



OPINION OF THE EUROPEAN GROUP ON ETHICS  
IN SCIENCE AND NEW TECHNOLOGIES  
TO THE EUROPEAN COMMISSION

No 19

16<sup>th</sup> March 2004

Original in English

**ETHICAL ASPECTS OF UMBILICAL CORD BLOOD BANKING**

Reference: Request from Romano Prodi, President of the European Commission

Rapporteurs: Dr. P. Puigdomenech Rosell and Prof. G. Virt

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The European Group on Ethics in Science and New Technologies (EGE),

Having regard to the request of Romano Prodi, President of the European Commission, to the EGE on 24 August 2001, to prepare an opinion on private cord blood banking;

Having regard to the Treaty on European Union and in particular its Article 6 of the common provisions concerning the respect for fundamental rights, and to Article 152 of the EC Treaty on public health, and in particular paragraph 4(a) referring to substances of human origin;

Having regard to the Charter of Fundamental rights of the European Union, approved by the European Council in Biarritz on October 14<sup>th</sup> 2000 and proclaimed solemnly in Nice by the European Parliament, the Council and the Commission on December 7<sup>th</sup> 2000, in particular its Article 1 on « Human dignity », Article 3 on the « Right to the integrity of the person », Article 8 on « Protection of personal data » and Article 38 on « Consumer protection »;

Having regard to the Directive of the European Parliament and of the Council on setting standards of quality and safety for the donation, procurement, testing, processing, preservation, storage and distribution of human tissues and cells adopted on 2<sup>nd</sup> March 2004;

Having regard to Directive 95/46/EC of the European Parliament and of the Council of the European Union of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data<sup>1</sup>;

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<sup>1</sup> Official Journal L 281, 23/11/1995 P. 0031 - 0050

Having regard to the Council of Europe Convention on Human Rights and Biomedicine, signed on 4 April 1997 in Oviedo, in particular its Article 5 on “Informed consent” and its Article 21 on « Prohibition of financial gain » and the Additional Protocol on Transplantation of organs and tissues of human origin opened for signature on 24<sup>th</sup> February 2001;

Having regard to the Universal Declaration on the human genome and the rights of man adopted by the UNESCO on 11 November 1997;

Having regard to the various laws and rules applying in some Member States concerning cord blood;

Having regard to the opinions expressed by national instances on that issue, namely the Opinion n° 74 of 12 December 2002 of the National Consultative Ethics Committee on umbilical cord blood banks for autologous use or for research (France)<sup>2</sup>, the statement by the Belgian Medical Association addressed to gynaecologists and general practitioners<sup>3</sup>, the opinion paper of October 2001 of the Scientific Advisory Committee of the Royal College of Obstetricians and Gynaecologists (UK)<sup>4</sup>, the opinion of 7<sup>th</sup> December 2001 of the Belgian Health Council on the revision of tissue banks’ legislation<sup>5</sup> and the American Academy of Paediatrics’ recommendations of 14<sup>th</sup> July 1999<sup>6</sup>;

Having regard to the previous EGE Opinion No. 11 of 21.07.1998 on the ethical aspects of human tissue banking and Opinion No. 15 of 14.11.2000 on the ethical aspects of human stem cell research and use<sup>7</sup>;

Having regard to the hearings of experts and Commission departments on 16 September 2003, 18 November 2003 and 16 December 2003 in Brussels and 20 October 2003 in Rome;

Having heard the rapporteurs, Dr. P. Puigdomenech Rosell and Prof. G. Virt,

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2 Internet: <http://www.ccne-ethique.fr/english/start.htm>

3 Internet: <http://www.ordomedic.be/braf/sangcordon.htm>

4 Internet: <http://www.rcog.org.uk/print.asp?PageID=430&Type=main>

5 Internet: [http://www.health.fgov.be/CSH\\_HGR/Francais/Avis/Avis\\_Banques\\_Tissus.htm](http://www.health.fgov.be/CSH_HGR/Francais/Avis/Avis_Banques_Tissus.htm)

6 Internet: <http://www.cordblood.med.ucla.edu/experts.html>

7 Internet: [http://europa.eu.int/comm/european\\_group\\_ethics/index\\_en.htm](http://europa.eu.int/comm/european_group_ethics/index_en.htm)

## **1. WHEREAS :**

### **BACKGROUND OF THE REQUEST**

The Group is issuing an Opinion on the ethical aspects of cord blood banking following a request from President Prodi in 2001. Concerns on commercial cord blood banks were also expressed in questions<sup>8</sup> from members of the European Parliament to the European Commission. There are concerns namely about the fact that promises about the benefits of cord blood transplantations to treat a number of diseases were made to convince future parents to store cord blood from newborn babies against payment with a view to using it to treat a disease incurred by the child or one of his family members and for which there is at present no medical evidence for the validity of the treatment.

### **INTRODUCTION**

Since 1988 it has been shown that the haematopoietic stem cells present in the blood of the umbilical cord can be used for allogeneic transplantation in a number of genetic diseases, blood malignancies and immune deficiencies, for example leukaemia. After transplantation, the haematopoietic stem cells can repopulate the bone marrow of the patient, providing a source of blood cells. It currently constitutes an increasingly used alternative to bone marrow transplantation.

In order to have cord blood cells available for transplantation a number of banks were created worldwide. These banks are run by either hospitals or non-profit organizations that collect the samples from donors and provide them when the cells are needed for transplantation.

Recently, private firms have been offering to future parents the conservation of blood from the umbilical cord of newborn children for one's own use or for the use of close relatives. Different types of cord blood banks can be distinguished : private or public, for-profit or non-profit.

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<sup>8</sup> Written question E-1079/01 by Ria Oomen-Ruijten (OJ C 340 E of 04/12/2001, p. 166) and written question E-3677/02 by Bart Staes (OJ C 137 E of 12/06/2003, p. 238)

In this opinion, the Group considered: 1. public (non-profit) banks that store cord blood cells from donors and provide them when transplantation is prescribed to an unrelated patient and 2. ° Private banks that offer a commercial service to parents in order to preserve the cells to be used for their child or children in the future.

## **DEFINITIONS**

For the purposes of this Opinion:

- a) « cord blood » means: residual placental blood collected from the cord of the newborn;
- b) « stem cells » means cells that can both replicate and also differentiate into several types of cells ;
- c) « progenitor stem cells » means cells whose terminal progeny consist of a single cell type only ;
- d) « haematopoietic stem cells » means those cells that give rise to cells present in blood ;
- e) « pluripotent » means capable of giving rise to all cell types in the body ;
- f) « HLA (Human Leukocytic Antigen) types » are determined by proteins present on the surface of leukocytes that allow the cells from the individual to be recognized. Identical or similar HLA types are necessary for successful transplantation.
- g) « autologous transplantation » refers to the transplantation to a patient of his/her own cells ;
- h) « allogeneic transplantation » refers to the transplantation of cells from a donor to another person.

## **SCIENTIFIC BACKGROUND**

### **1.1. Characteristics of cord blood**

Umbilical cord blood was found to be rich not only in normal blood cells but also in haematopoietic stem cells. These stem cells are found only in insignificant numbers in normal adult peripheral blood. After transplantation, the haematopoietic stem cells can repopulate the bone marrow of the patient, providing a source of blood cells.

An important characteristic of cord blood cells is their immunological immaturity. Therefore, haematopoietic stem cells from cord blood are less likely to induce immunological reactions when transplanted than haematopoietic stem cells from bone marrow.

Furthermore, in laboratory experiments it has been shown that cord blood stem cells can differentiate into a number of different cell types, which could give rise to future potential new therapeutic uses.

### **1.2. Advantages of cord blood cells compared to bone marrow**

The collection of cord blood units is easy and non-invasive for the donor and therefore the number of potential donors is higher than for bone marrow.

Cord blood units are stored in advance and are therefore rapidly available when needed while bone marrow has to be collected from the donor just before transplantation and there is always a risk of last minute consent refusal.

The HLA type does not need to be a perfect match in case of allogeneic cord blood cell transplantation because these cells are less likely to induce immunological reactions than bone marrow cells.

### **1.3. Current uses of cord blood.**

Cord blood can be an alternative to bone marrow transplantation in the treatment of patients with blood and immune disorders requiring a source of haematopoietic stem cells.

Cord blood is currently being used for the treatment of leukaemia, lymphomas, aplastic anaemia and hereditary disorders of the blood.

It is also used as a source of stem cells for current research.

#### **1.4. Allogeneic transplantation**

In all the current uses of cord blood indicated above, the transplantations are allogeneic and the cells used are obtained from donation. The use of autologous graft would be inappropriate in case of a genetic disease as the cells of the patient would carry the same genetic defect, or in case of leukaemia, as the cells of the patient could also become malignant. In the case of an allogeneic transplantation there is always a risk that the body rejects the transplanted tissue. Therefore, HLA-typing is essential to have the best possible HLA matching between donor and recipient in order to minimize rejection effects and optimize the chances of therapeutic success.

The residual HLA differences between donor and recipient may induce a limited immunological reaction. In the treatment of leukaemia, this “graft against host reaction” is beneficial and contributes to destruction of the leukaemia cells.

#### **1.5. Limitations of the use of cord blood cells**

In order to be useful for transplantation samples have to contain a sufficient number of cells according to the patient's weight and therefore mainly young patients of small weight can benefit from this kind of transplantation. Nevertheless, recent experience shows that it is possible to combine several samples in order also to treat adults<sup>9</sup>. Further, research on methods of cell expansion is actively being pursued in order to overcome the problem of the limited number of cells contained in cord blood samples, which would allow a more systematic treatment of adults. Until now between 2 500 and 3 000 transplantations from cord cells have been carried out worldwide<sup>10</sup>. Studies show higher survival rates for children than for adults.

#### **1.6. Autologous transplantation**

Most indications of autologous grafts concern adults who are undergoing aplasia following chemo- or radio-therapy. The aim of the transplantation is to repopulate the bone marrow of the patient with his/her own haematopoietic stem cells that will provide a source of blood cells. Such autologous grafts do not require one's own cord blood stem cells to have been stored at birth. Indeed, such grafts can be performed by harvesting before the therapy stem cells from the peripheral blood of the patient after stimulation by a growth factor. Therefore, indications to store cord blood at birth in view of a future autologous graft are for the present time almost non-existent.

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<sup>9</sup> Report “A worldwide study of umbilical cord cell banking” by Dr J. Gunning (June 2003)

<sup>10</sup> Hearing of Prof. Gluckman on 18 November 2003

The probability of needing an autologous transplantation has been estimated as approximately 1 in 20 000 during the first 20 years of life<sup>11</sup>.

Exceptions can however be mentioned. In case of rare HLA types or in a family at risk of specific leukaemia it may be appropriate to store cord blood of newborn children in order to have available cells in case of need for a member of the family. The purpose is then for an intra-familial allogeneic graft rather than for a strictly autologous use. Until January 2003, only 5 autologous transplants for the treatment of Neuroblastoma, Aplastic Anaemia, and Retino-blastoma<sup>12</sup> have been mentioned in the scientific literature.

### **1.7. Current research**

During recent years, research on stem cells has expanded rapidly. Research is taking place into differentiation of pluripotent stem cells into specific cell types which could be used for the treatment of chronic diseases such as Parkinson's, diabetes, cancer, or cardiac infarcts by means of human stem cells but no clear proof of the utility of these stem cells has been shown.

Stem cells from embryonic origin raise many ethical concerns as well as some scientific ones. Cord blood is another valuable source for research on stem cells.

The possibility of using one's own cord blood stem cells for regenerative medicine is currently purely hypothetical. Research in this field is only at a very early stage. To become a reality it would be necessary:

- To be able to control the differentiation of stem cells;
- To have evidence of the efficacy and safety of such therapy;
- To be able to store cord blood stem cells for decades;
- To be able to multiply cord blood stem cells.

Even if these conditions were met, it is not evident that the use of patient's own cord blood would be preferable to the use of his / her own bone marrow or to well-matched allogeneic stem cells from donation.

It is therefore highly hypothetical that cord blood cells kept for autologous use will be of any value in the future.

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<sup>11</sup> Annas, NEJM 2000 ; 340 :1521

<sup>12</sup> Report "A worldwide study of umbilical cord cell banking" by Dr J. Gunning (June 2003)

### **1.8. Collection of cord blood**

During or immediately after the birth of a child residual blood from the umbilical cord and placenta can be collected. The collection is a technically simple procedure that poses, if carefully done, no foreseeable health risks to the mother or the child in a normal delivery. In Europe the most widely used technique involves collecting the umbilical cord blood while the placenta is still in utero, while another technique waits until the placenta is delivered and then places the placenta in a sterile supporting structure and finally collects the blood by venepuncture. The first technique is more intrusive, and has the potential to interfere with the mother's care after the delivery, while the latter requires extra and specially trained staff members and holds a greater risk of contamination. Cord blood can also be collected during delivery by Caesarean section.

The blood collected in order to be donated to public banks is collected in some maternity departments where it is done on a regular basis with well established procedures and by an experienced staff. However, in the case of autologous storage, the staff of the maternity hospital that has to collect the blood might have no prior experience of the procedure. Commercial cord blood banks simply issue collection kits to the expectant parents who pass them on to the obstetric staff.

### **1.9. Storage and quality of cord blood**

After collection, the cord blood is reduced in volume, frozen at a controlled rate and stored in liquid nitrogen at  $-196^{\circ}\text{C}$ .

According to current experience, cells are usable for transplantation for at least 15 years.

Before storage, quality control has to be performed. Cord blood units are screened for some infectious diseases before storage in order to diminish the risk of transmission of infections. Protection against infection requires checking the mother for HIV, hepatitis, etc. at the time of collection as well as several months after collection. In case of donation made for the purpose of allogeneic use, including within the family, the sample has to be HLA-typed. The HLA type is necessary to identify the sample which is compatible with the recipient.

To be clinically useful the sample, at the present time, has to contain a minimum number of cells; below this number it does not have at this moment any use. Therefore, more than half of cord blood units have to be discarded<sup>13</sup> (the minimum cell dose to be transplanted should be  $2.0 \times$

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<sup>13</sup> Report « A worldwide study of umbilical cord cell banking » by Dr J. Gunning (June 2003)

10<sup>7</sup>/kg before freezing<sup>14</sup>). This might change if the samples of different donors are bulked or if cell expansion techniques are successfully developed.

#### **1.10. Umbilical cord blood banking**

There are now about 100 cord blood banks worldwide<sup>15</sup>. The present geographical distribution is approximately as follows : 40 % in Europe, 30 % in US and Canada, 20 % in Asia, 10 % in Australia and none in Africa.

About 75 % of cord blood banks in the world are public or private non-profit banks, which offer a service for the public benefit. They store donated samples for the purpose of transplantation or research. They also store cord blood for family use in case of a known risk in a family with a rare HLA group.

The remaining 25 % are commercial banks, which propose as a service the conservation of cord blood cells for autologous use for the benefit of their customers. In Europe, there are commercial banks namely in Austria, Belgium, Germany, The Netherlands, Poland and the United Kingdom<sup>16</sup>.

#### **1.11. Necessity of a great diversity of cord blood cells**

There is a need for a great diversity of cells with different genetic and HLA types from different populations in order to be able to find an acceptable donor for any recipient in need. The probability to find an acceptable donor is much lower for some ethnic populations. It is for example much easier to find a suitable donor for a patient of Caucasian origin than for one of an African origin, because most of the banks are set up in Western countries, and donors will be more frequently recruited within the Caucasian population.

#### **1.12. Networks and registries**

Networks of banks and registries have been created around the world in order to share and exchange samples. Such co-operation between the banks is necessary in order to have the largest possible choice of donors. In general, data about the stored blood samples are held by the same registries which were originally holding information about bone marrow donors. The biggest international bone marrow and cord blood registry is the Bone Marrow Donors Worldwide

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14 Hearing of Prof. Gluckman on 18 November 2003

15 Report "A worldwide study of umbilical cord cell banking" by Dr J. Gunning (June 2003)

16 Report "A worldwide study of umbilical cord cell banking" by Dr J. Gunning (June 2003)

(BMDW)<sup>17</sup>. It is a voluntary collaborative effort of bone marrow donor registries and cord blood banks with the goal of providing centralised and anonymous information on the HLA phenotypes and other relevant data of unrelated bone marrow donors and cord blood units. All cord blood registries participating in BMDW are expected to adhere to the guidelines of the WMDA (World Marrow donor association)<sup>18</sup>, which promotes the definition and standardisation of ethical, technical, medical and financial aspects of international haematopoietic stem cell transplantation. It has now extended its remit to cord blood registries. In 2003 the BMDW registry contained data on roughly 130 000 samples in about 34 different public banks all over the world.

### **1.13. The European Network**

The NETCORD Foundation<sup>19</sup> was established in 1998 with the aim of promoting the use of umbilical cord blood for allogeneic stem cell transplantation. It is a non-profit organization promoting the establishment of high quality umbilical cord blood banks and has issued statutes and guidelines in order to further promote studies and research on the collection, processing, characterization, preservation and ex vivo expansion of placental blood with the primary aim of improving the quality of such components for clinical cell therapy on an international level. 16 banks participate from 12 countries all over the world, currently totalling around 72 000 cord blood units and representing more than half of the units banked in the world<sup>20</sup>.

To facilitate the searches for cord blood units by transplant centres, NETCORD has also established an on-line search program, called the Virtual Office. By submitting a search request to the Virtual Office transplant centres will no longer have to search multiple data bases of the different cord blood banks, but they will receive a single unified search report on all units that are contained in the inventory of NETCORD.

In order to ensure high and uniform quality of all cord blood units in the NETCORD inventory, NETCORD has established quality standards in collaboration with the Foundation for the Accreditation of Cellular Therapy (FACT) on the collection, cryopreservation, storage and release of units. All NETCORD banks must obtain accreditation by FACT and thus have to comply with quality standards of FACT/NETCORD.

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17 Internet: <http://www.bmdw.org>

18 Internet: <http://www.worldmarrow.org>

19 Internet: <https://www.netcord.org>

20 Hearing of Prof. Wernet, Chairman of NETCORD, on 18 November 2003

#### **1.14. Research in Europe**

The European Commission is financing in partnership with Member States research projects through its Research and Development Framework Programmes.

A research project called EUROCORD was initiated in 1996 by The European Group for Blood and Marrow Transplantation (EBMT)<sup>21</sup>. EBMT is a non-profit organisation established to allow scientists and physicians involved in clinical bone marrow transplantation to share their experience and to develop co-operative studies. It aims to promote all aspects associated with the transplantation of haematopoietic stem cells from all donor sources and donor types including basic and clinical research, education, standardisation, quality control, and accreditation for transplant procedures.

The objectives of EUROCORD include establishing a European Registry of patients treated by cord blood transplants. EUROCORD works in close collaboration with NETCORD banks and registries.

These objectives are in conformity with the recommendations made in the Opinion no. 11 of the European Group on Ethics concerning the necessity to promote surveys on practices relating to tissue banks and to use the surveys to provide information on perspectives in therapy, diagnosis and research offered by human tissues.

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<sup>21</sup> Internet: <http://www.ebmt.org>

## **LEGAL BACKGROUND**

Most European countries have no specific legislation on cord blood banking. In fact, they have been following different practices. Only a very few, including Italy, have enacted specific rules on the issue.

When regulations on human tissue or human blood at large exist, such as in France then cord blood is considered as a tissue and not as blood because it is the haematopoietic progenitor cells contained in cord blood which are important for transplantation. For instance the Directive of the European Parliament and the Council on setting standards of quality and safety for the donation, procurement, testing, processing, preservation, storage and distribution of human tissues and cells, adopted on 2<sup>nd</sup> March 2004<sup>22</sup>, covers haematopoietic progenitor cells but excludes blood and other blood products. Another example is the Additional Protocol to the Convention on Human Rights and Biomedicine, on Transplantation of Organs and Tissues of Human Origin which applies to tissues and cells, including haematopoietic stem cells but does not apply to blood and blood derivatives.

### **1.15. The European Community**

The Treaty establishing the European Community<sup>23</sup> in its Article 152 § 4(a) provides that *“the Council ... shall contribute to the achievement of the objectives referred to in this article through adopting measures setting high standards of quality and safety of organs and substances of human origin, blood and blood derivatives; these measures shall not prevent any Member States from maintaining or introducing more stringent protective measures.”*

In order to implement high quality standards, a legal framework has been adopted.

First, there is a directive 2002/98/EC of 27 January 2003<sup>24</sup> concerning the quality and safety of collection, storage and distribution of human blood and components but it does not apply to blood stem cells.

Second, the directive of the European Parliament and the Council on setting standards of quality and safety for the donation, procurement, testing, processing, preservation, storage and

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<sup>22</sup> At the time of adoption of this Opinion an Official Journal number has not yet been attributed.

<sup>23</sup> The texts of the Treaties can be found on the Internet: [http://europa.eu.int/eur-lex/en/search/search\\_treaties.html](http://europa.eu.int/eur-lex/en/search/search_treaties.html)

<sup>24</sup> Official Journal L 033 , 08/02/2003 P. 0030 - 0040

distribution of human tissues and cells, adopted on 2<sup>nd</sup> March 2004, applies to cord blood banks as haematopoietic stem cells are considered as tissues. Transplantations of tissues and cells are increasingly offering greater opportunities for the treatment of as yet incurable diseases. The objective of the directive is to ensure the quality and safety of tissues and cells at European level, particularly in order to prevent the transmission of diseases.

Although the directive does not specifically mention commercial or for-profit private cord blood banks, it also applies to them. It therefore means that these types of institutions also have to apply the quality and safety standards set out in the directive, namely in terms of staff training or accreditation.

The European Community is however not competent when it comes to national measures on donation or medical use of organs and blood. Indeed, Article 152 § 5 of the Treaty establishing the European Community provides that *“Community action in the field of public health shall fully respect the responsibilities of the Member States for the organisation and delivery of health services and medical care. In particular, measures referred to in paragraph 4(a) shall not affect national provisions on the donation or medical use of organs and blood.”*

It can however be noted that the directive provides in its Article 12 that *“Member States shall take the necessary measures to encourage voluntary and unpaid donations of human tissues and cells with a view to ensuring that, insofar as is possible, they are obtained from such donations”, that “Member States shall report to the Commission on these measures” and that “on the basis of these reports the Commission shall inform the European Parliament and the Council of any necessary further measures it intends to take at Community level”*. It provides further that *“Member States shall encourage the procurement of tissues and cells to be carried out on a non-profit basis.”*

Concerning the duty of information, Article 28(d) refers to the information to be provided on the donation of cells and/or tissues.

Finally, the respect for fundamental rights is mentioned in the recitals of the directive. Mention of the EGE opinions is also made in the recitals.

### **1.16. The Council of Europe**

Article 21 of the Convention on Human Rights and Biomedicine<sup>25</sup> of the Council of Europe (Oviedo Convention) provides that *“the human body and its parts shall not, as such, give rise to financial gain”*.

The Additional Protocol to the same Convention<sup>26</sup> concerning transplantation of organs and tissues of human origin, opened for signature on 24 January 2002, provides in its article 2 that *“The provisions of this Protocol applicable to tissues shall apply also to cells, including haematopoietic stem cells.”*

The European Health Committee of the Council of Europe adopted a draft Recommendation on autologous blood banks. At the time of adoption of this opinion the recommendation has however not been adopted yet by the Committee of Ministers. It recommends to its member states that :

1. *“If cord blood banks are established, they shall be from altruistic and voluntary cord blood donation and used for allogeneic transplantation and related research.*
2. *The promotion of donation for autologous use and the establishment of cord blood banks for autologous use should not be supported by member States or their health services.*
3. *Accurate information should be provided to the population about the advantages and disadvantages of cord blood banking.*
4. *Where autologous cord blood banks are being established, the publicity and information provided to families must be accurate and fully informed consent to cord blood storage must be obtained.*
5. *Autologous blood banks that are being established must meet the same quality and safety standards as set out in the Council of Europe’s Guide to safety and quality assurance for organs, tissues and cells.”*

### **1.17. French legal framework**

Although there is no special regulation concerning the umbilical cord blood, there is every reason to admit that the rules of the code of public health relating to tissues and cells would be applicable to it. This would mean that umbilical cord blood can only be taken by establishments being the subject to an administrative authorization and only with a therapeutic or scientific aim.

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<sup>25</sup> The text of the Convention can be found on the Internet: <http://conventions.coe.int/treaty/en/treaties/html/164.htm>

<sup>26</sup> The text of the Additional Protocol on Transplantation to the Convention can be found on the Internet: <http://conventions.coe.int/treaty/en/treaties/html/186.htm>

On the one hand, although the creation and functioning of a commercial private bank for the auto conservation of the cord blood are not expressly prohibited, such banks seem not to be in accordance with the principles and rules laid down by the code of public health. On the other hand, in the eyes of civil law of contracts and medical deontology, the validity or the enforceability of the contracts by which parents are prompted to the taking and conservation of the cord blood for their child, taking account in particular the absence of medical and current or future therapeutic usefulness, could be discussed.

In December 2002 the French National Consultative Ethics Committee (CCNE) gave an opinion on umbilical cord blood banks for autologous use or for research (opinion no. 74)<sup>27</sup>.

The CCNE concludes that although it cannot recommend that private banks should be prohibited, it draws attention to a number of risks:

- *“The gravest danger is for society in so far as setting up such banks is likely to contradict the principle of solidarity, without which no society can survive”;*
- *“Such banks raise hopes of utopia and disguise a mercantile project using assistance to children as a screen”;*
- If autologous use proved to be useful, the principles of justice and equity should predominate and autologous storage should become routine and taken in charge by public authorities;
- The uselessness of autologous storage and its cost could constitute a provocation for the poorest countries;
- At the moment of birth the attention and care for the mother and child could be diverted;
- The advertising made by private banks could play on the parents’ feelings such as fear and guilt, although it should be made clear that today there is no scientific justification to autologous storage;
- Should the management of an autologous bank be left to the State, the high cost for a currently useless technique would be unethical.

In conclusion, the CCNE recommends to public authorities to promote the development of public banks which store umbilical cord blood for allogeneic purposes.

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<sup>27</sup> The text of the Opinion can be found on the Internet: <http://www.ccne-ethique.fr/english/start.htm>

### **1.18. The situation in Belgium**

The Belgian Health Council gave on 7th December 2001 an opinion on the revision of tissue banks' legislation<sup>28</sup>. It recommends in particular for the cord, cord blood and derived cells that :

- *“The cord and cord blood cells are part of the legislation regulating tissues and cells ;*
- *Quality standards for cord blood banks have to be worked out ;*
- *The therapeutic autologous uses for deferred preventive intentions have to be prohibited.”*

In its Annex II, the Health Council lists the conditions of approval and authorisation of the activities relating to cell and tissue banks. It stipulates in particular that *“each cell or tissue bank has to be approved by the Minister after a report of the relevant service and after the opinion of the Health Council and that this approval can only be granted for (...) non-profit-making organisms”*.

A Royal Decree is in preparation by the Ministry of Public Health<sup>29</sup> in order to have a clearer legislation regarding umbilical cord blood banks. The draft Decree provides that all tissue banks will have to be accredited by the Ministry of Health. The Royal Decree proposes that the accreditation will be granted to non-profit organizations only. The draft Decree also clearly forbids the use of umbilical cord blood cells for deferred preventive intentions as well as all discrimination aiming at favouring a person's access to therapeutic possibilities linked to tissues of human origin, any form of publicity and the research of profit.

### **1.19. The Italian law<sup>30</sup>**

An ordinance from the Ministry of Health was adopted on 30 December 2002 concerning urgent measures with respect to stem cells of the umbilical cord blood and replacing the ordinance adopted on 11 January 2002. It has been published in the official government announcements (Gazzetta Ufficiale) no. 27 of 3 February 2003 and is valid for one year. It provides the following:

- Cord blood banking is only authorized as a public conservation structure;
- Each bank is also subject to approval by the regional government where it is located;
- Private banking is forbidden;
- The import or export of cord blood must be authorized by the Ministry of Health;
- These provisions are believed necessary because therapies using stem cells from umbilical cord blood are still under study.

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28 Internet: [http://www.health.fgov.be/CSH\\_HGR/Francais/Avis/Avis\\_Banques\\_Tissus.htm](http://www.health.fgov.be/CSH_HGR/Francais/Avis/Avis_Banques_Tissus.htm)

29 Internet: <http://www.lachambre.be/QRVA/pdf/50/50K0156.pdf> , p. 120

30 Internet: <http://www.cittadinolex.kataweb.it/Article/0,1519,22470|99,00.html>

## **ETHICAL BACKGROUND**

### **1.20. Fundamental ethical principles**

There are several fundamental ethical principles and values which can be considered relevant for this opinion :

- The principle of respect for human dignity and integrity, which asserts the principle of non commercialisation of the human body;
- The principle of autonomy or the right to self-determination on the basis of full and correct information;
- The principles of justice and solidarity, as regards to fair access to healthcare services;
- The principle of beneficence, or the obligation to do good, especially in the area of health care;
- The principle of non-maleficence, or the obligation not to harm, including the obligation to protect vulnerable groups and individuals, to respect privacy and confidentiality;
- The principle of proportionality which implies a balance between means and objectives.

There are also some value conflicts. The values of freedom and free enterprise can conflict with the principles of solidarity and justice, according to which access to healthcare should be on an equitable basis and based on realistic needs, as well as with the principle of protection of vulnerable groups.

### **1.21. Ethical concerns regarding tissue banking**

The ethical implications of cord blood banking in the case of donated samples for the purposes of allogeneic transplantation or research are the same as for any tissue bank. This issue has already been addressed in the EGE Opinion no. 11 on the ethical aspects of tissue banking (21 July 1998). The ethical values underlined in this opinion are the following: body integrity, respect of privacy and confidentiality of data, promotion of solidarity, fairness of access to healthcare and information and consent of the donors.

Regarding umbilical cord blood, the opinion no. 11 provides that *“the information provided to the woman or to the couple must clearly explain these prospective new treatments, but stress that they are still very much at the experimental stage”*. This opinion also provides that *“in principle, tissue bank activities should be reserved to public health institutions or non-profit making organisations”* but that *“tissue banks set up by industry should be subject to the same licensing*

*and monitoring requirements as non-commercial operators*". The Group insists on the ethical imperative to protect health by appropriate quality and safety rules and calls for a European legal framework in that field and finally recommends that *"the European Union should promote periodic surveys in the Member States to obtain and diffuse data on practices relating to human tissues, from procurement to distribution, the organisation of tissue banks, particularly concerning the profit-making or non-profit making aspect ... "*.

#### **1.22. Specific concerns raised by cord blood banking for autologous uses**

Cord blood banking for potential future autologous uses raises additional ethical concerns. Tissue banks were up till now relying on free donation for treatment to the benefit of other persons or for research, and by the fact that it implies an act of solidarity or generosity it contributes to the social cohesion, while the commercial cord blood banks are running for profit. This reflects a more general shift to a privately funded health care system from a health system based on solidarity and motivated by public health considerations, which has characterised Europe in the last decades.

The services proposed by these banks and for which parents pay do not have any realistic use in the foreseeable future. If proposed and endorsed by medical doctors, it may raise a problem of trust.

#### **1.23. Information to consumers/citizens**

Citizens may be tempted to take advantage of all possibilities proposed for health even if they are not validated. Furthermore, time of pregnancy and of birth represents a period when women / parents might be vulnerable. This vulnerability and the sense of guilt in the parents who wish to do everything possible for their child's good, induced by providing misleading or over optimistic information may lead people to invest money for something that they cannot really afford, and that may not be worth the money invested.

#### **1.24. Protection of vulnerable groups**

Special attention should also be made to gender aspects because the collection takes place within the delivery process. The pressure to perform the collection to satisfy a pressing request from the parents may be heavier than when the cord blood collection is a systematic procedure in the context of donation. It might then distract the attention of the practitioners from care of mother and child.

### **1.25. Reliability of the bank**

Commercial cord blood banks offer long-term storage but they might go bankrupt or at any time stop their activities. That could be detrimental to the customers' interest, should they not get what they think they have paid for.

### **1.26. Recruitment of donors**

Public banks need a great diversity of samples representing as many HLA types as possible in order to be able to find a suitable match for any recipient. However, if the number of private cord blood banks proliferates and their success increases, public banks could be deprived of potential donors who will prefer to have the newborn's cord blood stored for autologous use rather than to donate it. Therefore one may fear that public banks may have more difficulty to collect enough samples to reach the necessary critical mass.

On the other hand, if public cord blood banks are sufficiently supplied with diversified types of blood, including the rare ones, and if there is a good networking of existing banks and development of registries, any individual will have a reasonable chance to find a compatible donor and to have access to the transplants necessary for his/her treatment in case of need.

### **1.27. Fairness of access to healthcare**

The use of one's own cord blood cells is currently highly hypothetical, but if in the future regenerative medicine developed in such a way that using autologous stem cells became possible, then the fact to have one's own cord blood being stored at birth could increase the chance of having access to new therapies. This would depend on the suitability of the autologous cord blood sample for the particular therapy needed. Not everyone may be able to afford the costs of storage. In that case, access would be related to financial resources.

## **2. OPINION**

The ethical aspects of human tissue banking in general have been addressed in the opinion no. 11 of the European Group on Ethics in Science and new Technologies on 21 July 1998. The statements made in this opinion n° 11 <sup>31</sup> are also valid for cord blood banking. There are however also specific ethical aspects of cord blood banking on which is the focus of this opinion, with a special attention to commercial banking for autologous use.

The Group submits the following opinion:

### **2.1.**

The legitimacy of commercial cord blood banks for autologous use should be questioned as they sell a service, which has presently, no real use regarding therapeutic options. Thus they promise more than they can deliver. The activities of such banks raise serious ethical criticisms.

### **2.2.**

While some members of the Group consider that this activity should be banned, the majority of the Group considers that the activities of these banks should be discouraged but that a strict ban would represent an undue restriction on the freedom of enterprise and the freedom of choice of individuals/couples. These banks should operate under strict conditions.

### **2.3.**

The Group notes that at least one Member State has already forbidden such commercial cord blood banks. Such banks could be considered illegal and the contracts voidable or unenforceable in other Member States. If commercial cord blood banks are allowed by a State, such activity must be subject to strict regulation. Such regulation should include previous licensing by the competent State Authority and close supervision of the procedures followed both in the public and the private domain.

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<sup>31</sup> see point 1.20

#### **2.4.**

If commercial cord blood banks are allowed, appropriate information should be given to the consumers willing to use their services, including the fact that the likelihood that the sample may be used to treat one's child is currently negligible, that the future therapeutic possibilities are of a very hypothetical nature and that up until now there is no indication that the present research will lead to specific therapeutic applications of one's own cord blood cells. Therefore, information has to be particularly explicit that the auto conservation has little value in the current state of scientific knowledge. This information should be made clear on all media, including Internet, and in any contracts linking commercial banks to their customers.

#### **2.5.**

Any kind of advertising made by commercial cord blood banks in the media, including on the Internet, must be adequately controlled by public authorities.

#### **2.6.**

Commercial cord blood banks have to observe the same quality standards as any other tissue bank. Therefore, the EGE welcomes the Directive of the European Parliament and of the Council adopted on 2<sup>nd</sup> March 2004 on "setting standards of quality and safety for the donation, procurement, testing, processing, preservation, storage and distribution of human tissues and cells", which provides for a legal European framework, namely in terms of authorization, licensing, accreditation, inspections, controls, promotions and publicity and staff experience.

#### **2.7.**

Given the possibility of termination of business or bankruptcy of a commercial cord blood bank, information should be provided to the customers and insurances should guarantee the continuity of the storage and the transfer of the samples to another bank, or the indemnity of the customers.

## **2.8.**

The collection of cord blood must not disturb the process of delivery and should not present any risks for the mother and child.

## **2.9.**

At present, in the exceptional cases where cord blood storage for autologous use may be justified for families at risk of specific diseases or with rare HLA types, it should be proposed to them that storage should be by public cord blood banks in order to ensure fair access to healthcare services to everybody needing it.

## **2.10.**

Considering that the European population is increasingly multi-ethnic, and in order to allow a fair access to transplantation for any citizen whatever his/her ethnic origin, specific measures should be taken by public authorities to have enough donation from different ethnic groups with different HLA patterns so that for any patient needing a transplantation, an appropriate donor could be found.

## **2.11.**

In the future, should the development get to the point where the use of one's own cord blood cells may be of value, the storage should not be a service left to commercial banks but should be taken over by the public sector in order to ensure fair access to healthcare services for everybody.

## **2.12.**

Support for public cord blood banks for allogeneic transplantations should be increased and long term functioning should be assured. However cord blood banks are of limited use as long as networks and registries are not also supported. Indeed, in order to make sure that any patient needing transplantation will find a suitable sample, the development of networks between banks and registries of donors is essential to be able to find rapidly a matching donor and they should be encouraged and supported.

### **2.13.**

A wide European debate on the increasing role of the market in the healthcare system and its advantages and disadvantages should allow European citizens to be aware of the present trends and their implications, in particular on the issues raised in the present opinion.

The European Group on Ethics in Science and New Technologies

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