International perspectives on the ethics and regulation of human cell and tissue transplantation

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Abstract The transplantation of human cells and tissues has become a global enterprise for both life-saving and life-enhancing purposes. Yet current practices raise numerous ethical and policy issues relating to informed consent for donation, profit-making, and quality and safety in the procurement, processing, distribution, and international circulation of human cells and tissues. This paper reports on recent developments in the international debate surrounding these issues, and in particular on the attention cell and tissue transplantation has received in WHO's ongoing process of updating its 1991 *Guiding principles on human organ transplantation*. Several of the organizers of an international working group of stakeholders from a wide range of backgrounds that convened in Zurich in July 2006 summarize the areas of normative agreement and disagreement, and identify open questions regarding facts and fundamental concepts of potential normative significance. These issues must be addressed through development of common medical, scientific, legal and ethical requirements for human cell and tissue transplantation on a global basis. While guidance must accommodate the distinct ethical issues raised by activities involving human cells and tissues, consistency with normative frameworks for organ transplantation remains a prime objective.

Bulletin of the World Health Organization 2007;85:941–948.

Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

From its origins with the first successful transplant of banked cadaveric tissue in the first half of the 20th century, the transplantation of human tissues (HTs) has become a widely practised surgical procedure.[1] Today, HTs are transplanted across the globe not only to save lives, but also to improve lives through reconstructive and cosmetic interventions. Due to the growing demand for HTs and the increasing quality and safety standards required in tissue banking, many of the original hospital-based tissue banks, designed to meet local needs, have been replaced by national or multinational HT organizations which sell their products internationally and may operate on a for-profit basis.

In parallel, the transplantation of human cells (HCs) – haematopoietic progenitor cells in particular – has evolved into a widely used clinical activity. After the first successful bone marrow transplants in the 1960s, subsequent advances in immunosuppressive and antibiotic therapy have made haematopoietic progenitor cell transplantation an established treatment for a wide variety of genetic and malignant diseases.[2] As with HT, haematopoietic progenitor cells are exchanged globally today,[3] driven by the need to find a donor that closely matches the human leucocyte antigen type of the recipient. Profit-making has also been introduced into the field with the establishment of for-profit (private) autologous cord blood banks and a growing number of clinics offering experimental cell transplants.[4,5]

Current practices in HC/HT transplantation raise several questions that need to be addressed jointly by clinicians, scientists, health regulators and ethicists as well as representatives of civil society, in particular HC/HT donors and recipients. The increasing commercialization of HC/HT products has multiplied opportunities for profit-making and increased the risk of clinically unsafe and unethical practices (particularly in HT procurement). Recent scandals in the United States of America[6,7] and other countries[8,9] involving nonconsented procurement underline the urgent need for a common global technical and ethical framework. Although a number of regulations on HC/HT transplantation have been adopted in the past several years or are currently under discussion,[10–12] national regulation and oversight of HC/HT transplantation is nonexistent or inefficient in many countries.

Moreover, regulation is no longer merely a national matter because HCs/HTs can be processed, preserved and easily transported around the globe. While the international circulation of HCs/HTs can facilitate access, it can also spread tainted material, create global inequities in donation or accentuate inequities in access to HC/HT services. The lack of ethical guidance and the existence of unmonitored or unregulated HC/HT procurement and distribution represent a serious international risk to both donors and recipients of cells and tissues.

WHO has given special attention to human cell and tissue transplantation in the process of updating its 1991 *Guiding principles on human organ transplantation*,[13] an activity which has been ongoing since 2004.[14] As part of this process, WHO's Departments of Essential Health Technologies and Ethics, Trade, Human Rights and

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doi: 10.2471/BLT.**06.038703**

(*Submitted: 10 November 2006 – Revised version received: 3 July 2007 – Accepted: 15 July 2007*)

Health Law held a meeting jointly with the Institute of Biomedical Ethics, University of Zurich, in July 2006. The meeting involved an international group of experts on transplantation medicine, nursing, ethics, social sciences, law and policy-making. Meeting participants were: Tsuyoshi Awaya (Okayama University, Japan), Nikola Biller-Andorno (University of Zurich, Switzerland), Arlinke Bokhorst (Bio Implant Services, Leiden, Netherlands), Alexander Capron (WHO, Geneva, Switzerland), Mar Carmona (WHO, Geneva, Switzerland), Francis Delmonico (Transplantation Society, Boston, MA, United States), Deirdre Fehily (Centro Nazionale Trapianti, Rome, Italy), Gregorio Garrido Cantarero (Organización Nacional de Trasplantes, Madrid, Spain), Jens Gobrecht (WHO, Geneva, Switzerland), Alois Gratwohl (University of Basel, Switzerland), Bernadette Haase-Kromwijk (Dutch Transplant Foundation, Leiden, Netherlands), Marisa Herson (Asociacion Latinoamericana de Bancos de Tejidos, Sao Paulo, Brazil), Roman Hitchev (Osteocentre Bulgaria EAD, Sofia, Bulgaria), Liisa Kok (Dutch Ministry of Health, Netherlands), Jan Koller (Central Tissue Bank, Bratislava, Slovakia), Theo Le Roux (University of Pretoria National Tissue Bank, South Africa), Nabila Metwalli (WHO EMRO, Cairo, Egypt), Conrad Müller (Swisstransplant, Berne, Switzerland), Alessandro Nanni Costa (Centro Nazionale Trapianti, Rome, Italy), Aziz Nather (National University of Singapore, Singapore), Luc Noel (WHO, Geneva, Switzerland), Jan Pierce (American Association of Tissue Banks, McLean, VA, United States), Virender Sangwan (LV Prasad Eye Institute, Hyderabad, India), Volker Schmidt (National University of Singapore, Singapore), Annette Schulz-Baldes (University of Zurich, Switzerland), Naoshi Shinozaki (Cornea Center, Ichikawa, Japan), Magi Sque (University of Southampton, United Kingdom), Caroline Trouet (European Commission, Brussels, Belgium), Yongyudh Vajaradul (Siriraj Hospital, Bangkok, Thailand), Rüdiger von Versen (German Institute for Cell and Tissue Replacement, Berlin, Germany) and Kathryn Wood (Transplantation Society, Oxford, United Kingdom). The meeting focused on tissues – notably bone, skin, tendon and fascia as well as cornea, pericardium, heart valves, arteries and veins, procured for clinical use from deceased persons – and haematopoietic stem cells from cord blood and adult living donors. Issues relating to HCs/HTs retained for research or education purposes, HCs/HTs from human embryos or from animals, human blood or blood products and human reproductive cells, such as oocytes and spermatocytes, were not addressed.

The aim of the meeting was to delineate areas of normative consensus and divergence about HC/HT transplantation. Drawing on the Reflection Document that resulted from the meeting,[15] this paper provides the perspective of several of the meeting's organizers on the agreements and disagreements among stakeholders that emerged regarding normative issues, as well as facts and fundamental concepts of potential normative significance.

Current ethical and policy issues in HC/HT transplantation – areas of agreement and disagreement

1. Consent for removal of human cells and tissues

In line with universal ethical principles, the meeting participants agreed that informed consent was necessary whenever obtaining human cells and tissues. With regard to living donors, this conclusion was unambiguous: HCs/HTs should only be procured after the donor has given informed and voluntary consent, or, in rare cases when a minor is a donor of haematopoietic progenitor cells to a close relative, a surrogate has consented and the minor has assented after careful deliberation and professional scrutiny. While donors should be able to withdraw consent at any time before actual procurement, withdrawal can be highly problematic when, for example, the recipient is already immunosuppressed for transplantation of haematopoietic progenitor cells. This should be made clear to the donor at the time of consent.

Yet consent in and of itself was not considered sufficient to justify HC/HT procurement from living donors which can cause serious, even irreversible harm. Participants therefore agreed that live HC/HT donation should not be practised unless there is no feasible alternative and means are in place to effectively protect the donor's health and safety.

The implications for deceased HT donation were less straightforward. Substantial normative disagreement existed about whether presumed consent is ethically equivalent to actual informed consent, mirroring the longstanding debate regarding consent for post-mortem organ donation. However, participants broadly agreed concerning the practical challenges of presumed consent systems; namely, how to conduct public debates, to verify a positive societal attitude towards donation and to incorporate suitable measures for continued public education about the donation process, its implications and the procedures for individuals to opt out.

Meeting participants also agreed that, irrespective of the consent scheme, bereaved next of kin or legal representatives must be approached by specially trained professionals who are competent in sensitively discussing deceased HT donation (including the donor's history) and providing follow-up support. As far as possible, participants thought the information given in the donation discussion should reflect the informational needs of the consenting party. The exact amount and depth of information, however, were contentious. Because information about the procedures of HC/HT activities is complex and continuously changing, requiring fully-informed consent from an emotionally distressed person seemed overly arduous to some. It was particularly controversial whether information should be provided that relates to whether the processing or distribution of cells or tissues would produce a profit or surplus. Some suggested a nuanced approach that would require informing the next of kin or legal representatives only if the institutions involved in HC/HT processing or distribution dispense profits among owners or shareholders. Views also varied on the need to inform about the possibility that donated cells or tissues would be used abroad or for cosmetic purposes. Yet all participants concurred that consent cannot be valid if the consenting party is deceived or donates under false assumptions.

Mirroring ongoing debates about procurement of organs, participants also disagreed about whether next of kin should be allowed to veto the choice a person had made to donate tissue after death or, in a presumed consent system, the donation that would occur when the deceased had not opted out. Some meeting participants

argued that, to increase donation rates, the wishes of designated donors should be respected even if the next of kin object. Others asserted that doing so would be unacceptable, particularly in societies where family ties are strong.

2. Confidentiality of donor data

Confidentiality of donor data was considered a requirement for all activities involving HCs/HTs. However, participants acknowledged exceptions in the case of testing results which indicate a high risk of serious and preventable harm to third parties and agreed that donors or next of kin should be informed accordingly in the donation discussion. Ideally, consent should be sought for disclosing results which indicate a condition that cannot be treated due to resource constraints (e.g. anti-retroviral treatment in resource-poor countries).

3. Unpaid donation

By analogy to organ donation, all meeting participants concurred that donation of cells and tissues should remain unpaid, because payment can unduly induce vulnerable and poor living donors or constitute a conflict of interest for next of kin or legal representatives in deceased donation, and is likely to result in inequities in donation. Some also worried that paying for cells or tissues increases the likelihood of inaccurate responses on donor-history questionnaires, resulting in transplanted materials carrying an undetected disease. At the same time, the need to remove financial disincentives for HC/HT donation was recognized as it has been for organ donation. Participants therefore concluded that only compensation for travel expenses, loss of earnings or other expenses actually incurred in donation may be allowed and must be transparent and regularly audited. General consensus also existed that for-profit organizations should not be involved in promoting cell and tissue donation, or discussing it with potential donors, to avoid conflicts of interest.

More generally, although HC/HT procurement and transplantation have become quite common, the fundamental legal, economic and philosophical concepts of "body ownership" remain surprisingly vague for both living and deceased persons. This is startling considering that fundamental agreed norms about ownership are a general precondition for ordinary transactions. The lack of an overarching concept of body ownership also has practical implications because legal and regulatory definitions of human cells and human tissues remain to some extent arbitrary, although they heavily influence practices.

4. Fair procurement of cells and tissues

There was broad agreement that donors should be identified and selected according to fair and explicit criteria, above all medical eligibility, equally and without explicit or implicit discrimination based on social status, race or gender. Meeting participants recognized that the geographical location of HC/HT procurement facilities inevitably affects procurement where donation programmes are not well developed and resources are limited. There was also broad agreement that consent procedures and the methods for approaching potential donors should be standardized, transparent and subject to regular external auditing, given that vulnerable groups are at risk for subtle or overt manipulation regarding the decision to donate HCs/HTs.

A controversial issue was how tissue and organ procurement should be coordinated in those deceased donors who are medically suitable to donate both organs and HCs/HTs. Some participants believed that profit-making opportunities could bias in favour of procuring HTs rather than organs (e.g. heart valves instead of the entire heart), whereas others regarded such scenarios as practically irrelevant. Yet all participants recognized the need to coordinate procurement, while supporting the general priority of procuring organs over HTs, if clinically appropriate, because of the greater scarcity of organs and because organs are more frequently used for life-saving purposes. Nonetheless, disagreement remained whether this priority should be binding.

5. Stewardship for donated cells and tissues

All meeting participants agreed that HC/HT organizations have a responsibility to act as stewards of the donations entrusted to them for the benefits of others. Most participants concurred that HC/HT activities should, to the extent possible, fulfil the intentions or expectations expressed in the consent to donate regarding the future clinical, research and educational uses of donated HCs/HTs, the making of profit from the processing and distribution of the cells and tissues, and their circulation outside the country. Consensus existed that donors or next of kin should be given the opportunity to veto future HC/HT use for research, education and training. However, not all meeting participants supported the right to veto HC/HT circulation abroad or use for cosmetic purposes because of the practical difficulties in implementing such requests and the concern that including full information about such choices may be too complex or too emotionally burdensome for bereaved relatives or other legal representatives. Yet all concurred that procurement organizations should not implement donors' instructions to discriminate against individual recipients, in particular on racial or religious grounds.

Participants also endorsed that, in addition to respecting the non-discriminatory wishes of individual donors, HC/HT institutions and the profession should set priorities for clinical uses of HCs/HTs in light of their compatibility with general donor intent. However, even this common perspective did not yield straightforward conclusions. For example, it remained problematic whether HC/HT use for cosmetic purposes should be rigorously rejected, given that the distinction between reconstructive and cosmetic interventions is not clear-cut and a decline in certain preparations that can be used for both reconstructive and cosmetic purposes could imperil the care of patients in need.

Meeting participants found it overly simplistic to frame stewardship by contrasting for-profit with not-for-profit organizations. For one thing, what it means for an organization to be "for-profit" is, in many cases, unclear, and "profit-making" is a descriptive, not an inherently moral attribute. All organizations that process or distribute HCs/HTs can produce a surplus of income over expense, but the framework for using this surplus differs. Not-for-profit organizations are, at least in theory, subject to rules that tightly control the extent to which individuals may receive financial and material benefits; accordingly, surpluses must be used in ways consistent with the organization's purpose, such as in improving HC/HT services or supporting other services when the HC/HT activity is a unit within a publicly funded health system. In for-profit organiza-

tions, in contrast, surpluses that are not reinvested are distributed among the owners (such as the shareholders of corporations) and/or lead to higher salaries for the managers.

However, the apparent distinction between for-profit and not-for-profit institutions is often blurred in practice. Not-for-profit institutions may own or collaborate with for-profit subsidiaries,[16] and in countries where HC/HT organizations do not receive public funding, patients may have to rely on services of for-profit institutions to access necessary medical care. Furthermore, for-profit organizations are sometimes in a better position to invest in high-quality facilities and/or research and development, and may thereby promote efficient use of donated HCs/HTs and improvement of services. This can help to ensure enhanced benefits from the donation for patients, which is also an ethical imperative.

Finally, the institutional structure itself does not indicate the amount of income. For-profit institutions can generate little profit, while not-for-profit institutions can have large surpluses. What matters from a normative perspective is the way income is managed and the effects that efforts to generate surplus revenues have on stewardship, efficiency, transparency, accountability, fair pricing, responsiveness to local or national health needs and fair allocation. These criteria are more important in evaluating HC/HT organizations normatively than their formal profit-making status.

All participants recognized that being operated on a for-profit basis can create conflicts of interest or at least the appearance of such conflict. Hence, the participants agreed that for-profit HC/HT organizations should not be involved in the promotion of donation or the interviewing of donors, surrogates or next of kin. In addition, regulations that minimize commercial conflicts of interest in the processing and possibly the distribution of cells and tissues were considered necessary.

However, there was considerable dispute as to how a profit-making orientation might influence processing decisions. Although respective evidence does not exist, it is conceivable that for-profit institutions would be more prone to process HCs/HTs into the most profitable products, thereby imperilling equitable access to services (e.g. acellular dermis products rather than minimally processed skin for burn care).

Meeting discussions yielded the following preliminary ethical criteria for organizations processing or distributing cells or tissues with a profit-making orientation: donors, surrogates, next of kin or legal representatives should be informed accordingly; the quality, safety and price of cells and tissues should be at least comparable to those from not-for-profit organizations; and the profit-making orientation should not compromise equitable access to HC/HT services.

6. Quality and safety of HC/HT procurement and processing

All meeting participants considered compliance with recent international quality and safety standards mandatory to guarantee the safety of recipients, even if this implies a reduced availability of HCs/HTs.[17,18] Traceability (that is, the capacity to trace cells and tissues from the donor to recipients and vice versa) and long-term follow-up of living donors and recipients of cells and tissues are central elements of safety and quality management. Many participants envisaged for the future the ability to coordinate the traceability of organs and tissues in a common surveillance system with universal donor identification numbers, as many organ donors also donate tissues; however, such aspirations were distant for participants from resource-poor countries. The latter urged the international community to adopt minimal standards for procurement and processing as the surest way of helping them to balance quality, safety and HC/HT availability.

Quality and safety were considered a particular concern in for-profit autologous cord blood banking, where practices are often substandard. In addition, autologous cord blood banking is not an evidence-based practice today, but a speculative private investment.[4] Participants therefore agreed that such services should only be offered if quality standards correspond to those applied in allogeneic not-for-profit cord blood banks and if parents are fully informed about the currently limited clinical application of autologous cells.

7. Fair distribution of processed cells and tissues

Although the scarcity of HCs/HTs is less marked than the scarcity of organs, there was broad agreement that HCs/HTs should be distributed fairly. Participants concurred that a fair HC/HT distribution could only be achieved through the regulated implementation of transparent allocation criteria and prioritization rules which balance utility and equity considerations in the distribution process. While participants were committed to medical need as the primary consideration in distributing HCs/HTs, because donors generally give HCs/HTs with the intention to help others, they recognized that medical need is vague and context-dependent.

Although distribution according to medical need would imply prioritizing HC/HT use for life-saving purposes over life-enhancing or cosmetic purposes, participants recognized the practical limitations in effectuating such prioritization. HC/HT processing institutions frequently do not know where and how their products will be used. Even if better oversight was achieved, use of small amounts of cells and tissues in numerous clinical settings poses a clear practical limitation on designing, much less implementing, sophisticated allocation schemes even in resource-rich countries. Some also questioned the need for elaborate algorithms because most HCs/HTs can be stored, used as necessary and imported in case of shortage; moreover, some medical products or devices only contain traces of HCs/HTs. Nonetheless, all participants agreed that allocation rules should be generally and explicitly structured; examples in this direction already exist.[19]

Participants also appreciated that factors other than medical need can influence the distribution of HCs/HTs, provided they have been defined in a fair process. Regional balance, waiting time, the number of waiting patients, and reciprocity of services between procurement and processing institutions were mentioned (and partially criticized). However, all participants rejected discriminatory criteria in the distribution process, such as ethnicity and religion.

Some controversy arose about how a profit-making orientation affects HC/HT distribution. Several participants were convinced that for-profit institutions should not be involved in distribution, while others denied the assumed conflicts of interest in distribution. This disagreement could not be resolved because little is currently known about HC/HT distribution and the factors that influence the availability of, and

Table 1. **Eight of the central ethical issues in the regulation of human cell (HC) and human tissue (HT) transplantation**

Issue	Agreement	Disagreement
Consent for HC/HT removal	• No HC/HT removal without consent • Informed consent for donation from living donors • Disclosure of possible limitations to withdrawing consent	• Informed versus presumed consent in deceased donation? • Role of the next of kin ("family veto") in deceased donation? ◦ Obligation to inform about possible profit-making, international circulation or cosmetic applications?
Confidentiality of donor data	• Confidentiality of donor data (with exceptions)	
Unpaid HC/HT donation	• Unpaid donation • Removal of financial disincentives for donation ◦ Only not-for-profit institutions in donation discussions and the promotion of donation	
Fair HC/HT procurement	• Fair criteria for donor identification and selection	◦ Binding priority of organ over HC/HT recovery?
Stewardship for donated HC/HT	• Obligation to honour and realize donor intent • Option to veto HC/HT use for research or education • No discriminatory restrictions of HC/HT use ◦ Stewardship, effectiveness, accountability, fair pricing, responsiveness to local and/or national needs and fair allocation are more important than institutional for-profit/not-for-profit structure	◦ Option to veto HC/HT use abroad or for cosmetic applications?
Quality and safety management	• Necessity of quality and safety management • Long-term follow-up of donors and recipients	• Balance between quality, safety and HC/HT availability in resource-poor settings?
Fair distribution of processed HC/HT	• Need for allocation criteria and prioritization rules despite limited scarcity ◦ General priority of HC/HT use for life-saving over life-enhancing and cosmetic purposes ◦ General priority of local and/or national self-sufficiency	◦ Scope of allocation criteria and prioritization rules: institutional, national, subregional? ◦ Institutional reciprocity as an allocation criterion? ◦ For-profit organizations in HC/HT distribution? ◦ General priority of subregional self-sufficiency? ◦ International HC/HT circulation to subsidize public health care?
Consent for HC/HT transplantation	• No HC/HT transplantation without voluntary and informed consent	◦ Obligation to inform recipients about profit-making and international circulation? ◦ Limits of consent for medically contested uses?

• normative agreement or disagreement was analogous to that for organ transplantation;
◦ normative agreement or disagreement was specific for HC/HT transplantation.

equitable access to, HC/HT services, as well as about the impact of international circulation, legal definitions and regulatory requirements.

Whether the scope of allocation rules should be institutional, national, subregional or international was equally controversial. While trade in human cells and tissues can help address patients' needs worldwide, it can arguably aggravate global inequities both in donation and access to services. It is important to recognize that HT/HC organizations – in particular those with a profit-making orientation – can experience a conflict of interest between providing HCs/HTs to the donating population and generating income, inter alia by exporting HCs/HTs. To reduce the potential for such inequities, participants concluded that local or national self-sufficiency should have a general priority over international solidarity and that HCs/HTs should be exported only if exportation activities are controlled and transparent. The University of Pretoria National Tissue Bank, for example, will export a maximum of 10% of its stock provided that the remaining supply is sufficient to cover national need for three months. The idea of subregional self-sufficiency, however, was controversial: some participants from resource-poor countries argued that the international exportation of HCs/HTs after national needs have been met is needed to subsidize publicly funded national health care.

Finally, meeting participants emphasized that achieving equity in access to HCs/HTs is not only a matter of fair distribution but also of health care infrastructure. "Transplant tourism" occurs when people in resource-poor countries are unable to obtain needed cell or tissue transplants locally. Therefore, to achieve self-sufficiency in the provision of HC/HT services, national development of HC/HT organizations should be fostered as far as resources allow.

8. Consent for HC/HT transplantation

All meeting participants considered informed and voluntary consent by or on behalf of the recipient a necessary requirement for HC/HT transplantation. Valid consent requires informing the patient that a planned intervention contains human material with specific risks, if any, as well as what is known about the intervention's effectiveness. Yet the extent to which recipients should be informed about all aspects of HC/HT procurement, processing and distribution was contentious. Participants agreed, however, that consent alone is not sufficient to validate experimental (and medically contested) transplants of cells or tissues as "therapy" (so-called "miracle cures").

Conclusion

The Zurich symposium was the first international meeting on the ethical and policy issues in human cell and tissue transplantation. By selecting, analysing and structuring relevant issues, it aimed to provide a first step towards the needed comprehensive global framework for HC/HT transplantation. In the following remarks the authors of this paper wish to highlight, from their perspective, the key insights of the meeting to guide future efforts in this direction.

First, the practice of HC/HT transplantation has reached a global dimension. Activities of national and international HC/HT organizations and the worldwide circulation of HCs/HTs affect the way we practise medicine and trade health goods and services on a global level. They also entail international health risks and have the potential to create global inequities in access to HCs/HTs. For this reason, health authorities and professionals from all countries need to develop and implement a common normative basis for HC/HT transplantation.

Second, activities involving organ transplantation are inherently connected with those involving cells and tissues. Many ethical and policy issues in HC/HT transplantation mirror those identified regarding organ transplantation. At the same time, HC/HT activities raise distinct questions relating to profit-making, cosmetic applications and extensive global exchange and trading. While the regulation of cell and tissue transplantation must accommodate these particularities, consistency with normative frameworks for organ transplantation remains a prime objective.

Third, the current spectrum of practices in HC/HT transplantation is wide and difficult to pinpoint. It is hard to assess how practices influence national and international availability of, and equitable access to, cells and tissues. Research on the actual uses and distribution of HCs/HTs – in particular on the impact of profit-making and international circulation, and on appropriate allocation schemes – is urgently needed.

Fourth, there was considerable normative agreement among meeting participants (Table 1), which is encouraging for future work. Some points of agreement may seem trivial considering the nuanced debates about the ethics and regulation of organ transplantation.

Table 2. **Preliminary ethical framework for the regulation of human cell (HC) and human tissue (HT) transplantation**

Fundamental ethical principle	Specification in the context of HC/HT transplantation
Respect for persons	• Informed and voluntary consent for living HC/HT removal • Explicit consent during lifetime or presumed consent for deceased HC/HT removal • Option to veto future uses of donated HC/HT for research and education (and/or cosmetic applications and/or international circulation) • Stewardship for donated HCs/HTs • Informed and voluntary consent for HC/HT transplantation
Non-maleficence	• Minimal quality and safety standards for HC/HT procurement, processing and transplantation • Long-term follow-up of living donors and transplant recipients
Justice	• Fair criteria for donor identification and selection • Unpaid donation to reduce inequities in donation • Fair HC/HT distribution • General priority of local and/or national self-sufficiency to reduce global inequities in donation of and access to HCs/HTs

However, it should be recognized that some of these points contrast starkly with current practices. For example, at present criteria for the identification and selection of potential donors are typically not explicit; for-profit institutions are frequently involved in donation discussions; the ideal of stewardship often remains rhetorical; allocation criteria and prioritization rules are exceptional; and cells and tissues are commonly transplanted without full disclosure to recipients.

Fifth, general points of normative agreement are difficult to specify with regard to the large variety of HC/HT products. There seems to be a difference between transplanting large pieces of intact bone and composite tissues – such as entire hands or significant parts of faces – and transplanting orthopaedic screws that contain traces of bone dust to speed healing. The moral significance of this intuitive difference and implications, for example for donor and recipient consent and fair distribution, requires further inquiry.

Sixth, although the meeting was not designed to reach a consensus statement, the authors of this paper think that the present areas of normative agreement render a preliminary ethical framework for HCs/HTs that remains to be scrutinized and/or specified (Table 2). It is based on the three fundamental ethical principles of respect for persons, non-maleficence and justice, and in our view corresponds to the existing norms in organ transplantation.[13]

Certainly, more work is needed in this complex area of applied ethics and policy-making. It seems clear, however, that the only way forward is moving towards consistent regulation of, as well as common medical, scientific, legal and ethical requirements for, human cell, tissue and organ transplantation on a global basis. The revised WHO *Guiding principles on human organ transplantation* will be an important step in that direction. ■

Acknowledgements

We are grateful to all participants of the meeting on Human Cell and Tissue Transplantation – An International Symposium on Ethical and Policy Issues (Zurich, 17–19 July 2006) – for their critical and pertinent comments on the background paper and the Reflection Document as well as a productive discussion during the meeting. In particular, we thank Deirdre Fehily, Luc Noël (who was the principal WHO organizer of the symposium) and Francis Delmonico for valuable input on earlier versions of this manuscript. We also gratefully acknowledge the comments and suggestions of the anonymous reviewers.

Funding: The meeting was organized with WHO, which provided substantial funding, thanks to the generous support of the Ministry of Health and Consumer Affairs of Spain. The authors also thank the University of Zurich for hosting and supporting the symposium.

Competing interests: None declared.

Résumé

Points de vue internationaux sur l'éthique et la réglementation de la transplantation de cellules et de tissus humains

La transplantation de cellules et de tissus humains est devenue une entreprise d'ampleur mondiale, visant à sauver des vies et à améliorer des existences. Bien que les pratiques actuelles soulèvent de nombreuses questions éthiques et politiques concernant le consentement informé au don, ainsi que la rentabilité, la qualité et la sécurité des processus d'acquisition, de traitement, de distribution et de circulation internationale des cellules et tissus humains. Le présent article rapporte les faits marquants récents dans le débat international autour de ces questions et notamment l'attention accordée à la transplantation de cellules et de tissus dans le cadre du processus actuellement mené par l'OMS d'actualisation des « 1991 *Guiding principles on human organ transplantation* ». Plusieurs des organisateurs d'un groupe de travail international ayant réuni des participants issus d'horizons très divers en juillet 2006 à Zürich résument les domaines d'accord et de désaccord sur le plan normatif et identifient les questions restant ouvertes concernant les faits et concepts fondamentaux pouvant avoir une importance dans la normalisation. Il faut traiter ces questions en développant des exigences mondiales communes sur les plans médical, scientifique, juridique et éthique pour la transplantation de cellules et de tissus humains. Même si les recommandations doivent prendre en compte les différentes questions éthiques soulevées par les activités faisant appel à des cellules et tissus humains, la cohérence avec les cadres normatifs de la transplantation d'organes reste un objectif primordial.

Resumen

Perspectivas internacionales sobre la ética y la regulación del trasplante de células y de tejidos humanos

El trasplante de células y tejidos humanos se ha convertido en una gran empresa mundial que aspira tanto a salvar vidas como a mejorar la calidad de vida. Sin embargo, las prácticas actuales suscitan numerosas cuestiones éticas y normativas en relación con el consentimiento informado para las donaciones, la obtención de lucro, y la calidad y seguridad en materia de adquisición, procesamiento, distribución y circulación internacional de células y tejidos humanos. En este artículo se informa sobre las últimas novedades registradas en el debate internacional sobre estas cuestiones, y en particular sobre la atención que ha suscitado el trasplante de células y tejidos en el proceso seguido actualmente por la OMS para actualizar sus *Principios rectores sobre el trasplante de órganos humanos*, de 1991. Varios de los organizadores de un grupo de trabajo internacional de interesados directos con muy diversas experiencias que se reunió en Zurich en julio de 2006 resumen aquí las áreas de acuerdo y desacuerdo normativo y plantean interrogantes por resolver sobre hechos y conceptos fundamentales de eventual trascendencia normativa. Estos temas deberán abordarse formulando requisitos médicos, científicos, legales y éticos comunes para el trasplante de células y tejidos humanos a nivel mundial. Si bien las indicaciones deben tener en cuenta los aspectos éticos peculiares que plantean las actividades en que se manejan células y tejidos humanos, la coherencia con los marcos normativos para el trasplante de órganos sigue siendo un objetivo primordial.

ملخص

مناظير دولية بشأن أخلاقيات أنشطة زرع الخلايا والأنسجة البشرية، وتنظيمها

لقد أصبح زرع الخلايا والأنسجة البشرية من الأنشطة العالمية التي تجرى لأغراض إنقاذ الحياة وتحسين نوعيتها. إلا أن الممارسات القائمة تثير العديد من القضايا الأخلاقية، وتلك المتعلقة بالسياسات في ما يتصل بالموافقة المستنيرة على التبرع، أو تحقيق الربح، أو نوعية ومأمونية عملية شراء الخلايا والأنسجة البشرية ومعالجتها وتوزيعها وتداولها على المستوى الدولي. وتقدم هذه الورقة تقريراً عن آخر التطوُّرات في ما يختص بالجدل الدائر حول هذه القضايا على الصعيد الدولي، ولاسيَّما الاهتمام الذي تلقاه أعمال زرع الخلايا والأنسجة ضمن عملية التحديث المستمرة التي تجريها منظمة الصحة العالمية على المبادئ الإرشادية المتعلقة بزرع الأعضاء البشرية، التي صدرت عام 1991. وقد أوجز عدد من منظمي اجتماع فريق العمل الدولي المؤلَّف من أصحاب الشأن المعنيِّين من ذوي الخلفيات الثقافية المتعدِّدة، الذين اجتمعوا في زيوريخ، في تموز/ يوليو 2006، أوجه الاتفاق والاختلاف المعيارية، وحدَّدوا المسائل المعلقة في ما يختص بالحقائق والمفاهيم الأساسية ذات الدلالة المعيارية المحتملة. وينبغي بحث هذه القضايا من خلال وضع قواعد طبية وعلمية وقانونية وأخلاقية عامة لأنشطة زرع الخلايا والأنسجة البشرية على أساس عالمي. وعلى الرغم من حتمية استيعاب الإرشادات للقضايا الأخلاقية الواضحة المعالم التي أثيرت بسبب الأنشطة ذات الصلة بالخلايا والأنسجة البشرية، فإن تمشيها مع الأُطُر المعيارية لعملية زرع الأعضاء يظل هدفاً أساسياً.

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