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Cloning: Redefining When Life Begins

Exposing Flaws in the Preembryo-Embryo Distinction*

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Cloning is a technological breakthrough that adds a new dimension to reproductive technology as well as new insight into the long-standing debate regarding fetal interests. Currently, a flawed understanding of both science and the law has created a policy that allows for the destruction of countless human embryos created through advancements in reproductive technology including human cloning.

This policy resulted when recent advances in reproductive technology collided with the law in the Tennessee Supreme Court case of *Davis v. Davis*. In *Davis*, a dispute regarding the custody of frozen embryos arose between a husband and wife, who after undergoing an *in vitro* fertilization procedure could no longer agree on the disposition of their frozen embryos. To define the "interest" that the litigants held in the embryos, the Tennessee Supreme Court relied on a report published by the Ethics Committee of the American Fertility Society.

In this report, the Ethics Committee defined an embryo as distinct from a preembryo, based on medical science and legal precedents. According to the report, the preembryo stage is considered to last until 14 days after fertilization. Moreover, the consensus concerning preembryo status is that the preembryo deserves greater respect than that accorded to mere human tissue because of its potential to become a person, but not the respect accorded to actual persons.

The *Davis* court agreed with the committee report, holding that preembryos are not, "strictly speaking either persons" or "property," but occupy an interim category that entitles them to special respect because of their potential for life (*Davis v. Davis*). As a result of this decision, our understanding of natural, as well as noncoital reproduction, now includes a preembryo-embryo distinction and

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a policy that has been defined by the medical community and sanctioned by the courts. This distinction and policy will likely apply to all new techniques for noncoital reproduction including human cloning.

In the process of cloning, the 23 chromosomes of a recipient egg are removed. Similarly, the DNA or genetic material comprising 46 chromosomes is removed from a selected adult cell. The 46 chromosomes of the adult cell are introduced into the now empty (enucleated) egg. (Alternatively, the adult cell is fused with the egg to introduce the 46 chromosomes into it.) The egg then contains the 46 chromosomes of the adult cell, and will use the information encoded in the DNA to create a clone of the donor.

The 46 chromosomes introduced into the egg are identical to the genetic material contained by all the other adult cells of the donor that contain 46 chromosomes. The genetic material taken from the donor was originally determined (presumably years earlier) when an egg and sperm each donated their original 23 chromosomes at the point of conception. In natural conception, 23 chromosomes of the sperm and egg unite to create a single cell containing 46 chromosomes. Therefore, the moment that 46 chromosomes are introduced into the enucleated egg is equivalent to the naturally occurring point of conception. In cloning, the life created will be genetically identical to the donor, as though it were an identical twin of the donor.

During development, in both the naturally conceived and the clonal embryos, repeated divisions of the embryo continue to increase the number of cells until they then begin to specialize and organize into an adult. Specialization during development is called differentiation. Differentiation is a continual process. Specifically, as the cells multiply and divide, groups of cells become gradually committed to particular patterns of gene activity. Differentiation does not mean that cells lose genes during development. In fact, all differentiated adult cells of an individual are genetically identical. They are simply not metabolically identical. This means that different genes are activated to make proteins as required by the individual cell. For example, the proteins required by liver cells are not necessarily the same proteins required by hair cells. That is why each cell makes different proteins suited to its needs while the genetic material remains constant in each cell. This explains why genetic material can be taken, theoretically, from any cell and injected into an enucleated egg resulting in a clone of the animal or person from whom the cell was taken. In short, since all succeeding cells are genetically identical to the fertilized egg, the “magic” occurs whenever a complete set of 46 chromosomes is introduced into an egg, whether by natural conception, *in vitro* fertilization, or cloning technology.

Differentiation is of particular interest because the Ethics Committee and the *Davis* court use this developmental phenomenon as a foundational part of the preembryo-embryo distinction. Specifically, the report and reasoning of the committee make the preembryo-embryo distinction based on differentiation which is explained in terms of development of an individual and uterine implantation. The question then, is whether this preembryo-embryo distinction based on differentiation remains valid in the light of the newest reproductive technology, cloning. To make such a determination, a closer examination of the report by the Ethics Committee of the American Fertility Society is warranted.

The Ethics Committee explains differentiation in terms of "development of an individual" as correlated with visually recognizable structures of the developing embryo, and described in terms related to twinning (the splitting of an embryo into two identical twins). Specifically, the committee reports that, "[w]ith the appearance of the [primitive] streak, as far as is now known, the embryonic disc is committed to forming a single being; beyond this point, twinning is not believed to occur, either naturally or experimentally" (vol. 53, #6, at 32s, June 1990). Therefore, absent specific visually recognizable structures that indicate an end to the embryo's ability to create a twin, a human embryo is not a person nor is it property. It is a preembryo. There are at least two recognizable flaws in relying on this explanation as a basis for defining the preembryo status.

First, while it is conceded that prior to 14 days, single embryos have the ability to split or be split to effect development of more than one independent adult, each life so created develops in exactly the same manner as the embryo from which it was split. This is the result of being derived from the exact same genetic material. This event merely serves to reset the biological clock of the embryo, forcing it to repeat previously experienced divisions. In humans, this event does not prevent the embryo from attaining eventual personhood. At a minimum, the embryo will develop into at least one life. It is questionable, therefore, whether the phenomenal ability of the embryo, under some conditions, to produce more than one life should diminish an embryo's life status.

Second, evidence that the embryo is a specific life from the moment of conception is actually offered by cloning technology. The moment that a complete set of 46 chromosomes is introduced into an enucleated egg, the embryo is a very specific life, identical to the donor of the genetic material. To illustrate, the success of Dolly and various other cloned animals provides undeniable evidence that the embryo is set on a predetermined pathway of life from the moment the complete set of chromosomes is introduced into the egg. That is precisely the science and logic that explains how the clonal embryo is capable of duplicating the donor.

The individual cells of the clonal embryo early in cleavage follow the exact path of development followed by the donor of the genetic material when the donor was embryo. In other words, there appear to have been no options for the clonal embryo, as a whole, in its development. Therefore, we can infer that there were no options for the initial groups of cells (the preembryo) that came into existence through cell division in the first few days of life. Recalling that the moment that a complete set of chromosomes is introduced into the egg is equivalent to the point of conception, it is clear that development of the "individual" is encoded in the genetic material itself, and does not require 14 days to be committed to forming an individual being.

Additionally, differentiation is explained by the committee report in terms of uterine implantation. The report states that it is the physiologic interaction of the embryo with the mother during implantation that determines the path of differentiation. Clearly, cloning suggests otherwise. Specifically, the clonal embryo develops in exactly the same manner as the donor, despite the absence of the same available womb. Cloned animals, such as Dolly, were not implanted into the womb of the same mother that birthed the donor of the genetic material. Yet, the clonal embryo was a

genetic duplicate of the donor. Therefore, it is not the physiologic interaction of the embryo with the mother during implantation that determines the path of differentiation. Implantation of the egg in the uterine wall merely provides the nutritive environment for continued growth in relation to the embryo's current stage of life.

With these points in mind, one must recognize that the scientific rationale behind the preembryo-embryo distinction is flawed. The logic and specific evidence provided by successful cloning experiments indicates strongly that both the clonal embryo and the fertilized egg have been set on the path *of* life, not a path destined *for* life, the moment that the complete set of chromosomes exists within the cell. Indeed, if there is a preembryo, then it is the egg and the sperm themselves, not the clonal embryo or the fertilized egg. As a result, this analysis suggests that the human embryo, even at the very earliest stages, should be recognized as protectable life. This requires that the embryo be accorded the rights of a person: according to the committee report, "this position entails an obligation to provide an opportunity for implantation to occur and tends to ban any action before transfer that might harm the embryo or that is not immediately therapeutic."

General Information

Davis v. Davis, 842 S.W. 2nd 588, 604 (Tenn. 1992) (holding that when a dispute arises regarding frozen embryos, "the party wishing to avoid procreation should prevail, assuming that the other party has a reasonable possibility of achieving parenthood by means other than the preembryos in question").

Kass v. Kass, 663 N.Y.S. 2nd 581 (N.Y. App. Div. 1997) (following *Davis*, court held that the informed consent document and uncontested divorce instrument governed the disposition of frozen embryos).

JB v. MB, No. FM-04-95-97, slip op. (N.J. Super. Ct. Law Div. 1998)(citing *Davis*, the judge ordered the destruction of seven embryos in dispute amid a divorce proceeding).

Ethical Considerations for New Reproductive Technology—A Report by the Ethics Committee of the American Fertility Society, vol. 53, no. 6 Fertility and Sterility, Supplement 2, June 1990.

Katheryn D. Katz, The Clonal Child: Procreative Liberty and Asexual Reproduction, 8 ALB. L.J. Sci. & Tech. 1. 24–27 (1997) (addressing legal questions of human cloning intended to produce a child).

Cloning Human Beings: Report and Recommendations of the National Bioethics Advisory Commission (1997) at Chapter Two: The Science and Application of Cloning, at 17.

I. Wilmut et al., *Viable Offspring Derived from Fetal and Adult Mammalian Cells*, 385 Nature 810 (1997).

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