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M. Therese Southgate

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Genetic Engineering: Reprise

M. Therese Southgate, M.D.

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We commend to the especial attention of our readers an article by Paul Ramsey, PhD, on some of the ethical considerations in artificial reproduction of the human species, or broadly speaking, genetic engineering. In part 1 of this article (p 1346) Doctor Ramsey considers the medical ethics of in vitro fertilization or, as popular parlance has it, the "test tube baby." (This latter term is, however, not strictly correct as will be noted below.) In part 2 of the article, which will appear next week, Doctor Ramsey answers objections which might be raised to his statements and also develops some of the implications for genetic engineering in current embryologic research.

Before examining some of the issues, it is perhaps important to define some of the terms and procedures which are subsumed under the broad umbrella of "genetic engineering," but which are frequently confused, as well as noting the

Dr. Southgate is a Senior Editor of The Journal of the American Medical Association. She is a graduate of the Marquette University School of Medicine (now Medical College of Wisconsin) and during her medical school days was editor-in-chief of the Marquette Medical Review.



In her guest editorial (reprinted here from the Journal of the American Medical Association) Dr. Southgate makes reference to a two part article by Doctor Paul Ramsey. Those interested in reviewing Dr. Ramsey's article "Shall We 'Reproduce'?" are referred to The Journal of the American Medical Association Vol. 220, Nos. 10 & 11; June 5 and June 12, 1972.

"state of the art." The popular term, *genetic engineering*, might be considered as covering anything having to do with manipulation of the gametes or the fetus for whatever purpose, from conception other than by sexual union of two persons, to treatment of disease in utero, to the ultimate manufacture of a human being to exact specifications. It has nothing to do with the "creation of life"; it is concerned only with the methods for transmitting life.

Thus, the earliest procedure in genetic engineering might be considered to be *artificial insemination*, or the laboratory introduction of sperm (usually, but not necessarily, the husband's) into the woman's body with the intention that fertilization of an ovum will occur. This practice is relatively widespread today and utilizes not only freshly acquired sperm, but sperm which may have been stored for indefinite periods of time (frozen-sperm banks). The next procedure in point of logical development is *artificial*, or *in vitro*, fertilization, ie, union of sperm and ovum outside of the human body, "in the test tube." This has been accomplished in the laboratory with human sperm and ovum and the resulting zygote has developed in the test tube through several divisions, at least to the embryo stage of blastocyst.

The next step logically is, of course, *artificial implantation* into a uterus, since the blastocyst stage is when the embryo normally needs a uterine environment for continued development. This has been accomplished in laboratory animals

with the birth of some apparently normal offspring, but not yet in humans (the latter "failure" owing largely, we suspect, more to the fact that as yet we understand little about the process of implantation than to the fact that no one has been willing to try it without at least some chance of "success"). It is with these latter two procedures that Doctor Ramsey is chiefly concerned in the first part of his article.

Yet in the future, but following the same stepwise logic, are procedures which are commonly identified more sensationally with the term genetic engineering: *ectogenesis*, or *total extracorporeal gestation* of a fetus to term and "delivery" by reproducing the uterine environment in a test tube (this is properly called a "test-tube baby," although in the popular media artificial fertilization is often referred to as such), *cloning* (already accomplished in frogs), in which the nucleus of an ovum is removed and replaced by the nucleus of an asexual cell, eg, a skin cell, with the production, of course, of a being genetically identical to the donor of the nucleus (two observations can be made here: one is that whereas sex without procreation has always been possible, cloning makes possible procreation, or more accurately reproduction, without sex—a totally different and most serious human consequent; the other is that the only persons essential to preservation of the human species will be carriers of mature ova); production of *chimeras*, or the grafting of cells from

one or more blastocysts to another blastocyst, perhaps to correct defects in the original blastocyst, the "parents" of the several blastocysts being the same or different in each case; and finally, and what is popularly meant by *genetic engineering*, the production—or better, the biological manufacture—of a human being to desired specifications. Doctor Ramsey considers some of the implications for the future in the concluding portion of his article next week.

And why our concern about these matters? Why be concerned about genetic manipulation when at least some of its results will be good for the individual fetus, eg, detection and treatment of disease in utero? Why be concerned about procedures which have provided infertile couples with children, or which have made it possible for male sterilization to be "reversible"? Why be concerned about futuristic procedures which may seem so preposterous as to be impossible of accomplishment?

Doctor Ramsey discusses well the reasons for concern from the standpoint of what he terms "received medical ethics." Others¹ have been equally thoughtful and have raised additional issues. Popular concern, in contrast, usually voices more obvious and sensational pros and cons, for example, the raising of the so-called intelligence quotient or the fear that politicians will preempt control of the species to nefarious ends. These are hardly serious concerns at this moment, however, nor will they perhaps ever

become so, precisely because they are so obvious. In other words such practices as cloning or the biological manufacture of a human being are as yet several giant steps away and as such are readily rejected as being unethical, immoral, or impossible precisely because they are as yet in conflict with our culture. The change from the present is too drastic to admit into our perceptions of reality.

Rather, of graver concern today should be the ready acceptance by many of the first steps we are taking in divorcing procreation from human sexual union, ie, artificial insemination and in vitro fertilization, and the cultural conditioning we thereby undergo to accept the next small logical step as even better. Our concern thus is with this much more subtle danger—that of conditioning. It is the graver danger precisely because it is not easily evident. For example, we accept artificial insemination as a good because its immediate, seen result, relieving childlessness, is "good." We are thus conditioned, at least culturally if not ethically or morally in all cases, to accept the next logical step, artificial fertilization, without too much questioning beyond our establishing the fact that ultimately research will bring it to the same "good" end. Not asked are two corollary questions: (1) Have we a right to satisfy by any means whatsoever our legitimate desires, even our needs? and (2) What are we doing to the act in which human procreation takes place?

Human procreation ought to be

an act involving the total human person. It is a human act, as Kass¹ has noted, precisely because it engages two people physically and spiritually and not merely rationally, as in a laboratory procedure. With artificial insemination we have already de-humanized the act involved in conceiving a human being by making it a merely rational act. Procreation thus becomes reproductive—a word borrowed from the laboratory, but now established in our daily usage.

Perhaps, too, medicine, and especially the area of research, ought to reexamine itself in terms of its public relations. Perhaps we bear no small share of the blame in causing a demand for the realization of even legitimate desires by overselling our wares or distorting our true task. For example, the unfortunate word "cure," and by implication "satisfaction" and "happiness" as well, has crept into the language when we really mean "treat." In truth, we have no rose gardens to promise.

Obviously, we must examine more than the end result of our

actions. Otherwise we will be conditioned gradually so as to eventually forget what is human. Obviously, too, this is a complex and ongoing process of examination and decision. We must not lose the benefits of research out of fear. Mistakes will be made in our decisions. But we will retain and grow in our humanity if we look beyond the immediate "good" to what will allow us to reach our full measure of dignity as physical, rational, and spiritual persons, not reproduced or manufactured, but "called into being." As such, human procreation is a mystery, and not a problem. Whereas given enough money and time, one may solve virtually any problem, mysteries can only be contemplated.

Given the intricacies of the human mind, we doubtless possess the potential for reproducing someday, to exact specifications, a human person. But should we? Should we have even taken the first step?

REFERENCES

1. Kass LR: Making babies: The new biology and the "old" morality. *Public Interest* No. 26, pp. 18-56, 1972.

