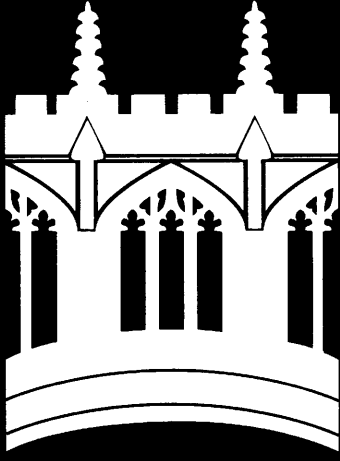


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Cloning humans – distorting the image of God?

by Denis R. Alexander

But do you whisper to yourself a secret confession? Wouldn't you love to be cloned? I've never admitted it before, but I think I would. This has nothing to do with vanity.....It is pure curiosity.

Prof. Richard Dawkins

Summary

This paper addresses the theological, relational and risk issues surrounding the proposal that individuals should create genetically identical copies of themselves, a procedure known as reproductive cloning. It is argued that cloning runs counter to the biblical teaching that humankind is made in the image of God. Cloning would divorce procreation from loving sexual union and generate a disturbing discontinuity in sibling and parental relationships, thereby undermining family and social structures.

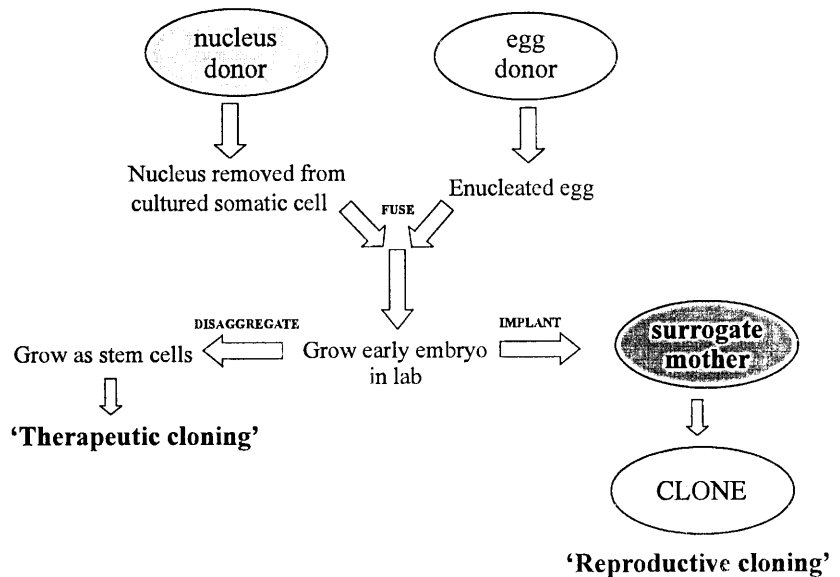
Introduction

Dolly the sheep, the first mammal to be cloned from an adult cell, created a furor when her birth was announced in 1997. Within months of the news breaking, 2.5 billion people worldwide had been exposed to the story. It is now likely that human cloning will be attempted soon somewhere in the world and Christians should be giving careful thought to the theological and social implications of such a development.

The cloning debate is marked by semantic confusion due to the many nuances of the word. Cloning can mean, for example:

- Making identical copies of a particular stretch of DNA using molecular biology.
- Generating a group of genetically identical cells from a single parental cell by cell division.
- Creating a group of genetically identical individuals descended from the same parent by asexual reproduction (as occurs in many plants).

Further confusion has been generated by the terms 'therapeutic cloning' and 'reproductive cloning' (see back page for definitions of technical terms). The key differences between these procedures are illustrated below:



volume 10

number 2

june 2001

ISSN 1361-7710

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The aim of 'therapeutic cloning' is to use cultured stem cells from very early embryos for medical therapies e.g. in people who have damaged tissues. Cells derived from genetically different donors risk being rejected by the patient's immune system. To avoid this problem a somatic cell nucleus from the patient could be used to fertilise *in vitro* an enucleated donor egg ('nuclear transfer'). Stem cell cultures would be derived from the early embryo, genetically identical to the patient's cells and so protected from rejection. The main ethical issue surrounds the use of early human embryos.¹ Important as it is, this particular application of nuclear transfer is not the subject of this paper.

1 Organisations such as the *Christian Medical Fellowship* run web sites presenting various viewpoints (www.cmf.org.uk) e.g. 'Therapeutic cloning and stem cells' CMF Files No. 12. Useful papers by the Human Genetics Advisory Commission are at www.dti.gov.uk/hgac/papers/. See also *Nature* 410: 622-625, 2001.

Instead this paper addresses 'reproductive cloning' which is a quite different application of nuclear transfer. Human clones could be generated in the same way as Dolly by using the nucleus from a somatic cell of a male or female to fertilise an enucleated donor egg *in vitro* followed by the implantation of the embryo in a surrogate mother (who may or may not be the nucleus-donor). The child born would then be a clone of the donor of the cell nucleus, genetically identical except for mitochondrial DNA. If the procedure was repeated several times using multiple surrogates (or the same surrogate multiple times) then a clone of (almost) genetically identical individuals would be reproduced.²

For the remainder of this paper the term 'cloning' will be used as shorthand to refer to the 'Dolly approach' to reproductive cloning.

Why clone humans?

Seven different reasons for cloning humans have been suggested, ranging from the medically serious to the bizarre:

- As a way of overcoming infertility due to absent or dysfunctional gametes. By using nuclear transfer, the donor nucleus could come from a somatic cell from either partner, generating a child clonal with respect to one of the 'parents', but not to both.
- As a source of completely compatible transplantation tissue.
- To replace a child who has been lost through disease or by accident. In this scenario a couple who can no longer have children lose their only child but arrange for the child's cells to be cultured following death (or even as an insurance before death). By nuclear transfer the child's DNA is then used to fertilise the mother's egg (or a donor egg) generating a 'replacement child' of identical sex and physical appearance.
- The duplication of individuals with particular talents or abilities.
- To enable homosexual couples to have children sharing the genes of one of them. In the US lesbian partners are already having children following *in vitro* fertilisation using donor sperm, whereas male homosexual partners have, more rarely, paid a surrogate to carry a child procreated using a donated egg.
- Out of curiosity, possibly allied with a scientist's or doctor's ambition to create the first human clone.
- In a cultic context.³

Theological perspectives

Are there intrinsic theological objections to cloning? Or is cloning unwise only because the procedure remains unsafe (as outlined below), a situation that may change with further biomedical advances? The biblical teaching that appears most relevant to the cloning debate concerns the 'image of God'.

The image of God

Bible commentators have emphasised two major themes in the 'image of God' concept. The 'essentialist' perspective draws attention to God-given qualities, such as moral and spiritual capacities, consciousness, free-will, reason and language, intrinsic to each and every individual, that distinguish humans from animals. However, this perspective alone, critical as it is, does not do full justice to the biblical context in which 'image of God' teaching is placed. Many commentators have drawn attention to the 'relational' (or 'functional') perspective that is implicit in the biblical passages that refer to the 'image of God'⁴ and, arguably, it is this insight which is most relevant in the cloning debate. It is our intrinsic God-given moral and spiritual capacities that enable us to reflect God's image in the relationships that He has ordained. Far from being rivals, the essentialist and relational perspectives are complementary.

There are only three passages in the Old Testament that provide explicit teaching about the 'image of God' (Genesis 1:26–28; 5:1–5; 9:1–7), whereas the theme is more common in the New Testament, particularly in the context of the restoration of the image, spoiled by sin, through Christ's redemptive work. The Genesis passages are of particular importance in establishing 'creation ordinances', meaning general principles valid for all people of all cultures in every era (such as the principle of caring for the environment). They draw attention to the awesome responsibility given to humankind to reflect God's character on earth. The 'image of God' language encompasses the whole range of relationships in and through which this reflecting process should occur, in particular relationships between God and humankind, and between men and women in sexual union:

The relationship between God and humankind

The reflection of God's character on earth begins with a strong hint at God's own relational character: 'Let us make man in our image....' (Genesis 1:26), an allusion greatly expanded in the trinitarian theology of the New Testament.⁵ There is no explicit reference to the Trinity in the Genesis passages, but magnifying Old Testament truths with the lens provided by the New is often a fruitful exercise. God has been Father, Son and Holy Spirit for all eternity, a being in everlasting personal relationship, and as God creates humankind in His image, so He likewise creates beings intended to be in relationship both with Him and with each other. Furthermore, in trinitarian theology persons are defined by being related to another who is *different*: individual distinction rests on an asymmetric mutuality in which Father and Son are not mirror-images (asymmetry), but neither can the Father be the Father unless he has a Son (mutuality).

It is striking that the Genesis 'image of God' passages refer in each case to the relationship between God and Adam in the sense of humankind, explicitly referring in each case to the diversity of His creation in making male and female (cf. Genesis 1:27; 5:2 and 9:6–7). The love that exists between Father, Son and Holy Spirit is to be reflected not by the atomised selves so characteristic of western individualism, but in the love displayed in human relationships. 'We learn from the Trinity that relationship is of the essence of reality and therefore of the essence of our own existence...God has created us for relationship, for He is relational'.⁶ God's love as He relates to humankind is demonstrated by the bestowal of delegated responsibilities to rule over His creation, not as tyrants but as responsible stewards (Genesis 1:28).

Relationships between men and women

The second way in which we should reflect God's image is unambiguously presented as sexual union leading to procreation: *Adam* was to be fruitful and increase in number (Genesis 1:28); *Adam* was created male and female (Genesis 5:1–2), a comment followed by an exposition of fruitfulness (Genesis 5:3–32); significantly, fruitful procreation still remains the mandate in humankind's post-Fall state (Genesis 9:6–7). The creation ordinance of sexual union within the boundaries of a loving, committed, marriage relationship is continuously emphasised throughout the Bible.⁷ Only by being fruitful and filling the earth can it be subdued (Genesis 1:28). The image of God is 'passed on' by sexual union leading to a family resemblance (Genesis 5:1–3). When the New Testament searches for language that will do justice to the profound implications of becoming one flesh within the context of marriage (Genesis 2:24), it is the relationship between Christ and His church which provides the striking analogy (Ephesians 5:22–33). Fruitfulness results in families, environments in which children should experience their parents' love and receive adequate care and protection, social units which contribute to the stability and health of society. God could have created a world of unisex humans, but instead He chose His image to be reflected by males and females. God could have made us to reproduce asexually, as many species do, but in fact He made us as relational sexual beings.⁸

² Humans could also be cloned by embryo splitting, extensively used in animal breeding, first used to multiply human embryos in 1993 (*Science* 262: 652–653, 1993).

³ A cult called the Raelian Movement is offering to supply a cloning service (CLONAIID®) for \$200,000 (see www.clonaid.com).

⁴ For example: A.A. Hoekema, *Created in God's Image*, Eerdmans, 1986; David J.A. Clines, 'The Image of God in Man', *Tyndale Bulletin* 19: 53–103, 1968; J. Jarrett, *Systematic Theology Vol. 1*, Eerdmans, 1990, ch. 30; P.A. Emmett, 'The Image of God and the Ending of Life', *The Ashbury Theological Journal* 47: 53–62, 1992; D. Atkinson, *Genesis 1–11*, IVP, 1990; D. Broughton Knox, *The Everlasting God*, Lancer Books, 1988.

⁵ M. Ovey, 'The Human Identity Crisis: Can We Do Without the Trinity?', in M. Schluter (ed.), *Christianity in a Changing World*, Marshall Pickering, 2000, pp.3–13.

⁶ D. Broughton Knox, op.cit. p.64 and p.66.

⁷ e.g. Gen. 20:3; Lev. 18:1–30; Deut. 22:13–30; Prov. 5:18–23; 18:22; Mal. 2:10–16; Mark 10:5–12; Eph. 5:22–33; 1 Tim. 3:1–7; 1 Tim. 4:1–4; Titus 1:6; Heb. 13:4.

Relational perspectives

'Image of God' theology has profound implications for human cloning. To assess these implications accurately, we must first correct some factual misconceptions and also consider the possible social consequences of cloning.

Cloning and genetic determinism

Two of the suggested reasons for cloning are based on a false premise: it is not the case that genetic identity implies identity of personality, talent or biography. Human development is shaped by a complex and continuous interplay between the individual and their environment. Identical twins are notable as much for their differences as for their similarities.⁸ Clones would be even more different than twins because they would not share the same womb, they would be born at different times and would have different mitochondrial DNA (of possible relevance to their athletic prowess). The grieving parents who seek to replace their dead child by cloning will be disappointed, for the clone will have a different personality, different gifts and interests, and a different biography. Each child is unique and irreplaceable. The parents would double their suffering by the tragedy of unfulfilled expectations and the clone might live under the terrible burden of knowing that s/he could never live up to those expectations.

The desire to replicate exceptional human talent would probably be similarly disappointed. There is no convincing evidence that complex human behaviours of any kind are inherited. Hitler's clone might decide to become an Austrian bus-driver. The cloned athlete might turn out to be more interested in stamp-collecting. Genetic determinism is a myth. Nevertheless, physical beauty and athletic potential are to a large degree inherited. Many diseases also have a genetic component. The clone might experience a deep sense of genetic fatalism as s/he observes the medical history of the nucleus-donor, assuming that the clone knows the identity of this individual.

Social disruption

Families are God's ordained way of structuring society so that sexual union is linked to procreation within the solid bonds of a marriage partnership, and so that children are reared, protected, disciplined and educated within a loving and stable environment. Extensive reproductive cloning would profoundly disrupt the social structure of the family, and therefore of society. Procreation in the context of a loving relationship would be replaced by a sexless reproductive technique for which neither love nor a relationship is necessary. Such would not be the case with infertile couples for whom cloning would, in this respect at least, play an analogous role to artificial reproductive technologies such as *in vitro* fertilisation (IVF), processes perfectly compatible with a loving relationship. But outside such contexts cloning by fertile couples represents a deliberate decision to reproduce without sexual union. In addition, cloning differs significantly from other technologies in that the clone's genetic endowment would be from a single individual.

The fact that genetic and personal identities are distinct does not imply that biological relationships have no bearing at all on human interactions. The evidence suggests otherwise. People who have never known their biological parents have a powerful drive to discover and meet them – the theme of numerous books and films. Cloning would divorce genetic parenthood from relational parenthood. Biological parenthood for *Homo sapiens* begins when two haploid cells merge to generate an embryo of diploid cells. The biological parent of the clone would not be the nucleus-donor, but the parents of the donor. The genetic parents of the clone would therefore be the grandparents in generational terms. If the clone was reproduced in turn to populate the next generation, then the biological parents would now be the great-grandparents, and if cloning were continued the parents would become ever more distant in time. Neither adoption nor IVF requires a

redefinition of parenthood, but cloning does, driving a wedge between biological and familial relationships. The clone might never have the opportunity to know their biological parents because they died long ago, leading to a crisis of identity.

It is often claimed that cloning is 'just like twins'. Not so. We have already noted some biological differences, but the relational differences are more profound. Twins are siblings born at the same time from the same mother. A clone would be the twin, not of a sibling, in the first instance, but of the person – the relational parent – who undertakes to care for the clone, assuming that this person is the nucleus-donor. This is twinhood across generations, something quite different from normal twins. The relational parent will be reminded constantly as the clone grows up that the child is his or her genetic twin, but bears no genetic relationship nor resemblance to his or her partner, who may well feel excluded from the developing relationship between the nucleus-donor and the clone. Cloning represents a denial of both the asymmetry and mutuality of marriage. When the clone grows up, his or her genetically unrelated relational parent might have the unsettling experience of seeing the clone looking virtually identical to his or her partner as on the day when they first met.

Social dislocation will be further exacerbated by increasing the number of cloned children. Large families with, for example, 6–12 children remain common in various parts of the world. Cloning might prove particularly attractive to the rich and to the narcissistic who might wish to reproduce multiple replicates. Paid surrogacy is already an option in the USA, and in countries where poverty is rife many women would be willing to bear the clones of the rich. The consequence could therefore be large collections of physically identical siblings, all growing up to look increasingly like their identical nucleus-donor. Relational dysfunction could be worsened where there is a mixture of clones and normal children.

The welfare of the clone should be paramount in any discussion of cloning. As Mark Phippen, head of the University of Cambridge Counselling Service, comments: 'Consciously or unconsciously the nucleus-donor is bound to compare, to note the similarities and differences, to make assumptions about their child's character and abilities...Psychologically, issues such as identity problems would be expected; there would likely be difficulties with the process of individuation and 'leaving home'; perhaps also with forming intimate relationships...'¹⁰ There is an issue here of human privacy and of human self-determination, which could so easily become smothered by the nucleus-donor's narcissistic tendencies.

Cloning and the image of God

Does reproductive human cloning help or hinder reflection of God's image in humankind? Clearly if human clones are ever born, then God will love them as much as any other human being. Likewise Christians should be the first people to display acceptance and practical compassion towards cloned children. The day could come when the psychological and social disruption introduced by cloning will simply represent yet one more contributing factor towards family breakdown, and the churches should respond accordingly with practical help and counsel, just as at present.

Such reflections underline the need for balance in the debate about cloning. If human cloning ever happens, this will not represent some catastrophic challenge to Christian faith. Arguably it would be a lesser evil than adultery, child abuse or divorce. Nevertheless, the biblical data do suggest that cloning would have a long-term distorting effect on the image of God in humankind, due to relational disruption. For that reason it should be opposed, not because it involves a novel reproductive technology, but because it risks establishing a new social order that fails to reflect God's image in humankind adequately.

Theological disquiet applies to both major aspects of the image of God already considered. Of course a clone could repent and become a child of God like any other person, but that is not the point. The Bible describes a God of diversity, of three-in-oneness, who has delegated stewardly responsibilities to males and females, humans in diversity, who subdue the earth, procreating and caring for their children in the context of loving married relationships. Biology and theology are in

8 Jesus reflects the Father's image perfectly (John 14:8–11) yet was born of a virgin and never married. The usual Christian understanding of the Virgin birth is that Jesus was miraculously bestowed with a full genetic complement so that he might share fully in our humanity (Heb. 2:14–18). His Father's will for Him was different from the rest of humankind since there is only one Saviour of the world (1 Tim. 2:5–6). God's will for glorified humans in heaven, where there will be no marriage, is also different yet again (Matt. 22:29–32).

9 L. Wright, *Twins*, John Wiley, 1997, pp.105–122.

10 M. Phippen, personal communication.

harmony, singing from the same hymn-sheet. That is God's pattern. Cloning disrupts this pattern by splitting the biology and the theology, by divorcing procreation from a loving and committed sexual union and by generating a disturbing discontinuity in sibling and parental relationships thereby undermining family structures. Such structures are already under intense pressure, and their breakdown leads to immense personal suffering, psychologically and often physically, and to major economic costs for society.

Just as reflections can be distorted by rough surfaces, so can God's image in humankind be distorted by departing from the familial and social framework that He has established for our wellbeing.

Technical risk perspectives

The breaking of a creation ordinance would be expected to have deleterious consequences which can be measured. Cloning is no exception in this respect.

Risk-taking is judged according to the practical benefits that might potentially be obtained. People dying from cancer may agree to novel and risky therapies because they represent their last chance. The stakes are high. Such is not the case with cloning. No-one will die if cloning remains banned. Of the seven reasons listed above put forward to justify human cloning, six are weak, misconceived or too bizarre to consider seriously, and only one, a potential use in infertility treatment, has any medical justification. Those infertile due to dysfunctional gametes deserve compassion and further research efforts to resolve their predicament, but experimenting with children, physically and psychologically, is no way to tackle infertility. One day it may be possible to induce cultured cells to develop into eggs or sperm, thereby solving infertility due to gamete dysfunction.

In general there seems little point in cloning apart from satisfying human curiosity, or from ill-conceived instrumentalist views of children as 'replacements' or as sources of donor tissue. And the risks of cloning are considerable:

- It took 277 attempts to generate Dolly. Foetuses produced by nuclear transfer are ten times more likely to die *in utero* than foetuses produced by normal sexual means, while cloned offspring are three times more likely to die soon after birth. Cloning humans would always remain experimental, with risks of high foetal loss and deformities in the newborn.
- All somatic cells accumulate mutations in their DNA during the course of life. These are not passed on to offspring during normal mating and are usually harmless. However, if several mutations accumulate in the same cell, then the cell may become cancerous. In nuclear transfer the nucleus from a random somatic cell is used, in which the DNA will already have accumulated unknown mutations. These could lead to cancer in the clone.
- Genomic imprinting represents a further risk factor. Although genes encoding the same proteins are present in duplicate on paired chromosomes in somatic cells, in genomic imprinting one copy of a gene is switched off depending on whether it came from the father or mother. In nuclear transfer the normal imprinting process may be disrupted, leading to abnormalities in development.
- Dolly was created by nuclear transfer from the mammary gland of a 6-year-old ewe and her cells already showed signs of aging soon after birth. The long-term implications of this remain unknown.

As Ian Wilmut, leader of the team that cloned Dolly, warns: 'How can all the potential hazards be identified and quantified so that we

know in advance what the risks would be if anyone did attempt to clone a human being? They can't.' Human cloning will always represent an experiment and experimenting on children is wrong. There are times when human curiosity should for ever remain unsatisfied.

Conclusions

The spectre of reproductive human cloning arouses a strong sense of disquiet in most people irrespective of their religious beliefs. This intuitive disquiet is well justified. Intrinsic theological objections to cloning draw attention to the way in which it would undermine God's image in humankind, an image underpinned by key creation ordinances that God has established for humanity's health and social wellbeing.

Cloning bypasses the safeguards that God has put in place to protect the structure of families and the welfare of children. The possibility of cloning continues to attract a powerful curiosity and fascination. But the suggested reasons for cloning humans are weak and far out-weighted by the possible risks.

Ironically, it is in sex-saturated societies that the secular proposal has arisen to reproduce without sex. Biblical teaching has always emphasised the beauty and wonder of sexual union within a loving and committed relationship. The prospect of cloning now provides the church with an opportunity to emphasise the same teaching within a totally novel context.

11 Ian Wilmut, Keith Campbell and Colin Tudge, *The Second Creation*, Headline, 2000.

Definitions of technical terms

pluripotent stem cells: cells that have not yet developed into the specialised tissues of the body and that have the potential to develop into any tissue. The early embryo up to 14 days consists entirely of stem cells.

nucleus: the part of the cell containing the paired chromosomes which incorporate the DNA encoding the c.30,000 genes of the human body.

nuclear transfer: the removal of the nucleus from one cell and transfer to a different cell from which the nucleus has been removed ('enucleated cell').

gametes: the sperm and egg cells which contain single copies of each chromosome ('haploid').

in vitro: carried out in the laboratory.

somatic cells: all the non-gamete cells of the body. During fertilisation the gametes fuse so that all somatic cells contain pairs of chromosomes ('diploid'). Every somatic cell contains all the DNA information to construct a complete human being.

therapeutic cloning: the use of stem cells as a therapy for medical disorders.

reproductive cloning: the use of nuclear transfer to create a genetically identical copy of an individual.

mitochondria: cellular organelles outside the nucleus that generate energy; they contain DNA – much less than one per cent of nuclear DNA.

Acknowledgments

I am indebted to Prof. Derek Burke, Prof. Brian Heap FRS, Prof. Gareth Jones and Dr. Colin Honey for their helpful comments on an earlier draft of the paper. The opinions that remain are entirely the author's own.

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