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Human Cloning and the Family in the New Millennium

Kerry Lynn Macintosh

Imagine the following scenario: A woman lies on a table in a hospital, attempting to give birth to her first child. Her doctor urges her to push. She does, with all her might. Suddenly a baby boy slips out of the birth canal and into the waiting hands of her husband.

The birth of a first-born son is a common event, one that is celebrated the world over. But this newborn baby is anything but ordinary. He is a human clone.

How did this birth come about? The woman's husband had dysfunctional sperm. Efforts to conceive a child through sexual intercourse and in vitro fertilisation failed, so the couple decided to try human cloning. A doctor retrieved eggs from the woman and removed the nuclei. Then, he fused to each egg a somatic cell of the husband, such as a skin or muscle cell. A few of these reconstructed eggs developed into embryos. The doctor placed one embryo in the woman, who became pregnant and delivered a baby who shared the nuclear DNA of her husband.

This scenario is science fiction today but could become reality in the near future. Therefore, this chapter will explore the practical and ideological consequences when human cloning is used to have children.

Scientific research over the past fifteen years has greatly improved cloning technology. Further advances may make it possible for humans to reproduce through cloning in the near future

The first mammal to be cloned was a sheep named Dolly. Her creator, Ian Wilmut, started with mammary tissue harvested from a Finn Dorset sheep. He extracted cells from the tissue and coaxed them into a quiescent state. Each one of these cells carried within it the nuclear DNA of the tissue donor. Working with enucleated eggs of Scottish Blackface sheep (a different breed), Wilmut used electricity to merge one cell into each egg. In this manner he created twenty-nine embryos that bore the nuclear DNA of the original Finn

Dorset sheep. He transferred these embryos into thirteen surrogate sheep. One Scottish Blackface sheep became pregnant and delivered Dolly: a Finn Dorset lamb. In terms of lambs born per embryos transferred, this initial experiment achieved a birth rate of approximately 3 per cent (Wilmut *et al.* 1997: 811).

Since 1997, when Wilmut first introduced Dolly to an astonished world, scientists have improved the efficiency of animal cloning. For example, birth rates for cloned cattle can now reach as high as 20 per cent (Niemann *et al.* 2008: 153). For cloned mice, birth rates can run as high as 13 or 14 per cent, depending on the genotype of the donor mouse and the type of cell used for the cloning (Inoue *et al.* 2009: 567; Inoue *et al.* 2010: 498).

To be sure, some animal clones miscarry or die shortly after birth (National Academies 2002: 40). Placental abnormalities are believed to account for many of these losses (Cibelli *et al.* 2002). However, most animal clones that survive the neonatal period exhibit normal patterns of growth and development and appear to be healthy (Center for Veterinary Medicine 2008: 156–68, 176–81, 328–29; Cibelli *et al.* 2002; Inoue *et al.* 2002).

In short, though animal cloning is not yet perfected, recent data indicate that birth rates are increasing and healthy offspring are common. Researchers who experiment on animals may eventually improve the technology to the point where it becomes efficient and safe.

Meanwhile, other scientists are working to create embryonic stem cells from cloned human embryos. If they can learn how to create stem cell lines from the DNA of individuals with specific diseases, medical researchers can study the cells and test potential drugs on them in the laboratory. One day, scientists may even use cloned stem cells to create DNA-matched tissues or organs for patients who need them (President's Council on Bioethics 2002: 130–33). Towards such ends, researchers have already cloned human blastocysts, that is, human embryos several days old and containing hundreds of cells (French *et al.* 2008). This is a significant milestone, because in human reproduction, embryos ordinarily implant in the womb after reaching the blastocyst stage of development. Once medical researchers learn how to create healthy cloned blastocysts, and share that information with the world, it will be a relatively simple matter for a fertility doctor to read that information, create blastocysts, and transfer them to the womb of a patient.

**Human cloning cannot create duplicate human beings.
The most likely practical use of the technology is
to help people have children**

However, in order for human cloning to become commonplace, more than technical proficiency is required. There must be a market. The need for a

market raises the question: why would anyone want to conceive a child through cloning technology?

People who assign too much power to genes sometimes imagine that cloning is a method of copying existing persons with desirable characteristics, such as great thinkers or star athletes. Others suppose the technology can be used to resurrect dictators or recreate lost loved ones (Macintosh 2005: 26–27). Nothing could be farther from the truth.

Consider the results of experiments in cloning animals. Animal clones are born as infants of their species, and not as full-grown adult copies. Indeed, clones frequently exhibit coat patterns, sizes, weights, and behaviours that differ from those of their DNA donors; moreover, if multiple animals are cloned simultaneously from the same DNA, the clones differ from each other (Archer *et al.* 2003; Center for Veterinary Medicine 2008: 495; Galli *et al.* 2003; Shin *et al.* 2002; Wells *et al.* 1999: 1003). The biological reasons for these variations are too complex to explore in detail in this brief chapter. However, one point deserves special mention: even when two animals have the same DNA, variations in the environmental factors that each animal experiences during gestation and after birth lead to differences in gene expression and phenotype (Macintosh 2005: 24–25).

Human clones, like animal clones, must be born as babies. And like animal clones, human clones are bound to differ from their DNA donors in gene expression and phenotype for biological reasons. However, humans are more intellectually complex than animals, so it is important to also consider the non-biological impacts that differing environments will have. A human clone born in the new millennium will be raised in a different family, era, and culture than his or her genetic progenitor, leading to differences in acquired traits such as personality, values and tastes (*Ibid.*: 25).

These realities render human cloning useless to dictators who wish to maintain a perpetual reign through their clones, or politicians who want to clone a master race. More poignant goals, such as the resurrection of a child who died too young, are also impossible to achieve. All cloning can do is create a new baby with a unique phenotype and personality.

Why, then, would anyone want to use human cloning? The value of the technology lies in this fact: cloning is a method of *asexual* reproduction. A person who cannot reproduce sexually can nevertheless transmit his or her DNA to the next generation via cloning.

For example, consider a man who lacks sperm, or a woman whose eggs are aged or otherwise dysfunctional. Such individuals are incapable of transmitting genes to the next generation through sexual intercourse or in vitro fertilisation. In order to have children to raise, they must resort to donor gametes or adoption. In the future, however, they may turn to cloning as a means of conceiving the genetic offspring they desire (Eibert 2002: 1101–02).

Gay or lesbian couples might also benefit from cloning. Though not infertile, these couples can produce offspring through sexual reproduction

only in cooperation with egg or sperm donors from outside their marriages or partnerships. Cloning offers them the opportunity to conceive a child who bears the DNA of one partner, rather than one partner plus one outsider (Macintosh 2005: 37). In the case of a lesbian couple, one woman could provide eggs and a womb and the other the DNA for the cloning. In the case of a gay couple, one of the two men could contribute the DNA for the cloning¹.

Finally, cloning could take some of the pressure off of single women whose biological clocks are ticking. Today, they are becoming single mothers by choice, procreating with sperm donors to beat the clock and hoping to find a suitable marriage partner later on (see Graham in this volume). But this strategy has a drawback: some romantic partners will not be enthusiastic about marrying into a family that already has a child. Cloning would free single women to take their time in finding a partner and building a healthy relationship, secure in the knowledge that they can reproduce asexually if medically necessary (Silver 2002: 1041).

In sum, cloning is a more egalitarian method of reproduction. What you need to conceive genetic offspring is DNA. Everyone has that, even those who are infertile, gay or lesbian, or destined to marry later in life. Moreover, cloning allows such individuals to bypass some tricky issues associated with collaborative reproduction. If a child is not conceived with donated sperm or eggs, parents need not agonize over whether to disclose the fact of donation to their child. Nor need parents construct elaborate narratives that portray the donor as unimportant and themselves as ‘real’ parents in an effort to reinforce family bonds and safeguard themselves against rejection (see Gurnham in this volume).

Unfortunately, the fertile majority has been slow to recognise the potential benefits of human cloning. Indeed, just the reverse: human cloning is a science that has drawn tremendous legislative fire. Around the world, many nations have enacted laws to prohibit human cloning (Kunich 2003: 63–83). For example, the United Kingdom first criminalized reproductive cloning ten years ago, through enactment of the Human Reproductive Cloning Act 2001 (*Ibid.*: 67). Parliament has since eliminated the need for a specific act on cloning by amending the Human Fertilisation and Embryology Act (HFEA). The HFEA provides that no person is allowed to transfer an embryo to a woman unless the embryo is ‘permitted’. To qualify as ‘permitted’, an embryo must be created through fertilisation of ‘permitted’ eggs by ‘permitted’ sperm – i.e. eggs and sperm that have been produced by or extracted from ovaries and testes and that have not been altered in nuclear or mitochondrial DNA (Human Fertilisation and Embryology Act 1990, as amended, sections 3(2), 3ZA). These provisions preclude human cloning for two reasons: cloning uses eggs that have been altered through the removal of their nuclear DNA; and cloning creates embryos by means other than fertilisation.

In the United States, the legal landscape is more complicated. Due to disagreements over the morality of stem cell research involving cloned embryos,

the United States Congress has been unable to enact a federal law on human cloning. Instead, a growing number of American states have enacted laws that prohibit reproductive cloning and prescribe stiff prison sentences for violators (Macintosh 2005: 75–80, 85–88).

However, even the most draconian anti-cloning laws will not put a stop to human cloning. Individuals who live in countries with restrictive laws already travel across borders to access assisted reproductive technologies. Tomorrow those who wish to reproduce asexually will travel abroad to locations where cloning is legal and come home pregnant (Macintosh 2005: 118). Chances are that their use of cloning will not be detected, as many children resemble one parent or the other.

Claims that cloning will create dysfunctional families are speculative and based on scientific fallacies

Despite the futility of attempting to control the human drive to reproduce, critics have insisted that human cloning must be banned. Their objections to the technology are multitudinous and range from the secular (for example, cloning is bad because it might lead to eugenic programs) to religious (for example, humans should not play God). I have debunked these objections at length elsewhere (Macintosh 2005). Here I will concentrate on concerns that are relevant to the family.

Critics claim that prospective parents will select DNA with an eye towards creating a child with desirable traits. For example, if the person who donated DNA for the cloning procedure was a brilliant physicist, the parents will hold unreasonable expectations that their child will also become a brilliant physicist. Failure to respect the child's individuality and right to forge his own path will generate familial conflict (National Bioethics Advisory Commission 1997: 69–70; President's Council on Bioethics 2002: 103).

Critics also claim there will be conflict and confusion when a child is cloned from a prospective parent. For example, suppose a husband and wife agree to clone a daughter from the DNA of the wife. Later on, if there is marital discord, the husband may project his resentment of the wife onto the daughter and treat her poorly. Conversely, if the husband and wife have a positive relationship, the husband may fall in love with the daughter who is the mirror image of his wife (President's Council on Bioethics 2002: 111).

Claims such as these implicitly assume that parents will perceive cloning as a copying process. I have two points in response. First, experiments have established the individuality and uniqueness of animal clones. Human clones will likewise be individual and unique. They will have their own looks, intellects, talents, personalities, and dreams. Parents will have no scientific basis for holding unreasonable expectations or projecting feelings for others onto a cloned child.

Second, even if many parents are ignorant of the scientific realities of human cloning, it is not necessary to prohibit the technology, for a less restrictive solution is readily available. The government could require education and counselling for prospective parents to ensure they are prepared to embrace the individuality and uniqueness of their child.

**Children conceived through cloning will be
psychologically healthy and the families to which
they belong will function well**

Once speculative harms are set aside, it becomes possible to draw a predictive analogy. For decades, infertile men and women, gays and lesbians, and single women have conceived children with the aid of assisted reproductive technologies such as in vitro fertilisation, intracytoplasmic sperm injection, donor insemination, and egg donation. These individuals will use human cloning for the same purpose (having children) and for the same reason (inability to procreate through sexual intercourse within a partnership). Given these similar parental characteristics and motivations, the experiences of families formed through assisted reproduction offer a reasonable forecast of what families formed through human cloning can expect.

Compared with those who are spontaneously conceived, children conceived through in vitro fertilisation, donor insemination, and egg donation do not show an increased risk of psychological problems (Shelton *et al.* 2009: 386, 390). Rather, children conceived with the aid of assisted reproductive technologies are well-adjusted (Barnes *et al.* 2004: 1486; Golombok *et al.* 2002: 837; Murray, MacCallum and Golombok 2006: 617) and remain so as adolescents and young adults (Wagenaar *et al.* 2009: 1912; Wilson *et al.* 2011: 1217). Their parents are also psychologically healthy and enjoy good relationships with them (Barnes *et al.* 2004: 1485–86; Golombok *et al.* 2002: 837–38; Murray *et al.* 2006: 616–17).

These positive outcomes are not surprising. Assisted reproductive technologies involve expense, effort, and even some physical pain. No one uses these technologies unless he or she is extraordinarily committed to the twin goals of conceiving and parenting a child. Indeed, some research indicates that families formed through assisted reproduction function *better* than families formed through sexual intercourse or adoption (Barnes *et al.* 2004: 1485–86; Golombok *et al.* 2002: 838).

To be sure, a child conceived through cloning will share nuclear DNA with only one of his parents. The same is true of children conceived with the aid of donor sperm or eggs, who have a genetic link to one of their parents and not the other. Yet, children and families created through donor gametes appear

to function as well as children and families created through standard in vitro fertilisation, indicating that a genetic link to both parents is not required in order for children and families to flourish (Golombok *et al.* 2002: 837; Murray *et al.* 2006: 616; Shelton *et al.* 2009: 390).

Challenges to the happiness of children conceived through cloning are more likely to come from outside the family. Peers, teachers, employers, and others who are ignorant of basic scientific principles may assume the children are copies until they get to know them as individuals. But the risk that the members of a minority group might suffer from prejudice is not an ethical basis for banning their existence (Pence 1997: 46). Indeed, anti-cloning legislation can only make a bad situation worse, since it stigmatizes cloned children as unworthy of existence (Macintosh 2005: 121).

The legal relation of human clones to their parents can be clarified through appropriate legislation

Critics also raise practical concerns about families created through human cloning. They worry that the social relationships and legal status of persons within the family unit will be unclear (National Bioethics Advisory Commission 1997: 70; President's Council on Bioethics 2002: 110; Harris 2004: 77–83). To illustrate the point, consider once again the hypothetical scenario from the start of this chapter. There, a couple created a cloned embryo from the eggs of the woman and DNA of the man. The woman gestated the embryo and gave birth to a baby boy. Is the man the father of the child, or is he the brother of the child? And is the woman the mother of the child?

This conundrum exists because cloning makes asexual reproduction possible without eliminating the prevailing paradigm of sexual reproduction. If one sticks with the sexual reproduction paradigm, it appears that the persons who last reproduced were the *parents* of the man, meaning that the child is his twin brother. But if one adopts an asexual reproduction paradigm, the man passed his genes to the next generation and is the child's genetic father.

How, then, should one choose between these two competing paradigms? I submit that a functional approach is most practical. In the scenario, the man is infertile. He and his wife turned to cloning because sexual reproduction was not possible for him. Their intention is to raise the boy as their son. Therefore, the boy will experience them as parents, and they will experience him as a son. The asexual reproduction paradigm better describes the situation, and the law should acknowledge the child as the son of the couple. This solution has an added benefit: it is consistent with the biological motherhood of the woman, who gestated the child.

By contrast, a sexual reproduction paradigm does not fit the facts. Siblings ordinarily grow up together in the same household with the parents who made

the decision to conceive them. The hypothetical scenario is different: the man, who has already reached maturity, is the one deciding to conceive the child. His wife gestated the child, and he and she will be the ones to raise the child. Functionally, the child is a son, and it makes no sense to treat him as a younger brother of the man.

Assuming the asexual reproduction paradigm best describes the social circumstances of the hypothetical family, the next question is whether the law of parentage is adequate. At first glance, one might think not. After all, existing statutes were written to deal with the parentage of children conceived through sexual reproduction. Upon closer inspection, however, it appears that some statutes and common law principles may attribute parentage correctly in cases of asexual reproduction (at least in the United States and United Kingdom).

In the United States, eighteen states substantially adopted the Uniform Parentage Act (UPA) in its original 1973 form (West Group 2001: 377). The National Conference of Commissioners on Uniform State Laws issued a revised text of the UPA in 2000 and amended it in 2002. Nine states (including six that had previously adopted the 1973 version) have substantially adopted the revised UPA (Thomson Reuters 2010: 4). All in all, twenty-one states have some version of the UPA.

In its 2002 incarnation, the UPA added provisions addressing the parentage of children born through assisted reproduction. These provisions probably would not apply to children conceived through cloning, since cloning is not included within the definition of assisted reproduction (*Ibid*, UPA section 102(4) at 12). However, the UPA also includes general provisions that may be broad enough to establish parentage for many heterosexual couples who clone.

Consider the hypothetical scenario. Under the original and revised UPA, when a child is born to a woman, she is the mother of that child (West Group 2001: UPA section 3(1) at 391; Thomson Reuters 2010: UPA section 201(a)(1) at 21). Therefore, since the woman in the scenario gave birth to the baby boy, she is considered the mother of that child. Further, under the UPA, her husband is presumed to be the father of the child. (West Group 2001: UPA section 4(a)(1) at 393; Thomson Reuters 2010: UPA section 204(a)(1) at 23). Unless that presumption is rebutted, a father-child relationship will be established (Thomson Reuters 2010: UPA section 201(b)(1) at 21).

The outcome is similar even if the facts are altered to make the woman the infertile one. If she conceives a daughter using her own DNA, so long as she gives birth to the daughter, she is the mother and her husband is still presumed to be the father of the daughter. Thus, when a man and woman who are married to each other utilize human cloning to overcome infertility the UPA assigns parentage to them (Price 2010: 145–46).

In the United Kingdom, cloned embryos are not ‘permitted’ embryos that may legally be transferred to a woman. Therefore, the parentage rules for children of assisted reproduction contained in the Human Fertilisation and

Embryology Act (HFEA) do not apply. Nevertheless, common law principles may still accommodate human cloning to some extent. For example, suppose the man and woman from the hypothetical scenario travelled abroad to obtain cloning services and returned home to the U.K., where their son was born. Under the common law, it appears that the woman is the mother of the boy because she gave birth to the child. The man is presumed to be the father because he is married to the mother (Cretney *et al.* 2002: 523–24). If the child is the clone of the woman, rather than the man, the presumptions as to legal parentage of the child are the same (*Ibid.*).

Granted, some courts may balk at applying existing statutes or common law principles to a technology as novel and controversial as human cloning. Moreover, existing law may not protect all families formed through cloning. For example, the UPA fails to address the parentage of gay and lesbian couples who have children through assisted reproductive technologies, let alone through cloning (Byrn 2007: 171). However, the very fact that lawmakers in the United States and United Kingdom have begun to address the parentage of children born through assisted reproduction shows that laws can be amended to deal with new technologies and families. Should the parentage of children born through cloning require further clarification, legislators have the power to act.

Human cloning undermines social and religious dogmas that are based on the naturalness of sexual reproduction

If cloning does not pose a serious threat to the family, and if parentage laws are readily amended, why has society reacted so negatively to the prospect that infertile, gay or lesbian, or single individuals might use cloning to have children?

Until the advent of cloning, sexual reproduction was the norm for mammalian species, including human beings. Throughout human history, men had sexual intercourse with women and children were born as a result. This history makes sexual reproduction appear to be the natural means of procreating for our species.

Many social and religious beliefs have been based on this biological foundation. For example, secular opponents of gay marriage appeal to the biology of sexual reproduction to justify their position. They argue that marriage is for heterosexuals because only one man and one woman can join their bodies through sex and procreate together (Girgis *et al.* 2011: 253–57).

Similar reasoning is evident in Roman Catholic teachings on assisted reproduction and cloning. In 2008, the Congregation for the Doctrine of the Faith released an instruction addressing bioethical issues. According to the Congregation, procreation must occur in the context of marriage, where

a man and woman give of themselves (through sexual intercourse) to create new life in cooperation with God (Congregation for the Doctrine of the Faith 2008: paragraph 6). The Congregation asserts that this principle is rooted in the laws of nature (*Ibid.*). The Congregation rejects as unethical reproductive technologies that substitute for sexual intercourse between husband and wife. Thus, it disapproves of in vitro fertilisation, intracytoplasmic sperm injection, and the use of sperm or eggs donated by third parties outside the marriage (*Ibid.* paragraphs 12, 14, 16, 17).

The Congregation reserves special condemnation for human cloning. Some of its objections echo the fallacies discussed earlier in this chapter. For example, the Congregation claims that cloning forces a specific genetic identity on a person, thereby condemning him to ‘biological slavery’ (*Ibid.* paragraph 29). There is no scientific basis for this claim. As animal experiments in cloning have demonstrated, genes are not destiny. This is fortunate; otherwise, we all would be biological slaves from the moment we were conceived.

However, the Congregation’s opposition to human cloning has deeper roots. As it notes, cloning is not only unconnected to sexual intercourse between marriage partners, but also has no link to sexuality (*Ibid.* paragraph 28). In other words, the problem with cloning is that it is a form of *asexual* reproduction; as such, it runs counter to natural law as perceived by the Roman Catholic Church.

Thus, human cloning inspires opposition in part because it contravenes social and religious dogmas. Those who might procreate through cloning are incipient rule-breakers. Anti-cloning laws are necessary to deter and punish such violations.

But there is a deeper reason for opposition to human cloning. Through the forbidden fruit of cloning, humanity has acquired new knowledge: mammalian reproduction can be asexual rather than sexual. This knowledge is threatening to the existing order because it challenges dogmas premised on the naturalness of sexual reproduction at their core. Traditionalists may hope that legal bans will suppress not only cloning but also this dangerous knowledge. However, efforts to hide scientific facts rarely succeed. Legal or not, cloning invites us to reexamine social and religious dogmas. It is a force that may contribute to greater acceptance of diverse families of all kinds.

Human cloning will not harm nuclear families but will challenge the nuclear family ideal

As discussed in this book, a nuclear family consists of one man and woman, typically married, who conceive children through sexual intercourse. In discussing human cloning, it is important to consider the technology’s impact on nuclear families as such, before considering its impact on the nuclear family as paradigm or sanctioned ideal.

To begin, many families created through human cloning will come quite close to the paradigmatic nuclear family in both their structure and intention. For example, consider the hypothetical scenario that appears at the beginning of this chapter. There, the family consists of one man, married to one woman, with a cloned son. The child bears the DNA of only one parent, rather than the standard two. However, by using cloning, the man and woman avoided the need to incorporate the DNA of a sperm donor into their family. Cloning allowed them to approximate the nuclear family despite the man's medical disability.

Other families created through human cloning will deviate more strongly from the nuclear family ideal. Gay and lesbian couples may find that cloning is an attractive means of conceiving genetic offspring while excluding the DNA of gamete donors. Unlike the standard nuclear family, these families will be headed by two men or two women. Similarly, single women may sometimes procreate through cloning even though they never do find a romantic partner who is willing and able to play the social role of father.

Still, relatively few people will have the resources and motivation to utilize human cloning for reproductive purposes. Sexual intercourse between men and women, which is fun and free, will continue to be a far more popular option, resulting in the procreation of countless children within nuclear families. For billions of people around the world, the nuclear family will continue to serve in the new millennium as the foundation for interpersonal relationships, child-rearing, and economic survival. Thus, human cloning does not threaten nuclear families as such.

Rather, what human cloning has done is challenge the nuclear family *as ideal*. By revealing that humans may be able to procreate asexually, cloning has undermined the argument that the nuclear family is and should be privileged for biological reasons.

Those who oppose human cloning can rattle their swords and threaten prosecution of anyone who dares to conceive a child in an unsanctioned manner. Ultimately, however, anti-cloning laws will prove impotent for two reasons. First, for all its power and majesty, even the law cannot turn back the hands of time and return us to a biologically simpler era in which sexual reproduction was the only option. Second, prospective parents will find ways of circumventing anti-cloning laws, such as travelling offshore to conceive their children. The more happy and healthy children are born through cloning, the more obvious it will become that the nuclear family ideal can no longer dominate the concept of family in the new millennium.

Note

- 1 In order to conceive a child through cloning, a gay couple would still need the assistance of an egg donor and gestational surrogate. The egg donor would pass a tiny amount of DNA to the child via the mitochondria in her egg. However, neither the donor nor the surrogate would pass nuclear DNA to the child.

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