Implications of oocyte cryostorage for the practice of oocyte donation

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ABSTRACT: As the efficiency of oocyte cryopreservation has increased rapidly in recent years, oocytes are currently being stored either in the course of IVF treatments or as a fertility preservation measure. These practices may have an impact on the number of available donor oocytes due to two different dynamics: first, a certain percentage of women for whom oocytes were cryopreserved will eventually not use their oocytes and may decide to donate them to others; secondly, especially in the practice of social freezing, women may opt to donate a portion of the retrieved oocytes in ‘freeze-and-share’ schemes in order to reduce the costs. In this article, we aim to sketch the ethical implications of such developments in general and the issue of payment to oocyte donors in particular.

Key words: oocyte cryostorage / oocyte donation / ethics / in vitro fertilization / cryopreservation

Introduction

In recent years, improvements in the slow freezing technique and especially the development of vitrification have opened up the possibility of efficiently storing human oocytes and using them successfully in an IVF treatment after thawing (Almodin et al., 2010; Grifo and Noyes, 2010; Kim et al., 2010; Rienzi et al., 2010; Trokoudes et al., 2011). Oocytes may be cryopreserved in a number of circumstances: during the course of an IVF treatment, at the request of women whose fertility is threatened by diseases or aggressive medical treatments (the so-called ‘medical freezing’) or at the request of women who fear infertility due to aging (the so-called ‘social freezing’). These practices may have an impact on the number of available donor oocytes due to two different dynamics: first, a certain percentage of women for whom oocytes were cryopreserved will eventually not use all of their oocytes and may decide to donate them to others; secondly, especially in the practice of social freezing, women may opt to donate a portion of the retrieved oocytes in ‘freeze-and-share’ schemes in order to reduce the costs. In this article, we aim to sketch the ethical implications of such developments in general and the issue of payment to oocyte donors in particular.

Oocytes cryopreserved during IVF treatment

In the course of IVF treatments, it is common practice to harvest more oocytes than can be fertilized and replaced in one cycle. Currently, most fertility centers opt to fertilize all the available oocytes and cryopreserve the high-quality embryos that are not transferred in the first cycle. However, as these embryos ‘belong’ to two individuals, disagreements may arise over their disposition. Now that the efficiency of oocyte cryopreservation (through vitrification) equals that of embryo cryopreservation, it may thus be wiser to freeze oocytes instead of embryos, although this practice will probably be less cost-effective as a certain percentage of oocytes will be frozen, but will eventually fail to fertilize. Other reasons for freezing oocytes rather than embryos include legal restrictions on the storage of embryos (such as in Italy), moral objections of the patients or the inability of the male partner to produce semen at the time of oocyte retrieval.
Recently, it has also been suggested to freeze not only those oocytes that are not needed for the first, fresh cycle of an IVF treatment, but also all retrieved oocytes as a routine practice for those fertility centers that switch to a hCG-free protocol in order to avoid ovarian hyperstimulation syndrome (Devroye et al., 2011; Mertes and Pennings, 2011). In a GnRH antagonist protocol, final oocyte maturation can be triggered with GnRH agonist (instead of hCG), which results in a total absence of ovarian hyperstimulation syndrome (Melo et al., 2009). However, the pregnancy rates of this protocol in the fresh cycle are lower than in GnRH agonist protocols with hCG triggering as the endometrium is less receptive. If all oocytes are frozen and embryos are transferred in an unstimulated cycle, the endometrium is more receptive and the ongoing pregnancy rate is higher. Low responders may also have an advantage if oocytes from several stimulation cycles are vitrified and accumulated before starting transfer cycles (Cobo et al., 2012).

Deciding to donate
Regardless of the reason why oocytes are frozen during the course of an IVF treatment, a number of these oocytes will remain unused due to a myriad of reasons and will thus become surplus or spare oocytes. In the years after oocyte storage, women may have completed their family through natural conception or IVF with other oocytes, pass away, break up with their partner or abandon their desire to have children. The same disposition options should be offered for these spare oocytes as for spare embryos after IVF treatment: prolonged storage, disposal, donation to other couples or donation to research.

We expect less reluctance to donate oocytes to other IVF patients when spare oocytes are already in storage than when a woman has to undergo the stimulation and retrieval procedures specifically for the purpose of donation or when donation implies a decrease in the woman’s own chance of conceiving (such as in oocyte sharing). At present, few women are keen to come forward as donors unless when directed (or cross-) donation to a friend or family member is concerned, or when donors receive a personal benefit, either in cash or in kind (in oocyte-sharing schemes). Potential donors need to overcome a double threshold: the first with regard to the physically demanding procedures of ovarian stimulation and oocyte retrieval, secondly with regard to the psychological burden of becoming the genetic parent of a child that one does not know.

For women who already have spare oocytes in storage, the first threshold is removed. In this case, the decision to donate does not imply any additional-physical hardship. Some additional testing for infectious or hereditary diseases may be requested, but the effort will be minimal compared with the oocyte stimulation and retrieval procedure itself. However, the psychological threshold remains largely intact. Many, if not most, women find the idea of having a genetic child grow up in an unknown family emotionally troubling, and therefore, even if the physical burden is lifted, it is unlikely that large numbers of women with spare oocytes will be donating them for reproductive purposes. Nevertheless, the percentage of women who choose donation may be higher for spare oocytes than for spare embryos. First, the donation of oocytes appears to be less emotionally troubling due to the different narratives that, for example, link oocytes to cells and embryos to children (Kirkman, 2003; de Lacey, 2005). Whether this distinction is rational (as both donated oocytes and donated embryos have the potential to become genetic children of the donor) is disputable, but that does not change the observation that the experience for donors is different. Secondly, one of the reasons why couples do not donate their embryos to other IVF patients is that they are a symbol of their partnership (Provoost et al., 2009). This objection to donation does not arise for oocytes.

If there is more of a trend to cryopreserve oocytes rather than embryos, even a small percentage of donations might be sufficient to meet the current demand. As a general indication, in 2010 there were 15 504 donor oocyte transfer cycles (with an average of two embryos per transfer) in the USA and 1320 cycles in the UK (HFEA, 2012; SART, 2012). Practical advantages of using oocytes that are already in storage, rather than relying on fresh oocytes are, for example, that there is no need to synchronize the cycles of donor and recipient, that the number of available oocytes is known beforehand so that oocytes of one donor can be directed to several recipients and that donors can be tested for infectious diseases after the window period. An ethical advantage is that healthy women do not need to be subjected to the procedures of ovarian stimulation and oocyte retrieval, which are not beneficial for their own health, and which may, in seldom cases, even be harmful to them. These advantages also hold true in places where there is no donor oocyte shortage, meaning that even in those places the availability of spare frozen oocytes may have an impact on the practice of oocyte donation.

A practical disadvantage of relying on IVF patients as oocyte donors is that most oocyte donor programs maintain an upper age limit of 35. In the UK, only 41.6% of cycles (fresh and thawed combined) were performed in women below 35 years of age in 2010 (HFEA, 2012). For the same year, only one-third of fresh embryo cycles were performed in women under 35 in the USA (SART, 2012). However, on average, more oocytes are harvested from younger women, which means that they are more likely to have spare oocytes than their older counterparts, which is for example reflected in the fact that in thawed embryo cycles the number of women below 35 rises to 50% (for the US). Also, the younger the patient is, the more likely she is to conceive on her first attempt (HFEA, 2012; SART, 2012), which again makes it a plausible assumption that women below 35 are more likely to have spare oocytes left at the end of their treatment than IVF patients over 35. Nevertheless, in countries where paid donation is the norm, the average age of current (paid) donors is likely to be significantly lower than the expected average age at which spare oocyte donors will have had their oocytes harvested, which makes paid donors more attractive candidates for recipients, as the recipients will have a better chance of conceiving with younger oocytes. A trade-off will thus need to be made between the practical and ethical advantages of using spare oocytes on the one hand and better success rates when recruiting healthy young donors on the other hand. An additional factor to be considered will undoubtedly be the cost. As we will discuss below, spare oocytes are likely to be the cheaper option, which will make it attractive even in those places where there is no shortage. The future will tell if this will lead to a shift from fresh to frozen spare embryos or if this will lead to an increase in the demand, as it may open up the option of donor conception for a range of patients who are currently unable to afford the costs involved in donor recruitment and donor compensation.
Reimbursement

Whether or not donors should receive financial compensation for anything other than out-of-pocket expenses has been a much debated issue for several years (Gazvani et al., 1997; Steinbock, 2004; ESHRE Task Force on Ethics and Law, 2006; Hyun, 2006; Johnston, 2006; Ethics Committee of the ASRM, 2007; Mertes and Pennings, 2007; Thompson, 2007; Dickenson, 2009; Flower, 2010; Levine, 2010). Although most donors indicate altruism as their prime motivation to donate oocytes, it cannot be denied that the offer of money to offset physical discomfort and time investment or the price cut for patients in oocyte-sharing programs (which accounted for half of the total number of donated oocytes in 2010 in the UK) serve as important incentives (Lindheim et al., 2001; Pennings and Devroey, 2006; Purewal and van den Akker, 2009; HFEA, 2012).

Some authors have argued that one should steer clear of such incentives, fearing that they might lead to commodification of oocytes, undue inducement and/or exploitation of financially deprived women (Dickenson, 2009). Although we have previously questioned the validity of these objections and defended limited reimbursements, it is interesting to consider whether the prospect of spare oocytes becoming available for donation might render this debate superfluous all together (Mertes and Pennings, 2007). In this regard, it is interesting to compare the donation of spare oocytes to the donation of spare embryos by former IVF patients who have decided they no longer need those embryos for themselves. To our knowledge, these donors are not retrospectively compensated for the financial or physical investment in the creation of their embryos and this custom goes unquestioned. There are several possible explanations for this.

First, as the time when the investments are made and the time of the donation are usually several years apart, even a partial reimbursement at the time of donation would make the embryo donation look more like an embryo sale (Robertson, 1995). Even though an offer of compensation might be inspired by laudable principles such as reciprocity or a just distribution of the costs by all the beneficiaries, it may still be perceived by the donors as offensive and of actually devaluing their gift.

Secondly, when someone gives something away that she no longer needs, it is not obvious in common social practice that the receiver of the gift ought to compensate the cost or efforts that were originally invested in creating or obtaining the gift. Of course, it is not immoral to ask money for a second-hand car, especially if it was never used by the original owner, but note that that is a case in which an item is sold, meaning that an amount of money is offered that equals the financial value of the car (as determined by supply and demand). Embryos fall outside this economic realm and cannot be exchanged for money. Therefore, the only possible justification for compensation of embryo donors would have to be based on establishing a just, proportional distribution of the costs (both financial and in terms of time and effort) and benefits. This is the rationale that also underlies oocyte-sharing programs, in which a woman shares her oocytes with another woman, who in turn contributes to the costs of the donor’s IVF treatment (and thus the ovarian stimulation and oocyte retrieval from which she also profits). However, this paradigm is not applicable for embryo donation as the original intention is a morally relevant difference between the two cases. We can use the analogies of hitchhiking and carpooling to demonstrate this claim and to answer the question of reimbursement. In the context of hitchhiking, a person takes her car to go to a certain destination. During the trip, she picks up another person who has the same destination. It is part of the practice of hitchhiking that the car driver does not ask for money. Gratuity is a constitutive rule of hitchhiking. Carpooling is essentially different. Here two people want to go to the same destination but they make an agreement beforehand that the person who drives will receive compensation for the costs that she makes (the gasoline bill will for example be split in half). The rules make perfect sense within the practices. The hitchhiker is not willing, or unable, to pay for the trip and accepts the uncertainty about whether being picked up, timing, etc. The car driver is free to decide whether or not to go and when, to pick up the hitchhiker or not, depending on whether she wants company or whatever. The carpooling passenger, however, knows when and how she will travel but she has to pay a certain amount for that certainty. The driving party in the carpooling commits herself to driving at a certain time, etc. An IVF patient who underwent the treatment for herself, without making any commitments to future candidate recipients of a possible surplus, and then asks for reimbursement at the end would make the same mistake as a car driver who picks up a hitchhiker and asks for a contribution. These patients would want to have all the advantages of the uncommitted car driver and the advantages of cost sharing in a carpooling system.

Oocyte sharing or other existing forms of fresh oocyte donation follow the carpooling scenario, the donor and the receiver set out on a joint project together and decide beforehand that they will share the costs and benefits (or that the receiver will offset the investments made by the donor by a financial compensation). When spare embryos are donated, the donors originally made their investments only to their own benefit. We could argue that it would be nice if recipients of a donor embryo would show their gratitude, and many infertile patients might be willing to sacrifice a great deal of money for the chance of carrying a baby to term, but this does not imply that the donors have a legitimate claim to demand a compensation for the time and effort they have invested in the creation of the donated embryo. A more complicated situation would arise in a scenario in which the donors are still paying off the debt they incurred in pursuing IVF treatment at the time when they donate their spare embryos. If the embryo recipients would propose to help them settle this debt, we might be more inclined to look upon this as not merely a nice gesture, but as a fair distribution of the costs, as in this case the financial investment is still ongoing. Also, in this case there would be less ambiguity about whether the receiver is reimbursing expenses or purchasing an embryo.

However, as a general rule, we can state that embryo donors are not compensated for the investments that were necessary to create their embryos, due to concerns over commodification of embryos and the fact that it is not common social practice to compensate people for the investments that they made for their own benefit when they allow a third person to share the benefits. When the donation of spare oocytes is concerned, the same considerations come into play. If enough women come forward as spare oocyte donors (and in this case one can be sure that the donation is ‘truly’ altruistic), there would no longer be a need to attract donors by
means of financial incentives and thus the ongoing ethical debate about this issue can potentially come to an end. An important reservation that needs to be made is that in those countries where donor compensation is currently common practice and especially where donor compensation varies significantly depending on donor characteristics, a market for paid donation will persist for those patients who are only willing to accept fresh oocytes or oocytes from donors with specific traits. In countries where donor compensation is not the norm and that currently rely on oocyte-sharing programs, these programs are likely to become less appealing as using spare frozen oocytes will become a cheaper, less burdensome and less controversial alternative. On a negative note, this also implies that the women who are now only able to afford IVF treatment thanks to these oocyte-sharing programs will no longer be able to fulfill their child wish.

### Oocytes cryopreserved for medical reasons

Oocytes may also be cryopreserved as a fertility preservation measure for women who fear infertility due to medical reasons. Women may for example have a family history of premature ovarian failure or may be facing aggressive medical treatments with gonadotoxic effects, such as radiation to the pelvic area or chemotherapy with alkylating agents. By gathering and storing oocytes of these women while they are still fertile, they retain the option of establishing a pregnancy through IVF later on in their lives.

As for IVF patients with oocytes in storage, also in this case, there will be instances in which the frozen oocytes will never be used by the patient for whom they were stored. In this context, however, there are a number of additional considerations to make before recruiting these patients as donors for reproduction.

First, the issue of posthumous donation will be more pertinent in this group, as many of the women who freeze oocytes due to medical reasons are gravely ill and may face premature death. In line with most guidelines regarding the posthumous use of cryopreserved sperm, a basic requirement for the posthumous use of cryopreserved oocytes in third-party reproduction (or research) is the informed consent of the deceased ‘donor’ (Ethics Committee of the ASRM, 2004; ESHRE Task Force on Ethics and Law, 2006). This is a sensitive issue. On the one hand, discussing the possibility of posthumous donation with the patient may be very confronting. While the undertaking of cryopreserving oocytes is an expression of hope towards the future, anticipating the situation in which the patient may not survive is quite the opposite. On the other hand, women may be less troubled about donating posthumously than while they are alive, as the fears of not being able to cope with the idea of having unknown children or of being confronted with a child who wants to meet its genetic mother do not apply. For the donor conceived children, there will be no difference in those jurisdictions where donations are anonymous. In jurisdictions that have lifted donor anonymity, the donor conceived children may be disappointed when they find out that there is no possibility to meet their genetic mother, although they would still be able to gather information about their genetic heritage. This scenario is also possible for regular donations and not a sufficient reason to forbid the practice, but the receivers of the donor material should be informed about the fact that the donor has already died, so that they are well aware from the start that their child will not be able to meet its genetic mother (ESHRE Task Force, 2006).

Secondly, since certain cancers are at least partially caused by genetic factors, should the oocytes of cancer patients and patients suffering from other hereditary diseases be accepted for donation for third-party reproduction or only for research? When the danger of genetic transmission is high, for example when a patient is known to carry a mutation on the BRCA1 and/or BRCA2 gene, it would be irresponsible to donate these oocytes to others for reproductive purposes. This does by no means imply that when a breast cancer patient with BRCA1 and/or BRCA2 mutations wants to have genetically related children herself, she should not be allowed to do so. In the latter case, the patient’s oocytes might be used and the embryos diagnosed before implantation, but this is a disproportionate effort in the former case, as there is no added value, in terms of genetic relatedness, in using these oocytes rather than others. The issue becomes more complicated when the genetic component in the development of a patient’s disease is less obvious or when the risk is low and when there is a shortage of donor oocytes. In this situation using the oocytes that were frozen by seriously ill women may be warranted, but if sufficient numbers of spare oocytes from IVF patients become available, a cautious approach pleads against using these oocytes.

For some oocytes that are frozen for medical reasons, there is no contraindication against donation at all. There is, for example, no reason to exclude the oocytes of women who have a family history of premature ovarian failure and have stored their oocytes at a young age.

### Oocytes cryopreserved for non-medical reasons

A last category of cryopreserved oocytes are those frozen by women who anticipate ovarian failure caused by aging. Acceptance of this kind of cryostorage is less widespread than for the previously discussed applications, but nevertheless numerous fertility clinics do offer the so-called ‘social freezing’ (Dondorp and de Wert, 2009; ESHRE Task Force on Ethics and Law, 2012). Nekkebroeck et al. (2010) reported that in their clinic, from the women who opt for oocyte cryopreservation for non-medical reasons, 13.3% have the intention to donate them to another woman if they would not need their oocytes themselves, and an additional 26.7% were undecided. While there are no data yet on whether these women actually follow through on their intentions and while the group of women cryopreserving oocytes for non-medical reasons is still small, we should also take this group into consideration as potential spare oocyte donors. Currently, the average age of women resorting to social freezing is 38 years, which is rather high (Gold et al., 2006; Klein et al., 2006; Sage et al., 2008; Nekkebroeck et al., 2010). Considering that most oocyte donation programs have an upper age limit for the donor of 35, a number of the spare oocytes from this source will either not be eligible for donation, or will only be accepted if there is a substantial donor oocyte shortage. However, as far as oocytes younger than 35 years old are concerned, the donation of these oocytes would have the same practical advantages as donation by (former) IVF patients and would be largely uncontroversial.
As for IVF patients and women freezing oocytes for medical reasons, we argue that these women should not be compensated for the time and effort invested in obtaining and storing their oocytes, as this was done for self-interested reasons, not on the receiver’s behalf. However, both public opinion and the donors themselves may be more open to the offer of compensation for the actual costs that were incurred to obtain and store these oocytes in the context of social freezing. Women who freeze oocytes in anticipation of future infertility but who eventually do not use them themselves, may not look upon them as a surplus that remains unused, but rather as a poor investment. This is somewhat different for IVF patients, who are more likely to perceive the costs they made as the price for infertility treatment as a whole and the spare oocytes as a by-product of that treatment. The former will perceive the costs as the price they paid to generate these oocytes and will feel that they did not get a return on their investment, making them more open to the option of recuperating some of their expenses. This perception may be flawed to a certain extent. When one buys an insurance policy against hurricane damage during a 10-year period and no damage is suffered in that time frame, one might say that there was no return on the investment made. However, during those 10 years, those who bought the insurance had more ‘peace of mind’ than those without the insurance and they did not have to put other investments on hold in order to be able to cope with the costs that a hurricane might inflict. One cannot sufficiently point out that oocyte cryopreservation, unlike insurance coverage, is an investment that is not even guaranteed to pay off if disaster (in this case infertility) does strike, but nevertheless, women who freeze their oocytes for non-medical reasons can be said to benefit from a similar peace of mind, not in the sense that they are certain to have children in the future, but rather that the option of parenthood is not yet completely gone. At the time when a woman makes the investment to cryopreserve her oocytes, she knows that there is only a chance that she will eventually establish a pregnancy using these oocytes, not a guarantee, and yet she esteems at that point that the price is not too high for the gamble that she is taking.

In short, a woman who stores oocytes for social reasons and decides to donate them later on cannot make a legitimate claim on the recipients of her oocytes to offset the financial investment that she made to obtain and store them. At the time when the investment was made, this was done for self-interested reasons and the decision to make the investment was not influenced by the future recipients. Nevertheless, we acknowledge that there may be a greater margin for acceptance of compensation for these donors rather than for IVF patients who donate spare oocytes. Although the donor cannot claim compensation, the offer of compensation is not immoral as it can be grounded in principles of reciprocity, just distribution of costs and benefits, or gratitude. An exception to this rule would be women who donate spare oocytes that they obtained in a freeze-and-share program, in which the recipient has already paid all the expenses.

Freeze and share

There is another way in which an overlap is created between the practice of oocyte cryopreservation for non-medical reasons and oocyte donation in countries faced with a donor oocyte shortage. Rather than donating oocytes that were frozen for self-use, but that remain in storage due to various circumstances, oocytes can also be donated immediately at the time of freezing in a new form of oocyte sharing, making extra oocytes available today, rather than in a few years time. The idea of ‘freeze-and-share’ arrangements was developed at the London Bridge Fertility, Gynaecology and Genetics Centre and offers a way for women to offset the costs of retrieval and storage. Women are eligible to participate in the freeze-and-share program if they are ‘fit, healthy and under 35’ and if they are likely to respond to relatively low doses of fertility drugs. They undergo three treatment cycles over a 12-month period and the mature oocytes of suitable quality that are obtained are equally divided between the donor and the recipient. The donor does not need to pay for the cost of oocyte retrieval and gets free storage for 5 years (Atalla, 2008). At first sight this is a win–win situation. First, women who cannot afford to pay for the oocyte cryopreservation procedure are now able to benefit from this new technology. Secondly, in areas faced with an oocyte shortage, more oocytes will become available so that more women will be able to receive donor oocytes.

However, this arrangement is not commended by everyone: ‘In the “freeze-and-share” scheme, vulnerable women as they approach their mid-30s are being encouraged to put their faith in a storage technique with as yet unproven efficacy in the hand of a clinic offering storage in exchange for eggs to donate to other women. These women may then delay childbearing, become infertile, not conceive with their own stored eggs and know that a woman or women conceived with the fresh eggs they donated some years previously’ (Parsons, 2008). This concern for the psychological ramifications for women entering into a freeze-and-share agreement have also been voiced in the context of oocyte sharing by IVF patients in order to get free or discounted treatment. As the system implies that women donate before they know whether they will eventually become mothers themselves, they should receive counselling about possible feelings of regret if it turns out that the recipients became mothers while they do not. However, in the oocyte sharing context, it has been shown that this is a concern for a minority of the women (Ahuja et al., 1998), and most patients perceive the arrangements as a win–win procedure (Blyth, 2004).

Other objections to oocyte sharing are that the donors’ consent is not free from outside pressure as their options are often limited by financial considerations (Englert, 1996), that oocyte sharing might lead to ‘a general erosion of social altruism’ and that it represents a de facto commercialization of human gametes (Johnson, 1999). Freeze-and-share programs are likely to be challenged with those same objections. All these objections can be brought back to the fact that a large percentage of oocyte sharers are indeed motivated by the benefit in kind that they receive, rather than by altruism. A recent report by the Nuffield Council on Bioethics (2011) stresses that the reward of oocyte sharing should not be perceived as payment, but as ‘the opportunity to bear a child’. Nevertheless the fact remains that the decision to enter into an oocyte-sharing scheme is often contingent upon the (lack of) financial resources of the IVF patient. A study by Pennings and Devroey (2006) shows that in Belgium, the number of oocyte sharers decreased by 70% after a system of full reimbursement for six IVF cycles was installed. This indicates that the success of oocyte sharing is to a large extent a consequence of unequal access to healthcare services, which is
ethically troubling. However, while this is a strong argument to plead for public funding of IVF, we believe it is not a strong argument to ban the practice of oocyte sharing in places where public IVF funding is not available. The fact that a number of, admittedly financially deprived, women opt for oocyte sharing, means that for them, in their particular situation, this is the best option. Taking this option away does not empower them, but limits their freedom even further.

For freeze and share, the objection that the scheme takes advantage of the precarious situation of women who desperately want IVF, is less convincing than for ‘traditional’ oocyte sharing, as there is less urgency in this case. Women who share oocytes need ART treatment and they need it now, while women who freeze-and-share oocytes are storing oocytes for possible future use. In other words, the pressure on women who want to freeze oocytes is less strong and they will be in a better position to think through all the pro’s and con’s. For these women, sharing oocytes will be less of ‘an offer they cannot refuse’ than for infertility patients. However, the peculiar position that these women are in, does require an extra effort on the level of counselling. Women who consider participating in a freeze-and-share program not only need to be informed about the practical aspects of the oocyte retrieval procedure, but also about the psychological impact of oocyte donation, the effect on their own chances of conceiving and about the limitations of oocyte cryostorage as a fertility preservation measure in general.

**Donating for research**

For all three categories of possible new sources of donor oocytes, a number of the difficulties that were outlined do not apply if oocytes are donated for research purposes. First and most importantly, as the oocytes donated to research do not result in offspring, the psychological burden is largely absent. One cannot be confronted with an unknown child in search of its genetic mother and neither does one have to wonder about who this unknown child may be and under which circumstances the child will grow up. If both this psychological barrier to donate oocytes and the physical barrier of having to undergo ovarian stimulation and oocyte retrieval do not apply (as the oocytes are already in storage), we would expect a large number of women to donate their unused oocytes to research when given the option. This expectation is reinforced by empirical data showing that donation for research is the preferred disposition option for spare embryos (Lyerly and Faden, 2007; Provoost et al., 2012), which is explained by the observation that IVF patients in general do not want their embryos (and the efforts involved in creating them) to go to waste, but at the same time have difficulties with the idea of having a genetic child growing up in a different family (Provoost et al., 2009). As a general indication, Nekkebroeck et al. (2010) report that 46.7% of women who freeze their oocytes for non-medical reasons would donate them to research if they would not need them themselves. This new source of human oocytes for research would be easily accessible for researchers and it’s use, would stir much less commotion in the general population and in regulatory bodies than the use of oocytes from donors who would have to go through hormone stimulation and oocyte pick-up for the purpose of donation. Until now, the recruitment of research donors has been very difficult and ethical concerns have been repeatedly voiced. The procedure of oocyte donation is deemed to be disproportionately burdensome in comparison to the possible scientific benefits, there are concerns about the fact that those who donate do not represent the part of society that is most likely to benefit from the research and there are concerns about informed consent (Magnus and Cho, 2005; Beeson and Lippman, 2006; George, 2007). While financial incentives to donate have been accepted in some jurisdictions, they have been outlawed by others. In the scenario where spare oocytes are donated (from either of the three sources described above), there is no longer a causal tie between the decision to donate and the hardship involved in the oocyte retrieval procedure, which renders most of the objections to research donation superfluous. Moreover, in this scenario, the chances of recruiting a sufficient number of donors without offering financial compensation are much higher than in the current situation.

Oocytes that are possibly genetically affected and therefore unsuitable for donation to IVF patients can also still be used in research and may even be especially useful for research into the development of diseases that are caused by genetic mutations. Similarly, the issue of posthumous donation is less troublesome when oocytes are used in research than when they are used in reproduction.

Finally, some of the concerns related to the freeze-and-share program would not apply if the oocytes donated under such a scheme are donated for research instead of infertility treatments. For instance, the concern regarding the psychological burden on women who remain childless in the knowledge that another woman may have a child resulting from her oocytes, would not apply. An oocyte-sharing program in which IVF patients agree to donate half of their oocytes for research in return for a 50% discount on their IVF treatments was approved in 2006 for the UK’s Newcastle University and is not considered as exploitative by the participants (Newcastle University Press Office, 2006; Haines et al., 2012). A similar program for women who want to store oocytes for future use (instead of access to IVF treatment) is probably even less controversial as these women are in a less precarious situation. Whether the costs of a ‘freeze-and-research’ scheme should be divided 50/50 as in the Newcastle University’s oocyte-sharing scheme (for IVF patients and researchers) or if the researcher should pay the full cost, as in the Bridge Centre’s freeze-and-share scheme (for social freezers and IVF patients) is debatable. However, this question may be irrelevant in practice if our hypothesis that spare oocytes will become available at no added cost for research institutes holds true, as in this case, there will be no need to rely on oocyte-sharing schemes.

On a critical note, we must concede that some researchers may not be too keen on using oocytes that have been subjected to vitrification or slow freezing, as these manipulations may constitute a confounding factor in their research data. However, this may not be an issue for all types of research.

**Conclusion**

In conclusion, as a ‘side-effect’ of the ability to freeze oocytes in a safe and effective way, we anticipate that more oocytes will become available for donation from a variety of sources. Oocytes may be frozen for routine IVF treatment, for medical or for social reasons, but as the years pass by, a portion of them will remain unused by the woman for whom they were originally stored. It is reasonable to expect that if the option is presented, many of these oocytes will be directed to
research and these new kinds of donations will put an end to most, if not all, of the practical hurdles and ethical concerns regarding oocyte donation for research purposes, even the issue of financial reimbursement. Thus, the ongoing ethical debate surrounding ‘research donation’ may finally be quelled.

Although the effect may be less prominent, there will probably also be a positive effect on the number of oocytes donated to IVF patients. While some particular scenarios require special attention, the donation of spare oocytes for third-party reproduction offers more benefits than problems. The most controversial development are the freeze-and-share arrangements, whereby women who donate oocytes to IVF patients get free storage in exchange for half of the retrieved number of oocytes for (future) autologous use. If, as a result of the donation of spare oocytes, there is a sufficient increase in donor oocytes to accommodate the present demand, these arrangements are likely to be abandoned again. Nonetheless, in countries where oocyte sharing between IVF patients is currently allowed, freeze-and-share agreements, if accompanied by careful counselling, should also be allowed.

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References


