sector at the interface between medicine, cellular and molecular biology, materials science and engineering. It aims at developing products designed to replace, repair or regenerate human tissues.

One of the most exciting aspects of human tissue engineering involves **inducing the body to regenerate a part that is missing**. In the long run, it may eventually enable people to grow a breast, ear, joint, nose, finger or bone; this could also mean the end of organ shortage.

Tissue engineering integrates the sciences of biomaterials, cell biology, biochemistry, biomedical engineering and transplantation to create tissue and organ substitutes. Starting with a few human cells, tissue engineers simulate the environments that allow cells to develop into viable tissue. The primary motivation behind tissue engineering is the need for **available, safe and transplantable organs and tissues**.

Every year thousands of people die waiting for hearts, livers, lungs and kidneys simply because there aren't enough transplantable organs to go around. Similarly, the need for other human tissues such as skin and cartilage is constant, and the availability (or lack thereof) can make a real difference in the lives of burn and accident victims.

Current applications of this nascent field of “regenerative medicine” include treatment for skin, cartilage and bone diseases or injuries. More complex products – such as heart valves, blood vessels or heart muscle tissue – are already in clinical development, and could reach the Community market in a near future.

What is the Commission proposal on advanced therapies, what is the objective?

The Commission proposes a Regulation on advanced therapy products. This project is part of the Commission 2005 Work Programme[1]. The overall policy objective is to improve patients’ safe access to advanced therapies by increasing the research, development and authorisation of these products. More specifically, the proposal is intended to fulfil the following key objectives:

- To guarantee a **high level of health protection** for European patients treated with advanced therapy products;
- To **harmonise market access** and ensure the **free movement** of these products by establishing a tailored and comprehensive regulatory framework for their authorisation, supervision and post-authorisation vigilance;
- To **foster the competitiveness of European undertakings** operating in this field, in particular small and medium-sized enterprises;
- To provide overall **legal certainty**, while allowing for sufficient flexibility at technical level, in order to keep the pace with the evolution of science and technology.

Why do we need a proposal?

The development of the field of advanced therapies is currently hampered by the lack of a harmonised and tailored EU regulatory environment. In particular, while the other advanced therapy products have been regulated as medicinal products for many years within the Community, tissue-engineered products currently lie outside of any Community legislative framework. This leads to divergent national approaches as to their legal classification and authorisation, which impairs the free movement of these products, hinders patients’ access to innovative treatments, and ultimately affects the EU competitiveness in this key biotechnology area.

The Commission proposal has been prepared in order to bridge this regulatory gap, by addressing all advanced therapy products within a single, integrated and tailored legal framework.

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[1] See http://europa.eu.int/comm/off/work_programme/index_en.htm

What did the Commission do to develop its proposal?

In accordance with the principles set out in the Communication *'Better Regulation for Growth and Jobs in the European Union'*[2], the proposal is based on an extensive Impact Assessment[3], which builds on a three-years, wide-ranging consultation process with all stakeholders, including patients, industry, hospitals, doctors, regulators, and the research community.

Two supporting studies conducted by the Joint Research Centre of the European Commission have also been carried out to assess the potential impact of the proposal on the tissue engineering market[4].

What are the key measures proposed?

The key measures included in the proposal are:

- A centralised marketing authorisation procedure for all advanced therapy products, to benefit from the pooling of expertise at European level and direct access to the EU market;
- A new and multidisciplinary expert Committee (Committee for Advanced Therapies), within the European Medicines Agency (EMEA), gathering the best European experts to assess advanced therapy products and follow scientific developments in the field;
- Tailored technical requirements, which are adapted to the particular characteristics of these products;
- Strengthened requirements for risk management and traceability;
- A system of low-cost, top-quality scientific advice provided by the EMEA;
- Special financial and administrative incentives for small and medium-sized enterprises.

What about ethical aspects?

As certain advanced therapy products (but not all of them) may be based on human cells, they can raise important ethical issues.

Decisions on the use or non-use (prohibition) of any type of cells, including embryonic stem cells, are a national responsibility. In accordance with the subsidiarity principle, the proposal fully respects this national competence. The proposed Regulation will not interfere with decisions made by Member States on the use or prohibition of these cells.

Example:

- IF
- (i) Embryonic stem cells and related products are prohibited in Member State X;
- (ii) Embryonic stem cells and related products are not prohibited in Member States Y and Z.
- THEN =>

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[2] COM(2005) 97 final, 16.3.2005. See also: http://europa.eu.int/comm/enterprise/regulation/better_regulation/index_en.htm

[3] See http://pharmacos.eudra.org/F2/advtherapies/index.htm

[4] See http://www.jrc.es/home/pages/publications.cfm

- Advanced therapy products based on embryonic stem cells can be developed only in Member States Y and Z, but not in X.
- Those advanced therapy products can be marketed only in Member States Y and Z, but not in X.

Moreover, the proposal respects fundamental human rights and observes the principles reflected in the EU Charter of Fundamental Rights. It also takes into account the Convention for the protection of human rights and dignity of the human being with regard to the application of biology and medicine ('Oviedo' Convention). Human tissue- and cell- based products should be founded on the philosophy of voluntary and unpaid donation, anonymity of both donor and recipient, altruism of the donor and solidarity between donor and recipient.

What will happen next? When will this proposal become law?

The proposal will now be delivered to the European Parliament and to the Council where it will go through the so-called 'co-decision' procedure. It will also be transmitted to the European Economic and Social Committee and to the Committee of the Regions, for consultation.

More information can be found at:
http://pharmacos.eudra.org/F2/advtherapies/index.htm