

Thinking Twice: Cloning and In Vitro Fertilisation

By Dr Helen Watt

The Linacre Centre for Healthcare Ethics



Human cloning and in vitro fertilisation may seem very different procedures; certainly, they are regarded very differently by many people at the present time. IVF is seen as a mainstream procedure raising few ethical problems, while cloning, or 'reproductive' cloning, is widely regarded as beyond the moral pale. In this paper, I argue that the two procedures have more in common than might at first appear, although cloning does raise some new issues which need to be separately addressed. I begin with these new issues, before looking at points of similarity between IVF and cloning (1). Finally, I return to discussion of ways in which the two procedures diverge.

Genetic similarity and human identity

An objection often raised to cloning is one which does not apply to IVF, concerning the effect of genetic similarity on the way we see ourselves, and are seen by other people. The clone is not, of course, the same individual as the individual from whom he or she was cloned. Rather, cloning can be regarded as a form of asexual reproduction. Just as, in the case of natural twinning, an individual embryo can give rise to one or more new embryos (2), so an individual adult could give rise to one or more clones. An individual can produce a new individual, with a totally separate identity. The physical or, for that matter, the mental similarity of two individuals does not make them one and the same individual.

However, similarity, if carried to extremes, can have harmful effects on the individuals concerned. The case of identical twins is often cited as evidence that genetic similarity is in itself innocuous (3). It should be noted that identical twins can, in fact, experience problems in their social and personal development (Bryan 1998, pp. 813-815), particularly in those environments where others do not adequately recognize their separate identity. Such problems would be, on the face of it, more likely to occur in the case of cloning, since whereas twins are not deliberately created as identical clones would be created, at least in some cases, in order to resemble someone else. Those who have gone to such lengths as cloning to ensure similarity between two human beings have shown, by that very fact, their wish that these two human beings be very much alike.

Unlike twins, clones would (or could) be widely separated in age from the person from whom they were cloned. The difference in age, where this existed, would create problems in itself. The clone would see the person from whom he or she was cloned acquiring certain features, whether positive or negative, and would feel him or herself in tension with this pre-existing life (Holm 1998). Similarly, the person cloned would feel drawn to compare him or herself with the clone. Even if clones would never meet each other or the person cloned (4), the mere knowledge that genetic counterparts to themselves existed would be likely to give both the clones and the original a sense of incompleteness, and prevent them, at least to some degree, from concentrating on their separate lives.

Genetic similarity does not affect in any way the moral separateness of those who are similar to each other. Nonetheless, genetic difference is a powerful symbol of separate identity, which should not be deliberately abandoned. Physical differences, starting with genetic differences, visibly witness to the fact that each person is a separate individual with his or her own life to lead. This is particularly evident when we think of large numbers of clones being produced together - for example, twenty at a time. While each of the clones produced will be a separate human being with his or her own life to lead, clones are likely to be treated as interchangeable by some of those with whom they have to deal. People value less what they see as interchangeable. If (as I will argue) the symbolic content of production is inappropriate to human generation, that of mass identical production is still more inappropriate.

Natural and artificial processes

It has been suggested that cloning by embryo splitting resembles natural twinning, and may for that reason be morally preferable to cloning by nuclear transplantation (Human Genetics Advisory Commission and Human Fertilisation and Embryology Authority January 1998, paragraph 8. 7). Here as elsewhere, it needs to be remembered that nature is not a moral agent. We need a better reason to bring about a process than the fact that this process, or a similar process, naturally occurs. A judgement must be made on the kind of process - healthy or unhealthy - which we are considering, and on the social context in which this process would take place. For example, procreation, even where totally 'natural' (that is, involving no technology) must still be justified by reference to such factors as the parents' commitment to the child.

Healthy human functioning

It is insufficient to justify choosing a procedure to say that it involves, promotes, or closely imitates healthy human functioning. However, it can certainly be argued that there is more reason to question procedures which do not involve, promote, or closely imitate healthy human functioning, but instead seriously distort it. Distortions of function do occur naturally, as any doctor can testify. However, this is in itself no reason for causing them deliberately.

Cloning by embryo splitting, in which the original embryo is, or risks being, destroyed (5), reproduces what is arguably a natural dysfunction (6), not a natural function. There may be some value, at least in some cases, to the imitation of natural functions. In contrast, there is no particular value to the imitation of natural dysfunctions. It is, for example, no better to cause someone's death by causing heart failure - something which can occur naturally - than to cause his or her death by some means not found in nature.

Distortions of function which will or may cause death are still more to be avoided than distortions which will not. For this reason, embryo splitting (and nuclear transplantation using the nucleus or pronuclei (7) of a pre-existing embryo) raise more serious moral objections than nuclear transplantation from somatic cell to ovum, since the individuals produced would or might owe their lives to the death of a previous individual. However, even cloning which does not involve the death of a previous individual involves a distortion of function, which in itself would need to be defended in some way (8).

Medical treatment

It is doubtful whether cloning could be seen as a medical treatment, even when used to circumvent infertility in the donor of the nucleus. A medical treatment will normally help the patient have or exercise some function which he or she needs to have or exercise in order to be in better health (9). As functions are more and more distorted, it is less and less plausible to argue that the process which distorts them promotes the healthy functioning of the person or people involved. If cloning was used to enable an infertile man to give rise to children to whom he was genetically related no natural function would be restored - even temporarily - to the man concerned (10). To supply a nucleus to a scientist or doctor so that a clone of oneself can be produced is not to exercise a reproductive function, even if a child should result.

Welfare of the child

Leaving this point aside, what are the main ethical objections to human cloning? The most fundamental objections concern the welfare of the child created (Callahan 1997), and the nature of his or her relationships with the social parents and with others. In the first place, there is the physical well-being of the child to be considered. Even after extensive research had been performed - research which would itself raise very serious moral questions - risks to the health of the child, both long- and short-term, would be difficult to justify. This would be so even in cases where the motive for cloning was to prevent the transmission of disorders such as mitochondrial disease (11). The production of children in ways which carry risks to those children needs to be evaluated differently from high-risk treatments of existing human beings, since commissioning couples will always have the option of avoiding conception altogether. More risks can be justified in the attempt to benefit an existing individual with a serious medical condition than can be justified in the attempt to produce an individual who is only produced because a certain procedure is on offer. It should be remembered that animal clones are often abnormally

large, and have major deformities; there have also been serious health problems in the gestating mother.

Child's sense of separateness

Apart from the medical concerns raised by cloning, there are significant psychological concerns, including the effect already mentioned of genetic similarity on the clone's view of him or herself. Children - and, indeed, older human beings - need a sense of separateness from their parents and from others for their healthy psychological development. Genetic individuality, while not a condition of separateness, is nonetheless a symbol of separateness. Normal human procreation carries with it a valuable symbolic content, not only (as I will argue) at the level of sex itself, but also at that of fertilisation. The fusion of the parents' genetic contributions to form a new and distinct individual presents itself as at once a symbol of relatedness, and at the same time one of difference. The child is genetically related to both parents, but is not identical to either, just as his or her life is both a new start and owes a debt to the past (Kass 1997, p. 73).

The child is not only physically and visibly different from his or her parents, but (except in the case of identical twins) is also different from his or her siblings. The contingent nature of procreation - the unpredictability of the child's makeup, both mental and physical - also carries with it a valuable message both for the child and for the parents. Genetic novelty and unpredictability serve as a reminder of the forward-looking and flexible nature of good parenthood and healthy child development: of the way in which parents and child should live their lives with a certain novelty and freedom.

Parenthood involves, or should involve, a going 'out of oneself' towards the other: an acceptance of difference. The perennial temptation for parents is, however, to seek excessive control over their children's characteristics, and to value their children only according to how well they meet their own requirements. Cloning, it is clear, will do nothing to help parents guard against this particular temptation, as cloning will itself involve a very high degree of parental control. Even in the case of natural procreation, children will often need to struggle hard to establish a separate identity from their parents. How much more of a struggle will be needed when the child is genetically identical either to one social parent, or to someone the parent or parents want reproduced?

It is no answer to this objection to assert that there will be significant differences, due to differences in environment, between the clone and the original. The point is not that the clone will be in every way similar to the original. The point is rather that the parents will expect a high degree of similarity between the clone and the original, particularly if such an expectation is the reason why the clone has been produced (Holm 1998, p. 162).

Cloning and human lineage

Children need a sense of separateness from their parents; they also need a clear sense of lineage. The potential of cloning for the disruption of human lineage is, in fact, considerable, as it is quite unclear what relationship the clone would have to the original. Even where two people of different sexes have been used to produce a clone, he or she will have literally no genetic parents in the normal sense of the term. Instead, he or she will have a provider or providers of a nucleus and/or enucleated ovum - or indeed, in the case of embryo splitting, a precursor produced and destroyed in order to create him or her.

Cloning is asexual in a more radical sense than IVF and similar techniques, in that two people of different sexes are no longer required. Thus a single woman could have a child using only her own genetic material: surely a remarkably solitary, rootless and narcissistic form of procreation. A lesbian couple could have a child, using a nucleus from one partner and an enucleated ovum from the other (12). In either of these cases, the child would be deprived - not by accident, but by deliberate choice - of both a social and a genetic father. It is difficult to argue that a child subjected to this dual deprivation would be favourably affected in her relations with the sex which contributed neither to conception nor to postnatal care.

Other reproductive techniques

Similar objections can be raised, to some extent, to other forms of human reproduction. For example, existing techniques already make it possible for single women and lesbians to conceive and bring up children in the absence of a father. While the child conceived will have a genetic father, he or she may not know the genetic father, and is in any case deprived of the father's contribution to his or her care. Even where the child is brought up by a heterosexual couple, and thus by a social father, the child may not know his or her genetic father if he or she is the result of 'donor' sperm. In the same way, in the case of ovum donation, while the child will have a full genetic mother, he or she may not know the genetic mother. The 'donor' is excluded from social parenthood, if not from full genetic parenthood.

In evaluating cloning, we need not, and should not, accept the status quo in other areas of reproduction (13). Many of the problems cloning raises are, indeed, raised by other ways of having children. Gamete donation, in particular, can be seen as irresponsible, however well intentioned: one should not deliberately generate a child whom one will never see or help to bring up. It is disorienting for 'donor' offspring that their genetic makeup has been partially determined by a stranger with no involvement in their lives (Turner and Coyle 2000; Cordray 1999/2000) (14). It is far from clear that responsibility in procreation does not preclude the deliberate conception of children for whom one intends to take no responsibility as a parent. This objection would also apply to cloning where the person cloned was not the social parent of the child; more generally, cloning, like gamete donation, involves a distortion of family relationships.

Production of children

There are other features of cloning which are shared by existing reproductive techniques. In particular, one very basic feature is shared by IVF (among other procedures), whether or not involving donation. This is the fact that, in these procedures, the child is the outcome of an act of production: an act which bears a close resemblance to any other manufacturing process.

The symbolic content of this process has, it can be argued, a harmful effect on the way in which the 'product' is then treated. To produce a child as if he or she were an artefact, by controlling raw materials, creates a situation in which the child is liable to be treated as an artefact thereafter. In contrast, sexual procreation by those who are committed to each other and to the nurture of new lives has its own symbolic content: that of interpersonal giving and receiving. An act with this symbolic content is more appropriate to human generation, and will help the couple to respect as a person any child who may result.

The objection is not, it should be noted, to the use of technology in human reproduction. Technology which helps a couple to conceive a child by sexual means would be accepted on this theory, since it leaves intact the symbolic content inherent in sex where this constitutes mutual unconditional self-giving. The objection is rather to technology which replaces, rather than assists, this kind of sexual procreation, and substitutes for an act of giving and receiving - with all its natural, personal connotations - an act of manufacture. Just as buying a child has the wrong connotations for becoming a parent, so, too, does producing a child.

Mentality of production

What is the evidence that this kind of act is harmful to attitudes to children? In the case of IVF, there is, in fact, no doubt that the 'product' of the process is normally treated - at least in the early stages - as if it were a product in fact. In IVF, the 'producer' mentality can be seen in the way in which IVF embryos are, in practice, dealt with by parents and clinicians. These embryos are mass-produced, screened, discarded, used in experiments and so on; in short, they are treated as products or possessions under adult control. Such de facto expressions of the 'producer' mentality are sometimes confirmed by explicit statements on the part of IVF patients. For example, one study found that over 90% of IVF patients regarded the embryo as their property (Fisher 1989, p. 156) (15).

Of course, such attitudes can and do change over the course of the parent-child relationship, in the case of those offspring who are implanted and subsequently born. However, such attitudes certainly provide an extremely poor start to the parent-child relationship, and can, indeed, prevent this relationship - in the case of many IVF conceptions - from ever getting off the ground.

The embryo is the human being or organism at an early stage of life. He or she has interests (without, of course, taking an interest) in his or her possible fulfilment as an older human being. This is, of course, a view which is disputed, and one I have defended

elsewhere (16). If it is correct, however, then commitment on the part of parents to their child is no less important at the embryonic than at a later stage. Clearly, such commitment is rarely found in the context of IVF, where couples act more like owners or producers than like parents of a child. Similarly, those who literally produce the embryo - the IVF scientists - show little commitment to his or her care.

With cloning, too, those prepared to defend the procedure show by their proposed applications a 'producer' mentality towards the envisaged 'products' of cloning. To begin with, there is the proposal to produce clones for use in non-therapeutic research (a procedure euphemistically described as 'therapeutic' cloning (17). Far from being, as some maintain, the most reasonable suggestion for the use of cloning (18), this is a particularly blatant example of the 'producer' mentality. Similarly revealing is the long-term proposal to use clone embryos to generate tissue for transplant to older human beings. If the embryo is itself a human being, albeit a very young one, this is no more defensible than any other use of people for their parts.

Less grossly exploitative, but nonetheless disturbing, are proposals to 'replace' the dead by cloning. It is both dishonest and cruel to offer to 'replace' an aborted human foetus by what would be another child entirely (Rogers 1997) (19). It would be similarly dishonest and cruel to encourage the belief of those who think they can 'cheat death' by making a clone of themselves. Genetic similarity must not be confused with literal sameness of identity. Those who die will not be brought back to life by cloning. In the case of abortion, those who die can, indeed, be seen as wronged twice over in being first deprived of their lives and then used as unconsenting sources of genetic material. In this last case, there would be a danger that women who were otherwise reluctant to abort would be induced to do so by the promise or suggestion that the child could 'come back' when they were ready to be pregnant. Society would once again demonstrate its willingness to terminate existing human lives, as the same time as its willingness to go to extraordinary lengths to generate new lives if desired. The ingenuity devoted to aborting, freezing and cloning the foetuses in question would, some would say, be less perversely employed in supporting their mothers through pregnancy to term.

New issues raised by cloning

Like other techniques, including IVF, in the area of assisted conception, cloning invites those who choose it to adopt a 'producer' mentality to children. In some ways, however, cloning would constitute still more of a production-type process than existing techniques. The symbolic content of mass identical production would be still less appropriate to human generation than that of production - or even mass-production - per se. Moreover, to the 'quality control' of human embryos - which cloning would doubtless reproduce - would be added control over even non-disease features of children. Even more than in

the case of IVF, parents would be invited to accept the child conditionally, as he or she would be constructed to meet very detailed requirements on their part.

In the case of IVF, the focus of the parents is on a healthy child. After the child is born, the parents may want to 'play down' the way in which the child was conceived (20). The child will also have some opportunity of forgetting, in the course of daily life, the circumstances of his or her conception. In contrast, in the case of cloning, the focus of the parents is much more on the future: the parents want not just a child but a 10 year old, a 20 year old or a 30 year old with certain characteristics.

Visibility of cloning

It should be remembered that cloning, more than IVF (21), would be visible in the child's appearance. The child's facial features, for example, could be a daily reminder, both to the child and to the parents, of the circumstances of his or her conception. The tension between the parents' expectations and the child's wish and ability to meet these expectations may thus be felt on an ongoing basis.

If the child is a clone of someone famous - and/or one of many clones - the child may bear the signs of his or her origin plain for everyone to see: the signs of someone produced by artificial means to meet someone else's very specific expectations (22). Quite generally, genetic privacy - something we normally go to some lengths to protect (Andrews 1998) - will be unavailable in the case of clones, as their genotype will already exist.

Cloning and 'genealogical bewilderment'

Cloning would, moreover, replace not only sexual procreation but its outcome: fertilisation. IVF impoverishes parenthood - particularly where 'donors' are involved - while cloning would distort it to the point of unrecognizability. The primary role of the agent in procreation would be handed over even more completely to technicians, since prospective 'parents' would be reduced to providers of parts even smaller than a gamete.

The child's sense of confusion based on his or her all-too evident resemblance to the person cloned would be compounded by confusion with regard to his or her lineage (what some have called the 'genealogical bewilderment syndrome'). Whereas in the case of existing techniques involving donation, the child is deprived of one or both genetic parents, in the case of cloning there is not even a genetic parent, in the familiar sense, of whom he or she can be deprived.

Positive eugenics: commercial applications

Finally, there is the fact that cloning lends itself, as positive eugenics, to commercial exploitation of a most distasteful kind. I will not attempt to deal with this aspect of cloning in any kind of detail. However, it would appear that cloning 'for birth' has a

certain commercial potential (23), bearing in mind the fact that even healthy couples (or prospective single parents) would be in the market for cloning procedures. Positive eugenics is, of course, with us already - for example, in the form of sperm selection from those with high IQs. How much more attractive a proposition will positive eugenics become when the features of the child to be conceived can be more firmly guaranteed?

Conclusion

Cloning does, then, raise some new issues, in addition to those raised by existing procedures. However, it also raises more familiar issues, which should be urgently addressed. There is much we can learn from the way IVF and similar techniques are affecting our attitudes to children. There is no reason to suppose that cloning will have a less damaging effect. On the contrary, it would appear that cloning, which takes us one step further down the path of child manufacture, will be still more harmful to the way in which the child produced is treated and regarded.

Notes

1. This paper draws extensively from the Linacre Centre Submission on Human Cloning to the Human Genetics Advisory Commission and the Human Fertilisation and Embryology Authority (April 1998).
2. The number produced would depend on whether or not the original embryo was destroyed in the process of splitting. If splitting is symmetric, so that neither resulting embryo is more continuous with the original embryo than the other, then it would seem that the original embryo has ceased to exist (Watt 2000 pp. 59-60). The two resulting embryos, who are not numerically identical with each other, cannot both be identical with the original embryo. Normally when death occurs in living beings there are non-living bodily remains. However, that this is not always so can be seen from the case of chimeras, where one embryo is simply absorbed by another living embryo.
3. See, for example, Harris 1997, p. 353. More recently, Harris has argued that even if clones are in some way disadvantaged, their creation is permissible providing their lives are, on balance, worth living (Burley and Harris 1999). Such a standard for procreating children is, however, lax to a ludicrous degree: it could be met by parents who conceived a child to sell him or her into slavery. In their paper, Harris and Burley fail to distinguish between disadvantages for children which are caused by procreative choices which have an inherent tendency to distort attitudes to children, and disadvantages for which those who procreate are not in this way responsible. They also fail to distinguish between morally inappropriate natural conception, which cannot be prevented except at great cost to personal liberty, and morally inappropriate laboratory conception, which is much more readily prevented.
4. It is worth noting here that identical twins who have been separated will often deeply resent the loss of so much of their life that should have been shared with their twin (Bryan 1998, p. 813).
5. See note 2.
6. The evidence for this lies not only in the fate of the original embryo (see note 2) but in medical risks to the offspring resulting from the split. Quite generally, twins are at more risk than singletons of disability and early death; there is some evidence that identical twins are particularly at risk (Bryan 1998, p. 813; Little and Bryan 1988). Deliberate embryo splitting could itself create problems: mice resulting from the artificial splitting of embryos have been found to be weaker than other mice (Wright 1997, p. 75).
7. Here I am assuming that the embryo originates after sperm entry, but before syngamy, so that the human individual is already present at the pronuclear stage. See Watt 1999, p. 90; Watt 2000, pp. 61-62.
8. The fact that some procedure involves a distortion of function seems intuitively to be at least a *prima facie* reason against it. Tube-feeding, for example, is an acceptable response to the needs of those who cannot take food normally. It does not seem so easy to defend in the case of healthy adults on a diet.

9. There are, however, cases where the point of medical treatment seems to be the prevention of some form of dysfunction, without in any way promoting a function which is damaged or absent. We might think of the case of sedating a terminal patient whose pain cannot be otherwise controlled. The only function promoted here is sleep, while the aim is to prevent the psychophysical malfunctioning involved in serious pain.

10. A similar point can be made about the use of 'donor' gametes in human reproduction. Ovum donation, for example, does not treat an infertile woman in the sense of giving her the power she lacks to conceive her own genetic child. Rather, it simply makes it possible for her to use a power - the power to gestate a child - which she already has. However, being pregnant is not required for health, though having the power to conceive and bear children is required for health or perfect health in a woman of childbearing age.

11. Cloning would not, however, be the only possible means of having children while avoiding the transmission of mitochondrial disease. For one alternative proposal, see Rubenstein, Thomasma, Schon and Zinaman 1995. For a critique of this proposal, see Watt 1999.

12. One survey on attitudes to cloning found that lesbian women consulted were opposed to cloning as a way of having children. As one woman commented 'I think this is far more dangerous than anything else that we have talked about because it totally excludes the male at any stage of growing a new child.' (Wellcome Trust 1998, p. 16)

13. For a typically sanguine view of current social practices, which are then used to justify cloning, see Harris 1997; Edwards and Beard 1998, pp. 806-807

14. See also McWhinnie 2000(a); 2000(b); 1998; Rushbrooke 1999. Rushbrooke argues for the use of the term 'Remote Parent Conception (RPC)' in place of 'sperm donation' and 'egg donation'. To use the term 'donation' implies that only sperm and eggs are involved, that donating sperm and eggs is no different from donating blood, and that the identity of the 'donor' is of no particular importance.

15. The same study found that 82% of patients - well above the national average - supported research on 'spare' embryos to obtain information to help produce normal pregnancies, and that only a quarter opposed the growth of 'spare' embryos in the laboratory to obtain material which might have medical uses. Some research has found that parents of born IVF children tend to see the embryo as a child or potential child (McWhinnie 1996, p. 363). This makes such parents' consent to the destruction of their embryos in some ways more disturbing. For a description by one IVF parent of her feelings with regard to the fate of her embryos, see Hogben 1998.

16. See Watt 2000, pp. 57-65; Watt 1999; Watt 1996.

17. Similarly misleading is the use of the term 'reproductive' to describe only cloning for birth, as opposed to cloning for research. If the embryo is a human organism, as even pro-cloning bodies have conceded (Human Genetics Advisory Commission and Human Fertilisation and Embryology Authority December 1998, p. 48), there is human reproduction whenever an embryo is created.

18. The production of clones for research is not morally preferable to cloning for birth. It is surely worse to be killed as an embryo, and thus deprived of one's entire future, than to grow up with identity problems, even if these are severe.

19. Cryogenic Solutions Incorporated offered to freeze aborted fetuses so that those having abortions could later (in the words of a CSI spokesperson) 're-establish' the pregnancy.

20. I am assuming here that the child knows that he or she was conceived through IVF. Secrecy about IVF and similar procedures - particularly those involving 'donor' gametes - carries problems of its own. See Turner and Coyle 2000; Cordray 1999/2000; McWhinnie 2000(a); 2000(b); 1998; 1996; Blyth 2000; 1998.

21. Where 'donor' gametes are used in IVF, or in other procedures, this is visible to some degree where children look different from their non-genetic parents.

22. Human clones may also be recognizable by an abnormally large navel: a feature seen in animal clones.

23. 'Spare part' cloning has also been thought to have commercial potential, though this seems increasingly doubtful (see Aldous 2001). For news on developments in adult stem cell research, which is further advanced than embryonic stem cell research, see the website of Do No Harm: The Coalition of Americans for Research Ethics at www.stemcellresearch.org.

References

Aldous, Peter. 2001. Can they rebuild us? *Nature* 410:622-625.

Andrews, Lori B. 1998. Mom, Dad, Clone: Implications for Reproductive Privacy. *Cambridge Quarterly of Healthcare Ethics* 7: 176-186.

Blyth, Eric. 1998. Donor assisted conception and donor offspring rights to genetic origins information. *International Journal of Children's Rights* 6: 237-253.

Blyth, Eric. 2000. Sharing Genetic Origins Information in Third Party Assisted Conception: A Case for Victorian Family Values? *Children & Society* 14: 11-22.

Bryan, Elizabeth M. 1998. A spare or an individual? Cloning and the implications of monozygotic twinning. *Human Reproduction Update* 4: 812-815.

Burley, Justine, and Harris, John. 1999. Human cloning and child welfare. *Journal of Medical Ethics* 25: 108-113.

Callahan, Daniel. 1997. Cloning: The Work Not Done. *Hastings Center Report* 27: 18-20.

Cordray, A. W. 1999/2000. A survey of people conceived through donor insemination. *DI Network News* 14: 4-5.

Edwards, R. G. , and Beard, Helen K. 1998. How identical would cloned children be? An understanding essential to the debate. *Human Reproduction Update* 4: 806-807.

Fisher, Anthony. 1989. *IVF: The Critical Issues*. Melbourne: Collins Dove.

Harris, John. 1997. 'Goodbye Dolly?' The ethics of human cloning. *Journal of Medical Ethics* 23: 353-360.

Hogben, Marilyn. 1998. What Size Is an Embryo's Soul? *Human Life Review* 24: 88-93. Originally published in the *Monash Bioethics Review* (April 1998) as 'Frozen embryos - A view from my journals'.

Holm, Soren. 1998. A Life in the Shadow: One Reason Why We Should Not Clone Humans. *Cambridge Quarterly of Healthcare Ethics* 7: 160-162.

Human Genetics Advisory Commission and Human Fertilisation and Embryology Authority. January 1998. *Cloning Issues in Reproduction, Science and Medicine* (Consultation document).

Human Genetics Advisory Commission and Human Fertilisation and Embryology Authority. December 1998. *Cloning Issues in Reproduction, Science and Medicine* (Report).

Kass, Leon. 1997. The Wisdom of Repugnance. *The New Republic*, June 2, reprinted in *Human Life Review* 1997; 23: 63-88.

Little, Julian, and Bryan, Elizabeth M. 1988. Congenital Abnormalities. In *Twinning and Twins*, ed. Ian MacGillivray, Doris M. Campbell, and Barbara Thompson, pp. 207-240. Chichester: John Wiley.

McWhinnie, Alexina. 1996. Outcome for Families Created by Assisted Conception Programmes. *Journal of Assisted Reproduction and Genetics* 13: 363-365.

McWhinnie, Alexina. 1998. Ethical Dilemmas in the Use of Donor Gametes. *Medicine and Law* 17: 311-317.

McWhinnie, Alexina. 2000 a). Children From Assisted Reproductive Technology: The Psychological Issues and Ethical Dilemmas. *Child Development and Care* 163: 13-23.

McWhinnie, Alexina. 2000 (b). Families from assisted conception: ethical and psychological issues. *Human Fertility* 3: 13-19.

Rogers, Lois. 1997. Aborted fetuses saved for cloning. *The Sunday Times*, December 14.

Rubenstein, Donald S. , Thomasma, David C. , Schon, Eric A. , and Zinaman, Michael J. 1995. Germ-line Therapy to Cure Mitochondrial Disease: Protocol and Ethics of In Vitro Ovum Nuclear Transplantation. *Cambridge Quarterly of Healthcare Ethics* 4: 316-339.

Rushbrooke, Rupert. 1999. Towards an Open Fertility Industry. *Journal of Fertility Counselling* 6: 29-31.

Turner, A. J. , and Coyle, A. 2000. What does it mean to be a donor offspring? The identity experiences of adults conceived by donor insemination and the implications for counselling and therapy. *Human Reproduction* 15: 2041-2051.

Watt, Helen. 1996. Potential and the early human. *Journal of Medical Ethics* 22: 222-226.

Watt, Helen. 1999. Germ-line therapy for mitochondrial disease: some ethical objections. *Cambridge Quarterly of Healthcare Ethics* 8: 88-96.

Watt, Helen. 2000. *Life and Death in Healthcare Ethics: A short introduction*. London: Routledge.

Wellcome Trust. 1998. *Public Perspectives on Human Cloning: A Social Research Study*. London: The Wellcome Trust.

Wright, Lawrence. 1997. *Twins: Genes, Environment and the Mystery of Human Identity*. London: Weidenfeld & Nicolson.

[Reprinted with permission from Ethics and Medicine Vol. 18, Issue 2, Summer 2002],

Helen Watt is the Director of the Linacre Centre for Healthcare Ethics (now called The Anscombe Bioethics Centre). It is a Catholic academic institute that engages with the moral questions arising in clinical practice and biomedical research.