The cloning of animals has opened a vigorous debate among ethicists and legal scholars. We can expect that the debate in the halakhic community will be no less energetic. It is likely that opposing ends of the opinion spectrum have already been defined. In his careful analysis of the issue, Michael Broyde concludes that, at worst, cloning a person would be halakhically neutral and that, under certain circumstances, it may be even be a "mizvah." On the other hand, Dr. Abraham S. Abraham maintains that cloning is absolutely prohibited, as it falls outside "darkhei ha-teva." It is unlikely that there will be a reconciliation of these opposing views. One relies on cold halakhic analysis while the other sees such analysis as not decisive given the broader implications of cloning for what is perceived as God’s will. As with other reproductive technologies, the acceptance of human cloning will depend on which view emerges, over time, as dominant among posekim.

The need to bring this issue to closure is not pressing, as somatic cell cloning is a technology still in its infancy. While theoretical applications in humans have been the subject of great speculation, the groundwork has not yet been laid for the clinical application of cloning technology in humans. Given the fast pace at which reproductive science has advanced, however, it is reasonable to expect that the scientific and medical obstacles eventually will be overcome. When this occurs, the obvious first application would be in the treatment of reproductive failure.

Richard V. Grazi, M.D., is editor of Be Fruitful and Multiply: Fertility Therapy and the Jewish Tradition as well as numerous articles in the field of reproductive medicine and ethics. Dr. Grazi maintains an active clinical practice as the founder and director of Genesis Fertility & Reproductive Medicine.
Currently, even with the use of the most sophisticated reproductive technologies, there remain situations where male and female infertility are not treatable. Gonadal failure is not uncommon in either men or women. This may occur as a result of genetic disease (e.g., Klinefelter’s Syndrome in males and Turner’s Syndrome in females), ionizing radiation or surgery. Other cases are unexplained (e.g., Sertoli Cell Only Syndrome in males and Premature Ovarian Failure in women). In all of these cases, there exists no source of (haploid) germ cells with which to begin fertilization and embryonic development. Cloning would allow the use of (diploid) somatic cells for embryonic development, albeit without true fertilization. Were the male affected, one could use his wife’s egg to host his somatic cell DNA. The resultant embryo and the (always) male child born of this procedure would be a genetic clone of the husband. Were the female affected, her husband could play no part in the reproductive process. Instead, a host egg from which the nucleus has been extracted would need to be harvested from a donor. The recipient would conceive after her own somatic cell was fused with the enucleated egg. Save for mitochondrial DNA, which would remain from the donor, the resulting (always) female child would be a genetic clone of the recipient. Absent the *mizvah* of *peru u-revu* on the part of the wife, it is less likely that her somatic cell line would be chosen for cloning than her husband’s. In the case where the husband is cloned, neither halakhic paternity or halakhic maternity would appear to be in question. Cloning the wife would be more problematic. With current *in vitro* fertilization technology using an egg donor, a prevalent view is that the birth mother is the halakhic mother. Some, however, consider the egg donor to be in full or in part the halakhic mother. Opposition to egg donation in the halakhic community has been based on the grounds of uncertain lineage. But female cloning could render all this moot. The birth mother in this situation would also be the genetic mother. The contribution from the egg donor would be limited to cytoplasm within a membrane. While the child would have no apparent halakhic father, none but the birth mother could reasonably lay claim to being the halakhic mother.

Cloning individual organs to cure disease would also be an appropriate use of the new technology. Few would argue against a technology that could regenerate a failing liver or kidney in order to reverse a terminal illness. Justifying the use of technology to create new individuals, however, would be more controversial and might be limited to the situations described above. But even then, there are serious questions that
must be addressed before proceeding with clinical human cloning. And
here, it must be said, not all agonadal individuals are alike. Specifically, if
there is a known genetic etiology to the gonadal failure and the individ-
ual harboring that gene is to be cloned, is it fair to propagate that genetic
problem in the next generation? Does this not increase the future need
for cloning? Or is life as an agonadal human clone infinitely more valu-
able than no life at all? Unfortunately, the ethical discussion cannot take
place without also addressing the cold facts of a society’s limited
resources. Who will pay for all of this? May only the rich be cloned?

The Human Genome Project, which has just been completed, will
no doubt change the face of reproductive medicine, including human
cloning. Still, sequencing genes is different from understanding them.
Gene therapy is presently more of a concept than a reality. Eventually,
however, it is likely that inserting, removing or modifying genes will be
a standard part of medical practice.

Using genetic manipulation to cure illnesses should be, generally
speaking, halakhically neutral. Halakhic difficulties would seem to arise,
however, when the genetic manipulation occurs in the germ cell line
and, as such, is transmitted across generations. Genetic alteration of a
somatic cell prior to cloning would be another way to transmit an altered
genome. Although the potential impact of such therapies is obviously
more profound than standard medical therapy, it is not clear why they
would be halakhically problematic as long as a specific genetic disease
was being eliminated. Indeed, withholding such therapy, were it available,
would seem halakhically questionable. On the other hand, the use of
such procedures on healthy people or embryos in order to alter physical,
mental or other characteristics that may render them more “desirable”
would be a frivolous intervention and therefore, in all likelihood, not be
permissible.

The advent of cloning and its potential application in humans
prods us to rethink our notions of halakhic parentage, especially as it
relates to (or depends upon?) genetic/biologic parentage. What emerges
is likely to affect halakhic decisions in other areas as well. As an example,
the current halakhic debate about the use of gamete donors—whether
egg or sperm—is unlikely to be resolved. For reasons already stated, it is
possible that cloning may ultimately provide a solution for agonadal
individuals. But gamete donation as currently applied is not used solely
in such individuals. Indeed, the vast majority of donor egg recipients are
women in the perimenopausal phase of life, who have eggs, albeit ones
not capable of successful fertilization and implantation. For them, a
technique under current investigation employs donor eggs but allows the older woman to bear her own genetic child. This technique is called “pronuclear transfer.”

The pronuclear transfer technique requires that the recipient woman have oocytes. The underlying concept is that the egg of an older woman has perfectly normal nuclear DNA, and that its defective capacity to fertilize and implant is a result of cytoplasmic factors. To solve this, a young donor egg is extracted simultaneously with the older egg of the recipient. Both are incubated in a culture medium that induces the eggs to form distinct pronuclei. Using standard micromanipulation technique, the young pronucleus is extracted from the young egg cytoplasm, discarded and replaced with the other, older pronucleus. An electrical current induces fusion of the older pronucleus with the younger cytoplasm, forming a hybrid egg. A single sperm is then microinjected into the “grafted” egg. Because the egg cytoplasm is from the younger donor, fertilization and implantation may proceed successfully. However, the resultant embryo has received its genetic instructions from the older egg (as well as from the sperm), and therefore the resultant offspring must be the biological offspring of the older egg. This technique has been successfully described in mice. As with cloning, there is reason to believe that, were certain obstacles overcome, it would also be applicable in humans. If so, the demand would likely be intense.

Would the pronuclear transfer technique solve the donor egg dilemma? For those posekim who hold that the egg donor may be, at least in part, the halakhic mother, does this concern disappear? How much genetic material must one donate in order to be the halakhic mother? Does mitochondrial DNA count? In the quest for a sound halakhic approach to the developing reproductive technologies, including human cloning, these are just some of the issues that will need to be confronted and resolved.

Notes