

THE STATUS OF THE HUMAN EMBRYO: ONTO-BIOLOGICAL CONSIDERATIONS

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If we present a man with a concept of man which is not true, we may well corrupt him. When we present man as an automaton of reflexes, as a mind-machine, as a bundle of instincts, as a pawn of drives and reactions, as a mere product of instinct, heredity, and environment, we feed the nihilism to which modern man is, in any case, prone. I became acquainted with the last stage of that corruption in my second concentration camp, Auschwitz. The gas chambers of Auschwitz were the ultimate consequence of the theory that man is nothing but the product of heredity and environment—or, as the Nazi liked to say, “of Blood and Soil.” I am absolutely convinced that the gas chambers of Auschwitz, Treblinka, and Maidanek were ultimately prepared not in some Ministry or other in Berlin, but rather at the desks and in the lecture halls of nihilistic scientists and philosophers.

V. E. Frankl, *The Doctor and the Soul: From Psychotherapy to Logotherapy*, Revised and explained (vintage, third ed.1986), XXVII

In order to deal with the topic of *the status of the human embryo*, I am going to observe first some introductory aspects of the issue, for later reflecting on the objective biological properties of the embryo. Once gathered enough elements useful to my analysis, I will delineate specific ontological observations concerning the status of the human embryo. The scope of this work is the attempt to offer a valuable reflection for the academic discussion without the presumption to offer a definitive solution.

PRELIMINARY DISCUSSION

The need to recognize the embryo's status, in this historic moment, is exceedingly imperative, urgent, for the specific and sensitive reasons about which a perpetual discussion continues to rage. «The ability to create human embryos in vitro, freeze them, submit them to manipulative interventions (for scientific, therapeutic or eugenic purposes), implanting them in female uteruses for the purpose of procreation constitutes, however, one of the most controversial chapters in discussions on bioethics»¹.

¹ ITALIAN NATIONAL COMMITTEE FOR BIOETHICS, *Identità e statuto dell'embrione umano*, 22 giugno 1996, on: <http://www.presidenza.governo.it/bioetica/pdf/25.pdf>, 10.04.2016.

The genesis of the reasons that leads to feeling the weight of responsibility towards this situation is symptomatic, perhaps, of the fact that the universal recognition of the rights and dignity of the person is not so universal after all, indeed, it is only a theoretical notion, latently recognized, and in no way binding. For stating it in the manner of Kant, rights, dignity, and values would become a categorical imperative² when they would not be violated or transgressed for any reason or justification.

However, one can say that the problem of status of the human embryo is, in fact, caused by many converging issues, partly interdependent on each other, but which all have, finally, one underlying element: the obvious lack of an immutable principle to orientate towards, all together and without exception, or opt out. Unfortunately, there is not a common sentiment, at least at present, about nature, moral law or ethics; that is why I felt it was opportune to speak of “the problem of the status of the human embryo.”

² «Kant distinguishes between hypothetical imperative and categorical imperative: while the hypothetical imperative commands, in fact, an action in view of an extrinsic and conditioned end to it, with respect to the fact that we want that end or not; instead, categorical imperative controls an action unconditionally, “as necessary in itself, outside every relationship for a different aim, namely as objectively necessary”. The categorical imperative - that is the law of duty - therefore does not impose this or that action, it does not have a specific content; it determines the will *a priori*, by prescribing the manner, the form of our action, the regulation of the desire. This rule is that man obeys the requirements of reason. Acting according to reason is therefore the fundamental moral rule; and since reason is universality, the moral action puts us in a sphere of rationality and universality in which all rational spirits are found. The moral norm therefore controls, first, that our action can be - in that it is rational - universal. Where there is only one categorical imperative or the fundamental law of practical reason: “act in accordance with the maximum that, at the same time, you can want it to become a universal law” (where “the maximum” is the subjective principle of the action, while the “Law” is the objective principle, valid for every rational being). There may be two other formulations of the same categorical imperative: “act as if the maximum of your action should be elevated by your desire to the universal law of nature”; man promotes, as a rational being, a moral Kingdom, the Kingdom of purposes, of freedom. Still more, a third formulation: “act so as to treat humanity, both in your person or in that of every other, always, as an end, never only as a means”; man can never reduce another man to an instrument, but this must be the purpose of the action of each of us, for the ends of good actions. Moral law therefore constitutes the reason that determines the will: not according to the subject, the content, but as a principle or form. If the content were to determine the will, this would always be particular, and the will would be subject to an empirical condition (the connection between the representation determining the will and the feelings of pleasure and displeasure). To be truly universal the reason that determines the will must be purely moral and requires obedience to reason as the principle of universal law (the duty for the duty)», F. ADORNO - T. GREGORY - V. VERRA, *Storia della filosofia*, Edizioni Laterza, Bari 1975, 472-473.

With some perplexities, I recognize that numerous orientations exist regarding the embryo, which appear not to have any points in common³, and are even, in some cases, rather in contrast to each other⁴.

In this regard, Carlo Casini, in his article, asks the following questions: «Is the unborn a human being or not? If he is a human being, is he or is he not a child; and if he is a child, is he or is he not a child to be born? The positive response, scientifically and legally founded, is the keystone»⁵.

Whether the response is positive, as Casini maintains, or negative, as others uphold, I could not say at this time. However, I am aware of the fact that around this question there is much confusion and a great deal of relativism.

BIOLOGICAL ANALYSIS

The Center for Bioethics at the *Catholic University of the Sacred Heart* in Rome has already expressed itself on the topic in the past. In its document, it has searched for what could be objective data, recognized as such by all, which could contribute to a common approach toward the recognition of a status of the embryo. According to the document drafted by the Center, the embryo has three biological characteristics that identify it, effectively without any possibility of misunderstanding, as an individual belonging to the human species, therefore human being⁶. The three characteristics are Coordination, Continuity, and Graduality.

³ Cfr G. CICHESE, «Il “problema uomo” tra filosofia e biologia», in G. CICHESE – A. PETTOROSSO – S. CRESPI REGHIZZI – V. SENNI (edd.), *Scienze informatiche e biologiche. Epistemologia e ontologia*, Città Nuova, Roma 2011, 297-306.

⁴ Cfr P. SINGER, *Ética práctica*, Akal, Madrid 2009, 155-160.

⁵ C. CASINI, «Ma sono già orfani quegli embrioni congelati», *Avvenire*, 6 marzo 2015, 20.

⁶ «I- Coordination. In the whole process, from the formation of the zygote onwards, there is a series of molecular and cellular activities, guided by the information contained in the genome, and under the control of signals originating from the interactions, that multiply incessantly at every level, within the embryo itself, and between it and its environment. Precisely from this guide and from this control derives the strictly coordinated expression of thousands of structural genes, which involves and confers a close unity to the organism that is developing in space and time. II - Continuity. The “new life cycle” which begins with fertilization proceeds - if the required conditions are met - without interruption. The single events, for example, cellular reproduction, cellular determination, tissue differentiation and the formation of organs, obviously take place successively. Yet the process itself of the formation of the organism is continuous. It is always the same individual who is acquiring his definitive form. Should this process be interrupted, at any time, the “death” of the individual would occur. III – Graduality. Intrinsic to the process of the formation of a multicellular organism is the law that it acquires its final form through its passage from simple, to more complex forms. This law of the gradual acquisition of the final shape implies that the embryo,

Those three native skills are perpetually present within the human person and never vanish or change⁷. Indeed, even after birth the human being continues on developing coordinated, without interruptions and gradually.

While, for pure observational reasons biologists are inclined to give nomenclatures and distinguishing moments in categories for facilitating their observations, it is fair to say that there is not a very new and extraordinary event that mutates our comprehension of the embryo. To be more specific, morula, blastocyst, zygote, embryo, are specific names given to segments of a bigger coordinated, continuous, and gradual process. Each moment it is not *ex nihilo* and self-referential, detached by what was previously and what is coming later.

Before the male gamete fertilizes the female gamete⁸, there is not any process presenting those three specific characteristics that could generate by itself a human being⁹. The very moment in which something totally new starts is the fertilization. Those considerations are the essence of reproduction and are valuable for every living species with a sexual reproduction.

Despite the fact that those data investigated and reported by the Center are objectively and undeniably biological, not philosophical, and can therefore be accepted even by those who do not

from the state of a cell onwards, permanently maintains its own identity and individuality throughout the entire process». CENTRO DI BIOETICA DELL'UNIVERSITÀ CATTOLICA DEL S. CUORE, «Identità e statuto dell'embrione umano, 22.6.1989», *Medicina e morale*, 39 (1989, 4), 666-667.

⁷ «It appears far more logical to consider the development of the zygote as a whole, even if with an appropriate differentiation of the parts, some of which may well be destined to have a function limited in time, after which they are destined to disappear. We cannot maintain, for example, that deciduous dentition is less human than definitive teeth», SPAGNOLO, *Bioetica nella ricerca e nella prassi medica*, Edizioni Camilliane, Torino 1997, 236.

⁸ In following, we reconstruct, through citation, the process in which the new genetic heritage is formed by means of the gametes of the Father and of the Mother. «Immediately after the entry of the spermatozoa, the fertilized oocyte, now called zygote, faces two problems. First, it must prevent other sperm cells from fertilizing it, because this would create triploidy (with an extra spermatozoa) or polyploidy (with many more spermatozoa). [...] shortly after the nucleus of the sperm has entered the egg the nuclear membrane breaks, and within 2-3 hours the highly condensed chromatin begins to expand with the progressive removal of protamines and their replacement with histones of maternal origin that are present in the cytoplasm of the egg. This de-condensation is actively induced by cytoplasmic factors that were synthesized in the latter stages of the oogenesis, and gradually makes the transcription of the father's genes possible again. [...] At this point (about 4-6 hours after fertilisation), both the chromosomes of the egg and those of the sperm are free in the cytoplasm, but do not unite immediately. Instead, they are surrounded by separate nuclear membranes, thus forming the promoters of the zygote. Later, both the male and the feminine pronuclei abandon their peripheral position to begin a slow migration towards the centre, lasting 12-16 hours. During this journey, their haploid chromosomes duplicate the DNA, acquiring the double chromatids which are necessary for mitosis», BARBIERI – CARINCI, *Embriologia*, Casa Editrice Ambrosiana, Milano 2015³, 121-123.

⁹ Cfr P. L. GUIDUCCI, *Manuale di diritto sanitario*, FancoAngeli, Milano 1999, 673.

believe that ontological existence is particularly significant, there is still skepticism, and the refusal to recognize that the instant of the meeting of the gametes, thus of conception, determines the beginning of a new individual.

However, there is one significant objection for attributing the status of individual to the human embryo because of the phenomenon of twinning. According to this school of thought the sole possibility that the zygote would split itself in two or more and producing twins would be enough sufficient to disprove the embryo as an entity with an individual status¹⁰. The first consideration to be made related to this objection need a brief preliminary distinction between twinning from multiple zygotes and twinning from a single zygote. While the former can be easily rejected because it is logical to discuss individuality in presence of two already distinct embryos, the latter instead requires a more careful analysis.

Indeed, the premise of the argument is that individuality cannot be even considered because the zygote has the potentiality to divide and generate two or more embryos. Therefore, the logical fallacy of the argument excludes *a priori* the already existing individuality of the zygote that have not yet split. Besides, I believe Gómez-Lobo correctly observes that «potential plurality is not inconsistent with actual unity. Therefore, it would be unwarranted to claim that the hundreds of thousands of human embryos that perhaps could have divided into two surviving embryos, but never did, were not individuals all along»¹¹.

It almost seems as if one wants to deny or forget the status of the embryo for convenience when, in fact, «respecting the dignity of man means – in the face of the great progress made by science

¹⁰ «The reasoning goes like this: an adult is an individual, but no embryo is a single individual because in its early stages it can divide and give rise to twins. It is potentially two (or more) individuals. The alleged conclusion to be drawn is that identity (the relation expressed by the phrase “is the same as”) cannot jump the gap that separates the early stages of embryonic development from an adult individual». A. GÓMEZ-LOBO, *Bioethics and the Human Goods: An Introduction to Natural Law Bioethics*, Georgetown University Press (Kindle edition), Washington D.C. 2015, 39.

¹¹ A. GÓMEZ-LOBO, *Bioethics and the Human Goods: An Introduction to Natural Law Bioethics*, 39.

and technology - safeguarding his biological nature and his personal identity»¹². The point of the matter is exactly this: who is the embryo?

ONTOLOGICAL ANALYSIS

While on the one hand, some are willing to evaluate the embryo as a human being, there are other more pragmatic thinkers and skeptics who do not recognize a status to the embryo, since they *a priori* do not attribute it to the already formed fetus, suggesting:

«that we grant to the life of the fetus a value not greater than that which we give to the life of a non-human animal that has a similar level of rationality, self-knowledge, awareness, sensory capacity etc. Since no fetus is a person, no fetus has the same right to life as a person. [...] For now it is enough to say that, while that capacity does not exist, an abortion puts an end to an existence that has no “intrinsic” value»¹³.

So ultimately, this is always the source of the problem and the related evaluations. Everyone relates to human embryos depending on their own way of thinking, not according to what the embryo is, but on what they think it is.

Indeed, we come to the point of segmenting the biological development process, attributing different values to each moment even arriving at the point where we do not call it human life¹⁴.

Many reasons have been given in support of the argument that the embryo has its own status.

Nevertheless, we are always in search of loopholes to deny what the embryo in fact is: human life¹⁵.

Therefore, is it so necessary that we arrive at the moment of birth to consider it as a human being? Or is it sufficient to understand that it is a human life from that moment of conception? I

¹² M. FUMAGALLI MERAVIGLIA, «Biotecnologie e tutela internazionale della dignità umana», in S. ZANINELLI (ed.), *Scienza, tecnica e rispetto dell'uomo. Il caso delle cellule staminali*, Vita e Pensiero, Milano 2001, 181.

¹³ P. SINGER, *Scritti su una vita etica*, Il Saggiatore, Milano 2004, 176.

¹⁴ Cfr SPAGNOLO, *Bioetica nella ricerca e nella prassi medica*, 233-236.

¹⁵ «Some people attempt to justify abortion by claiming that the result of conception, at least up to a certain number of days, cannot yet be considered an individual human life. In reality, “from the time that the ovum is fertilized, a life is begun which is neither that of the father nor the mother, but the life of a new human being who develops by himself. It will never become human if it were not human then. This has always been clear, and modern genetic science offers clear confirmation of it. It has demonstrated that from the first instant the programme of what this living being will be is established: a person, an individual person with his characteristic aspects already well determined. The adventure of a human life begins right from fertilization, and the great capacities of each of whom require time to set up and to be ready to act”. Even if the presence of a spiritual soul cannot be ascertained by the observation of any experimental data, it is the conclusions of science itself on the human embryo that provide “a valuable indication for rationally discerning a personal presence from this first appearance of a human life: how could a human individual not be a human person?». JOHN PAUL II, encyclical letter *Evangelium Vitae*, 25 march 1995, 60: AAS 87 (1995), 468-469.

can safely say that one can consider pointless to fragment human development into stages, just to prove its indefinability. On the contrary, as previously mentioned, by analyzing the various stages of development the deriving outcome is to notice that the three characteristics observed by the Bioethics Center of Sacred Heart are the only perpetual presence in human life from its beginning to its end. It is not the temporal moment in which an observation can be made to determine the ontological identity of a person. For example, gather social data by conducting a study over a group of teenagers (14-16 years old) will offer information about how members of the human species behave in a specific environment at certain age, but the same study would not be able to say if they are more or less human than others. It would be fair to derive logically that is not by observing the various moment of growth of an embryo that one can propounding the status of human being. This status has been already given by its very nature.

The fundamental mistake to avoid while reflecting on the status of the human embryo is to deny or derive philosophical truths solely from empirical observations *ipso facto* and *vice versa*¹⁶. Therefore, debunking ontological articulations by the use of empirical reasoning is profoundly fallacious. Both fields have to cooperate with each other without invading the realm that is not proper to them.

However, many people, as it is understandable, orient themselves as best they can in this delicate debate. Some base their opinion on biology, some on philosophy, others on theology. Some do recognize the individual status of embryo it in part or do not recognize it at all¹⁷. Instead, I am considering that the approach to the problem does exist precisely within this diverse

¹⁶ «[Hume] pointed out that the only reason we think that induction is a good way to proceed about making inferences concerning the world is because it has worked in the past [. . .] Hume was saying that our endorsement of induction is in itself a form of induction: we argue that induction works because it has worked in the past, thereby applying inductive reasoning to justify induction. This, Hume observed, is an instance of circular reasoning, one of the most elementary logical fallacies. Let me put it clearly: Hume's critique amounts to saying that there is no rigorously logical foundation for the entire enterprise of science!». M. PIGLIUCCI, *Answers for Aristotle: How Science and Philosophy Can Lead Us to a More Meaningful Life*. Basic Books (Kindle edition), New York 2012, 1445-46.

¹⁷ Cfr I. NUÑEZ DE CASTRO, *De la dignidad del embrión. Reflexiones en torno a la vida humana naciente*, Universidad Pontificia Comillas, Madrid 2008, 1-8.

comprehensions and conjectures about the fundamental anthropological account for the human being, in its being already formed or being still at the embryonal stage.

The fact is that there are some who, gathering strength, hide behind their own meddling hegemony in the field of knowledge of empirical science, when everyone knows that not even within the field of research, one can deny the embryo human-being at a systematic level.

«Because no procedure exists that allows us to deduce, from anatomical research on animals or through mathematical formulas, in what way a human egg develops into a human embryo and thus the newborn child [...] there is no way to convince us that the story of living beings on this planet has been only that of an evolution. If the development were nothing but evolution, then it would be, as the word stresses unequivocally, a one-way process from the inside outwards, an unfolding and therefore inevitably in constant progress from simple to complicated. There is nothing, however, to demonstrate all this, not even in the ontogenesis»¹⁸.

As a society, we are witnessing a disconnected series of theoretical approaches driven by ideology rather than well-reasoned arguments¹⁹. From any perspective, the final accounts on the status of the human embryo find their *raison d'être* either in personal convictions or in one own interest. Bioethics was born from the necessity to establish a dialogue between the scientific, as well as biological, dimensions and human values²⁰. However, both the fields appear to be in conflict on issues such as the beginning of life. Fortunately, the contrast seems to be due to a matter of will rather than of substance, and therefore it is mutable and can be resolved.

¹⁸ BLECHSCHMIDT, *Come inizia la vita umana*, Futura, San Benedetto del Toronto (AP) 2019, 11-12.

¹⁹ «For some, as is known, the human embryo/fetus is to be considered, and consequently to be treated, as a “thing”, which man can use for his most various own purposes or interests. [...] Some formulate the concept of the potential human person: this is the status of the embryo. [...] it seems to us to be entirely unacceptable to thus define the human embryo: potential is not the being of the human embryo, only its development is potential. After all, in relation to development, potential must be predicated not only for the embryo/fetus, but also for the born human being, indeed for the human being in all his/her subsequent stages of existence: infancy, childhood, adolescence etc. [...] Others propose authorizing scientific experimentation on artificial human embryos until 14th day of in-vitro fertilization. As it is well known, this is the position assumed in July 1984 by the Warnock Commission. It is a completely pragmatistic position, which is absolutely without any rational value», D. TETTAMANZI, *Bioetica. Difendere le frontiere della vita*, Piemme, Casale Monferrato (AL) 1996³, 237-238.

²⁰ Cfr SGRECCIA, *Manuale di Bioetica. Vol. I*, Vita & Pensiero, Milano 2007, 3-4.

A final question then arises spontaneously under the light of what has been considered so far: is there, ultimately, a real theoretical consideration that is capable to define universally the status of human embryo with which most people could agree?²¹

²¹ Only in a few of these cases, however, has there been a serious evaluation, without any obstacles; even for those who share the same ideas it is somewhat complicated to reach the same conclusions, as D'Agostino affirms in the presentation of the document "Identity and statute of human embryo", of the Italian National Committee for Bioethics (INCB) which argues that, «This unanimity was gained by paying a price: that of recording within the document some differences of opinion that appeared within the INCB on particular, thorny points, the decisions on which proved to be not only impossible but especially inopportune. This does not mean however, despite appearances, that the unanimity achieved by the INCB was not authentic or that it has been somehow split by the additional statements that accompany the document and in which are adequately set out the divergences in evaluation recorded in the main document with the due conciseness». COMITATO NAZIONALE PER LA BIOETICA, *Identità e statuto dell'embrione umano*, on: <http://www.presidenza.governo.it/bioetica/pdf/25.pdf>, 10.04.2016; For a better understanding of the motivations for which Ethical Committees are created, the contents of their pronouncements and the principal notions of the Italian CNB, we give, in following, some selected information: "In the last decades, progress in the scientific research and technology applied to biology and medicine have notably widened Man's operative potential. [...] The ever more advanced knowledge of the genetic and molecular mechanisms that regulate life in general, and which in the field of Man's congenital illnesses offer potential room for radical therapeutic interventions, but also the possibility of voluntary and transmittable alterations of genetic patrimony, such as genetic tests, gene therapy, staminal cells, has assumed particular importance. Finally, in evaluating the relationship between Man and the world of living things, ethical reflection appears to be of great importance, with possible juridical consequences concerning it regarding not only the production of new species by genetic manipulation, whether they be vegetables or animals, but also concerning the role of 'responsibility' that Man himself must recover, after phases of indiscriminate abuse of nature, [...] These organs, therefore, aim not only to represent a new type of scientific analysis, but also to furnish their Governments, Administrative bodies and national Parliaments elements for evaluating the ethical "values" involved in the choice between one legislative solution or another inspired, however, by supranational documents. Other than any unacceptable "State ethic", the significance of these organs is therefore "maieutic" [...] By Decree of the Prime Minister dated the 28th march 1990, Italy also has a national ethics Committee (CNB). [...] In past years, the CNB has enlarged its components by successive Decrees of the Prime Minister (PM's decree of the 10th July 1991; 11th June 1992; 16th December 1994; 23rd March 1999). Recently, the CNB put its works on internet and stipulated an agreement with the Ministry of Education for the drafting of the criteria useful for teaching and spreading bioethics in Secondary Schools (Memorandum of Understanding 6/X/1999), and with the Ministry of Health (Protocol 2 March 2001)», A. BOMPIANI, «Comitato Nazionale per la Bioetica», in S. LEONE – S. PRIVITERA (edd.), *Nuovo Dizionario di Bioetica*, Città Nuova, Roma 2004, 206-209.

BIBLIOGRAPHY

- ADORNO F.– GREGORY T.– VERRA V., *Storia della filosofia*, Edizioni Laterza, Bari 1975.
- BARBIERI M. – CARINCI P., *Embriologia*, Casa Editrice Ambrosiana, Milano 2015.
- BLECHSCHMIDT E., *Come inizia la vita umana. Dall'uovo all'embrione*, Futura, San Benedetto del Toronto (AP) 2009.
- BOMPIANI A., «Comitato Nazionale per la Bioetica», in S. LEONE – S. PRIVITERA (edd.), *Nuovo Dizionario di Bioetica*, Città Nuova, Roma 2004.
- CASINI C., «Ma sono già orfani quegli embrioni congelati», *Avvenire*, 6 marzo 2015.
- CENTRO DI BIOETICA DELL'UNIVERSITÀ CATTOLICA DEL S. CUORE, «Identità e statuto dell'embrione umano, 22.6.1989», *Medicina e morale*, 39 (1989, 4).
- CICCHESE G., «Il “problema uomo” tra filosofia e biologia», in G. CICCHESE – A. PETTOROSSO – S. CRESPI REGHIZZI – V. SENNI (edd.), *Scienze informatiche e biologiche. Epistemologia e ontologia*, Città Nuova, Roma 2011.
- FUMAGALLI MERAVIGLIA M., «Biotecnologie e tutela internazionale della dignità umana», in S. ZANINELLI (ed.), *Scienza, tecnica e rispetto dell'uomo. Il caso delle cellule staminali*, Vita e Pensiero, Milano 2001
- GÓMEZ-LOBO A., *Bioethics and the Human Goods: An Introduction to Natural Law Bioethics*, Georgetown University Press (Kindle edition), Washington D.C. 2015.
- GUIDUCCI P. L., *Manuale di diritto sanitario*, FancoAngeli, Milano 1999.
- ITALIAN NATIONAL COMMITTEE FOR BIOETHICS, *Identità e statuto dell'embrione umano*, 22 giugno 1996, on: <http://www.presidenza.governo.it/bioetica/pdf/25.pdf>, 10.04.2016.
- JOHN PAUL II, encyclical letter *Evangelium Vitae*, 25 march 1995, 60: *Acta Apostolicae Saedis* 87 (1995).
- NUÑEZ DE CASTRO I., *De la dignidad del embrión. Reflexiones en torno a la vida humana naciente*, Universidad Pontificia Comillas, Madrid 2008.
- PIGLIUCCI M., *Answers for Aristotle: How Science and Philosophy Can Lead Us to a More Meaningful Life*. Basic Books (Kindle edition), New York 2012.
- SGRECCIA E., *Manuale di bioetica. Vol. I*, Vita e Pensiero, Milano 2007.
- SINGER P., *Ética práctica*, Akal, Madrid 2009.
- SINGER P., *Scritti su una vita etica*, Il Saggiatore, Milano 2004.
- SPAGNOLO A. G., *Bioetica nella ricerca e nella prassi medica*, Edizioni Camilliane, Torino 1997.

TETTAMANZI D., *Bioetica. Difendere le frontiere della vita*, Piemme, Casale Monferrato (AL)
1996³.