

February 1995

## Early Human Embryonic Development: Individuation Before Implantation

Alfred Cioffi

Follow this and additional works at: <http://epublications.marquette.edu/lnq>

---

### Recommended Citation

Cioffi, Alfred (1995) "Early Human Embryonic Development: Individuation Before Implantation," *The Linacre Quarterly*: Vol. 62: No. 1, Article 10.

Available at: <http://epublications.marquette.edu/lnq/vol62/iss1/10>

# Early Human Embryonic Development: Individuation Before Implantation

by

Alfred Cioffi, B.S., S.T.D.

*The author is professor of Moral Theology at St. Vincent de Paul Regional Seminary in Boynton Beach, Florida. He has a Bachelor of Science in Biology from Florida International University in Miami and a Doctorate in Moral Theology from the Pontifical Gregorian University in Rome.*

---

## I. Background

Recently, Thomas Andrew Simonds, S.J., wrote an article addressing the status of embryonic human life.<sup>1</sup> In it he proposes the possibility of dividing early embryonic life into three stages. He holds this division to reflect contemporary language more accurately, since these three stages incorporate "observable and significant" developmental changes:

In this new conversation, we will use some current terminology to describe our biological observations. Rather than using Aquinas' terms to talk about development, i.e. animation, souls, and ensoulment; we will use these terms: human life, awareness, and the process of developing awareness. Based upon our biological observations, we will divide the first forty days of development into three stages. The stages are used to show that an observable and significant change has taken place in the developing embryo or fetus. As our criteria for what constitutes significant change may differ, our delineation of the three stages may differ somewhat. Therefore, we outline these three stages in a tentative way pending dialogue and conversation with others.<sup>2</sup>

He bases such division on current biological data:

In stage I we have human life. In this stage, the genetic code will guide the formation of the cells that make up the embryonic body. These cells will differentiate themselves and become specialized. Some cells will be designated to form the heart, while others will be tapped to form the lungs and the brain. The process of conception is completed at around fifteen days with implantation in the uterine wall. When implantation occurs, stage II begins, which is individual human life. At forty days after Fertilization, Stage III begins, individually aware human life. As early as forty, and definitely by sixty days after fertilization, we can detect brain waves in the fetus. This is an important observation because the presence of brain waves tells us that the brain is receiving sensory input. The fetus now experiences awareness.<sup>3</sup>

Defining stage I as "human life" and stage II as "individual human life" might imply that there is no individual human life before implantation. This, however, is not substantiated by current biological data.

## II. Biological Data

We now know that at completed fertilization, the human embryo contains all the genetic material necessary for development. We also know that, genetically, fertilization involves the fusion of the fertilizing spermatozoon pronucleus with the secondary oocyte pronucleus. Since these two pronuclei are haploid, we further know that the resulting diploid zygotic nucleus constitutes a unique genome at the biochemical level. Lastly, for our argument, we know that even the extranuclear genetic material contained in intracellular organelles (such as mitochondria, ribosomes, etc.) is also biochemically unique to each individual zygote.<sup>4</sup>

Thus, provided the zygote is living and is the result of the fusion of a human sperm with a human egg, one can conclude that the human zygote already qualifies as individual human life. In fact, if observable and significant developmental change is the operative criterion for differentiating between stages, then the first completed zygotic mitosis is a much more significant event than implantation. Why? Because first cleavage marks the true onset of differentiation, whereas during implantation the blastocyst is well along the differentiation process. That is why the conventional beginning stage II in (human) embryology is the first completed mitosis of the individual zygote *and not* implantation.<sup>5</sup>

## III. Twinning

Twins originate from two fertilized eggs (dizygotic), or from a single fertilized egg which undergoes complete or partial separation before implantation (monozygotic). Since dizygotic twins develop from two genetically distinct zygotes, their individuality from completed fertilization is not in question. Monozygotic twins, on the other hand, develop from a single zygote, which means that they have almost identical genomes.<sup>6</sup> One must bear in mind, however, that even monozygotic twins are true individuals, as evidenced by many living identical twins who lead normal, healthy, individual lives. In the United States, monozygotic twins occur about once in every 300 pregnancies.<sup>7</sup>

The question arises; how can the zygote that generates monozygotic twins be considered an individual? The answer to this question lies in the well established natural occurrence of asexual reproduction. In other words, it is entirely plausible for an individual zygote to undergo total separation at first cleavage so as to result in two new individual zygotes. Each one of these zygotes can then continue normal development into two individual embryos. Alternatively, an individual zygote can develop into an individual morula through normal mitosis. Subsequently, some blastomeres forming the morula fully separate before implantation, giving rise to two distinct blastocysts. Each one of the blastocysts can then further develop into individual embryos. At every stage of the aforesaid scenarios one observes individuals: an individual zygote which generates another individual zygote; an individual morula which generates another individual morula. If viable, all qualify as individual human life.<sup>8</sup>

#### IV. Dialogue

Simonds also mentions that: "In our current paradigm, conception is a process lasting fifteen days. Therefore, moral questions during this period of time would focus on the question of preventing conception rather than aborting an already conceived embryo."<sup>9</sup> This view of conception, however, stands in contrast with the standard medical definition of fertilization: "The process beginning with penetration of the secondary oocyte by the spermatozoon and completed by the fusion of the male and female pronuclei."<sup>10</sup>

If the processural dimension of fertilization can be used to expand conception until nidation of the blastocyst into the endometrium; why stop at implantation? Consistency would demand that the entire gestation be seen as one continual process, making conception coextensive with all nine months of human pregnancy! In the final analysis, then, one realizes that Simonds' proposal is no different from a proportionalist view of early embryonic life which attributes to the human embryo incremental value as development occurs.<sup>11</sup>

#### V. Conclusion

Recently, the National Institutes of Health has decided to federally fund research and experimentation on early embryonic human life.<sup>12</sup> Also, the federal government has decided to proceed with medical trials on the French "contraception" pill (RU486).<sup>13</sup> Both these actions reflect the erroneous notion that human embryonic life before implantation is somehow "less than" human, and therefore available for research and disposal. Given the general confusion regarding the status and value of early embryonic human life, it is imperative that our contemporary language reflect our present knowledge on the subject: it can now be stated that current biological observation corroborates the existence of individual human life from completed fertilization. Therefore, the moral question of experimenting and discarding embryonic human life before implantation, focuses on abortion rather than on preventing conception.

#### REFERENCES

1. Simonds, T.A., "Aquinas and Early Term Abortion," *Linacre Quarterly* 61, 3 (1994), pp. 10-17.
2. *Ibid.*, 14.
3. *Ibid.*, 14-15.
4. England, M.A., *Color Atlas of Life Before Birth: Normal Fetal Development*. Chicago: Year Book Medical Publishers, 1990. pp. 14, 35; Johnson, K.E., *Human Developmental Anatomy*. New York: John Wiley & Sons, 1988. pp. 17-27; Moore, K. L., *The Developing Human: Clinically Oriented Embryology, Fourth Ed.* Philadelphia: W. B. Saunders, 1988. pp. 13-35; Weaver, R. F. and Hedrick, P. W., *Genetics*. Dubuque, Iowa: Wm. C. Brown Publishers, 1989. pp. 66-94.
5. Moore, *op. cit.*, p. 2.
6. There seems to be some evidence pointing to certain chromatic differentiation even among monozygotic twins. See: Watson, J. W., Albright, S. G., Rao, K. W. and Aylsworth, A. S., "Monozygotic Twins Discordant for Partial Trisomy 1," *Obstetrics and Gynecology* 76 (1990), pp. 949-951.
7. Johnson, *op. cit.*, pp. 107-109; Moore, *op. cit.*, pp. 122-129.

8. Ashley, B. M., "A Critique of the Theory of Delayed Hominization," in: McCarthy, D.G. and Moraczewski, A. S., eds., *An Ethical Evaluation of Fetal Experimentation: An Interdisciplinary Study. Appendix I*. St. Louis, MO: Pope John XXIII Medical-Moral Research and Education Center, 1976. pp. 113-133; *ibid.*, "Constructing and Reconstructing the Human Body," *The Thomist* 51, 3 (1987), pp. 501-520; Ashley, B. M. and O'Rourke, D. K., *Healthcare Ethics: A Theological Analysis, Third Ed.* St. Louis, Missouri: The Catholic Hospital Association, 1989. pp. 211-213; May, W. E., *Human Existence, Medicine and Ethics: Reflections on Human Life*. Chicago: Franciscan Herald Press, 1977, pp. 93-103; *ibid.*, "Zygotes, Embryos, and Persons: Part I," *Ethics and Medics* 16, 10 (1991), pp. 2-4; *ibid.*, "Zygotes, Embryos, and Persons: Part II," *Ethics and Medics* 17, 1 (1992), pp. 1-3; McCarthy, D. G. and Bayer, E. J., *Handbook of Critical Life Issues*. St. Louis, Missouri: Pope John XXIII Medical-Moral Research and Education Center, 1982. pp. 80-90; Moraczewski, A. S., "No Brain and Yet Alive," *Ethics and Medics* 16, 12 (1991), pp. 1-2; O'Donnell, T. J., "Mifepristone: the New 'Abortion Pill,'" *Medical-Moral Newsletter* 26, 4 (1989), p. 7; *ibid.*, "Early Diagnosis of Tubal Pregnancy: New Issues," *Medical Moral Newsletter* 25, 6 (1988), pp. 23-24; *ibid.*, "Ethics and Production-Line Quality Control of Human Life," *Medical-Moral Newsletter* 28, 4 (1991), pp. 15-16.

9. Simonds, *op. cit.*, p. 16.

10. *Stedman's Medical Dictionary, 25th Ed.*, Baltimore: Williams & Wilkins, 1990. v. fertilization.

11. Bedate, C. A., "Reflections Concerning Questions of Life and Death: Towards a New Paradigm for Understanding the Ethical Value of the Biological Human Entity," in: Malherbe, J. F., *Human Life: Its Beginnings and Development*. Paris: L'Harmattan, 1988, pp. 67-97; Curran, C. E., "Abortion: Contemporary Debate in Philosophical and Religious Ethics," in: Reich, W. T., *Encyclopedia of Bioethics I*. New York: Macmillan, 1978, pp. 17-26; *ibid.*, *Moral Theology: A Continuing Journey*. Notre Dame: U. of Notre Dame Press, 1982. pp. 125-126; *ibid.*, *New Perspectives in Moral Theology*. Notre Dame: Fides, 1974. p. 188; *ibid.*, *Ongoing Revision in Moral Theology*. Notre Dame: Fides, 1975, p. 156; *ibid.*, *Transition and Tradition in Moral Theology*. Notre Dame: U. of Notre Dame Press, 1979. p. 212; McCormick, R. A., "Abortion: Rules for Debate," *America* 139, 2 (1978), pp. 26-30; *ibid.*, "Bioethics in the Public Forum," *Milbank Memorial Quarterly: Health and Society* 61, 1 (1983), pp. 113-126; *ibid.*, *Health and Medicine in the Catholic Tradition*. New York: Crossroad, 1984, pp. 134-135; *ibid.*, *Notes on Moral Theology: 1965 through 1980*. Washington: University Press of America, 1981. p. 797; *ibid.*, "Who or What is the Preembryo?" *Kennedy Institute of Ethics Journal* 1, 1 (1991), pp. 1-15; Shannon, T. A., "The Moral Significance of Brain Integration in the Fetus," in: Humber, J. M. and Almeder, R. F., eds., *Bioethical Ethics Reviews: 1991*. Totowa, New Jersey: Humana Press, 1991. pp. 123-144; Shannon, T. A. and Cahill, L. S., *Religion and Artificial Reproduction: An Inquiry into the Vatican "Instruction on Respect for Human Life in Its Origin and on the Dignity of Human Reproduction"*. New York: Paulist, 1979. p. 116; Shannon, T. A. And Wolter, A. B., "Reflections on the Moral Status of the Pre-Embryo." *Theological Studies* 51 (1990), pp. 603-626.

12. *Time*, August 29, 1994, pp. 60-61; *U.S. News and World Report*, October 3, 1994, p. 60.

13. *U.S. News and World Report*, January 3, 1994, pp. 78-79.