More than thirty years after the birth of Louise Brown, the first test-tube baby, studies warn against the risks of *in vitro* fertilisation (IVF).

**Medical risks**

The implantation of several embryos generates a high rate of multiple pregnancies with all the risks that they develop as miscarriage, diabetes and heart diseases in mothers; prematurity and long-term health problems in children (obesity, Type 2 diabetes, hypertension, etc.). According to the American Association for the Advancement of Science (AAAS)¹, we observe more neural tube defects for pregnancies after *in vitro* fertilization than for normal pregnancies. A study published in the magazine of the European Society of Human Reproduction and Embryology (ESHRE)² showed that women resorting to IVF have four times more risks to give birth to a still-born baby. Finally, the risk of extra-uterine pregnancy is higher when using frozen embryos.

Regarding these risks, the Human Fertilization and Embryology Authority (HFEA)³ asked British clinics to implant only one embryo in the maternal uterus. The supernumerary embryos are frozen, a practice which raises serious ethical problems.

**Ethics and cryopreservation**

Mgr Suauudeau, scientific director of the Pontifical Academy for Life, mentions these ethical problems during an interview granted to Liberté Politique⁴.

First of all he mentions that an embryo is not conceived to be in a tube at -196°C, but has a natural objective to develop according to the directions encoded in its genome. Maintaining the embryos by cryopreservation in a suspended animation state is thus a serious offense to the dignity of these embryos. Moreover freezing and thawing techniques has a significant risk for their integrity and their survival.

Moreover, the chronological phase which exists between the moment of oocyte fecundation and the moment when these embryos are subject to a new procreative project opens the way to all fancy desires: very late pregnancies, after separation of the parents or the death of a spouse. The biological parents to whom the embryos legally belong are not anymore aware to possess these embryos and to have on them a right to life and death.

Most of supernumerary embryos are not anymore subject to parental projects. Abandoned, they arouse greed of unscrupulous investigators and may be used as commercial raw material in a lucrative embryo traffic. Thus destroying them would be considered as a lesser evil.

Finally, the vulgarization of the cryopreservation of human embryos generates a lack of conscience of the deep value of these little beings, of their marvel and in particular of the extraordinary epigenetic mechanism of their development.

**Neo-natal resuscitation: unreasonable obstinacy?**

May we refrain from resuscitating or interrupt the resuscitation of a newborn baby to avoid a risk of handicap? This is the question raised by the judgement – largely polemic – rendered in June 2009 by the Administrative Court of Nîmes (France) and sentencing the Hospital of Orange (France) for "unreasonable obstinacy" during the resuscitation of a newborn baby.

**Obstinacy: medical error?**

When he was born in 2002, the little Michaël was in a state of "apparent death" and presented so many heart anomalies that he was rapidly considered as dead. When the physician was announcing the death to the parents, the resuscitation team carried on its efforts and brought the baby back to life after 20 minutes during which the baby brain was not sufficiently oxygenated. Today Michaël is seven years old and present a very serious physical and mental handicap due part to resuscitation sequelae and part not determined to a "Dubowitz syndrome". The judges referred to arguments of the family’s lawyer who estimated that "the fair decision was to allow the natural death to take its rights". According to them, "by practising [the resuscitation] without considering the harmful consequences highly predictable for the child, the physicians showed an unreasonable obstinacy (...) constituting a medical error expected to engage the liability of the hospital of Orange".

This judgement generated anxiety in resuscitators and neonatologists which were worried that it sets precedent and that practicing resuscitation becomes distorted: medical professionals could stop too early during a resuscitation phase for fear of having their liability engaged. However, for Philippe Hubert, head of paediatric resuscitation department in Necker Hospital, "not resuscitating a newborn baby in a...

---

¹- AAAS. 2010 Annual Meeting, Children of Assisted Reproductive Technologies : Their Health and New Genetic issues, 22/02/10
²- K. Wisborg, H.S. Ingerslev, T.B. Henriksen, IVF and Stillbirth : a prospective follow-up study in Revue de la Société européenne de reproduction et d'embryologie humaines, 23/02/10
³- HFEA, HFEA Statement on Elective Single Embryo Transfer (eSET) guidelines, 03/09/08
⁴- Mgr Jacques Suauudeau, "La face cachée des fécondations in vitro" in Liberté Politique, 19/02/10
state of apparent death would be a medical error” as “97% of children [born in apparent death state] do not show any sequelae”, confirms Dr Mostafa Mokhtari, resuscitator at Bicêtre Hospital.

Defining unreasonable obstinacy
Moreover, in the emergency of resuscitation situations, the notion of “unreasonable obstinacy” has to be considered with caution. “The unreasonable obstinacy is defined by gathering a certain number of prognostic arguments and elements”, explains Pr Umberto Siméoni, chairman of the Ethical Commission of the French Society of neonatology, however “we cannot predict, precisely, the prognostic to be able to define what would be an unreasonable obstinacy at the moment when the life of the patient is challenged.” “In the extreme emergency, when the survival of a newborn baby is compromised, for some minutes, the duty of the physician is to provide assistance to this newborn baby. For all that, it is medically impossible to recognise at this time any sign indicating with sufficient precision the prognostic of the ill patient”. On a medical level, we know that after three minutes of lack of oxygen, there are irreversible brain consequences that cannot be assessed as long as the child is not resuscitated. Generally, we estimate as unreasonable the interruption of a neonatal resuscitation if the child did not recover his vital functions within half an hour.

Accepting the uncertainty
The article 37 of the French Code of Medical Deontology according to which the judgement has been rendered stipulates that “the physician must avoid any unreasonable obstinacy in the investigations or the therapy”, but under the objective rules of caution accepted in neonatal resuscitation, the Minister for Health estimated: “We ask a lot to medical teams, but (...) the decision was made in the best way”, with the inevitable part of uncertainty inherent in any decision made cautiously and consciously.

About umbilical cord and placenta

The preservation and collection of cord and placenta are again encouraged: The French National Academy of Medicine adopted on 26th January 2010 a report on cord mesenchymatous stem cells (MSC) and on 19th February 2010 Marie-Thérèse Hermange submitted to the Senate a bill “tending to promote and organise the collection, the preservation and the research related to cord blood”.

National Academy of Medicine
Following the intervention at the Academy on 3rd March 2009, from Pr Zhong-Chao Han, Chinese scientist of the University of Tianjin famous for his works on mesenchymatous stem cells, a working group was devoted to examine the scientific and therapeutic interest of stem cells from cord and placenta. It has just delivered its report.

After the demonstration of the efficacy of cord blood hematopoietic stem cells, the researchers looked into the mesenchymatous stem cells which present an exceptional plasticity. Mainly present in the bone marrow and fatty tissues, they can also be found in cord blood in reduced quantity: according to Pr Lataillade, head of the research lab of the Army Blood Transfusion Centre at Percy Hospital, one cord blood out of three would hold them. His experience was shared with Pr Zhong-Chao Han who looked into the cord itself and the placental elements. These revealed to generate significant quantities of MSC. Pr Zhong-Chao Han’s team affirms that a single cord allows obtaining hundred of therapeutic units, which opens very encouraging perspectives in regenerative medicine.

Indeed the MSC have an exceptional capacity of immunosuppression: they do not express HLA molecules and are then compatible with any patient. Studies showed they could be used for repairing bones, cartilage or cardiovascular system, heart tissue after infarct, or for reconstituting skin,... When the embryonic stem cells never gave rise to any therapeutic application, the MSC are subject to hundred of therapeutic trials in the world. Pr Zhong-Chao Han affirms he has already treated hundred of people by cord MSC.

Faced with these “outstanding perspectives”, the report of the Academy asks France to promote researches on MSC, which do not cause ethical problem, and to create biological resource centres specifically dedicated to this mission.

Bill
The article 8 of the bill submitted to the Senate on 19th February 2010 mentions this request. Insofar as “cord and placenta generate mesenchymatous stem cells (MSC) in significant quantity and, [when] grafted allogeneically, they would be immunologically tolerated, without immunosuppressant therapy”, “a particular research effort must be make to define the therapeutic field in which these cells could be used”, we read in the exposition of motives.

Moreover the text mentions that the collection of cord blood and placental tissues is a “major public health challenge” and “a strategic interest to allow French research to be maintained at the highest level, in a context of international high competition”. Thus it asks that the status of therapeutic resource is conferred to the cord and that the development of cord blood collection and preservation is favoured in the “respect of the solidarity of donation through the principles of gratuitousness and anonymity by public banks”. It recommends systematic information of pregnant women and the preservation of “placental cord units for particular purposes of interfamily grafts”. While asserting that the cord blood “cannot be privatised”, finally it wishes that public-private collaborations can be developed to increase the number of collections.