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Biomedical and Ontological Transformation of Death Into Sickness

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Abstract

This piece seeks to present some origins of the biomedical transformation and ontological of death -as an ontological determinant- into sickness, a step that will be possible thanks to the advancements in medicine and biotechnology. From that exposition, the contributions of Craig Venter, María Blasco, Raymond Kurzweil, and Nick Bostrom about the control and overcoming of aging, robotic humanizations, and constant improvement of human life limitations in front of its determinant possibility (finitude). Those issues were studied from the philosophical platform that Martin Heidegger expresses in *Being and Time*, where he understands death as the *most proper, irrespective, and unavoidable possibility the Dasein* must face. Finally, the problem of death with senescence in its current state is articulated. The article promotes, in conclusion, new propositions to prosecute the characterization of this biomedical and ontological transformation of death -as an ontological determinant- into sickness.

Keywords: Biotechnology; death; aging; body; ontology.

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Introduction

In the last decade, medicine, robotics, and IT have reached significant advancements in different aspects. From micro-machines for biomedicine to large-scale systems for robotic construction, from robots for the outer space to those involved in the exploration of deep waters. Likewise, bioinspired designs are a trend that forges a direct communication between brain and machine, cerebral emulation and biological cognition. In January 2018, the *Science Robotics* journal published an article where 17 experts of robotics, philosophy, healthcare, among other disciplines, participated. They were led by the director of the Hamlyn Center in the UK, Guang-Zhong Yang. In this article, the authors proposed ten grand challenges of robotics that may have major breakthroughs, significant research, and/or socioeconomic impact in the next 5 to 10 years.[1] These advancements are modifying reality and opening new horizons and possibilities for life that lead us to think about today. This discussion refers to the constitutive elements of human life, such as aging and death, and to the fact that theymust be discussed from their ontological principles. The technologies mentioned above are transforming the determinant configuration of life, even if that is not their primary goal. Hence, our interest is to cast light over the origins of the metamorphosis of what we understand as "natural."

For the development and compliance of the proposed objective, this article initially establishes a direct relation between those challenges and the origins of the biomedical and ontological transformation of death. Thus, it is necessary to go through the most significant works on AI and molecular biology. Therefore, it is essential to study the works of the American molecular biologist, Craig Venter, who leads the studies in synthetical biology.

After that, the article will review the contributions of María Blasco, Raymond Kurzweil, and Nick Bostrom on overcoming and controlling aging, robotic humanization, and constant improvement of the limitations of human life in front of its determinant possibility (finitude).

These contributions will be reviewed from the philosophical platform of Martin Heidegger in *Being and Time*, where he understands death as the *most proper, irrespective, and unavoidable possibility* the Dasein must face.

1 The proposed challenges of robotics are (i) New materials and fabrication schemes, (ii) Biohybrid and bioinspired robots, (iii) New power sources, battery technologies, and energy-harvesting schemes for longlasting operation of mobile robots, (iv) Robot swarms, (v) Navigation and exploration in extreme environments that are not only unmapped but also poorly understood, (vi) Fundamental aspects of artificial intelligence (AI) for robotics, (vii) Brain-computer interfaces (BCIs), (viii) Robotic social interaction, (ix) Medical robotics with increasing levels of autonomy, (x) Ethics and security for responsible innovation in robotics.

Finally, the paper focuses on the configuration of senescence in its actual conceptual state. Hence, the elements developed in the other sections are picked up and are critically reviewed in the frame of the stage of life wheremany technologies find a rival to defeat: aging.

1. Reduction of life to physics and chemistry

Craig Venter is a scientist who had a significant impact in the biotechnological world because his work opened the possibility to improve the human body with technology. From this perspective, it is viable to imagine the design of simple animal forms that may allow to regenerate a damaged, sick, or aging body, improve the human body, among other possibilities[2].

That means humankind is in a period of transition, *ad portas* of achieving a new step in the evolutive race[3]. Nevertheless, the synthetic life exposed in his work may represent much more than a simple 'phase' of evolution. From this perspective, building new ways of life is the final goal of biology, where human beings can serve as creators of lively natures.If the human being achieves the control of organic materials, reducing the notion of life to chemistry and physics is entirely feasible.

His research illustrates a convergence between DNA code and computer code, the result will be a new era in digital biology, where a genome can be designed in a computer, transmitted through large distances via radio or electromagnetic waves, and reconstituted in a quick synthesizer to produce a new form of life.

Since the discovery of the DNA as life's software, the use of computer simulations of synthetical cells was extended. This allows researchers to avoid wasting time and money creating real synthetical cells for testing. For Venter, the future of biological research is deeply based on the combination of IT and synthetical biology[4]. He adds that the DNA can be written and programmed just as software is, which eases the possibility of human improvement. This may be used to synthesize vaccines around the world and intercept global pandemics. It can be used to modify the DNA sequence of a life form in an exoplanet and transmit it back to earth in a few minutes to recreate it here, and even think of the possibility of creating immortal synthetic life.

When evaluating the positive and negative aspects of the DNA control obtained through research in synthetic biology, Venter discusses its ethical and economic

2 VENTER, Craig. (2015). *La vida a la velocidad de la luz*. (J. Ros, Trad.) Crítica: Barcelona, 2015. P. 185.

3 Ibid. p. 16.

4 Ibid. 117.

impact. Humanity must embrace every achievement of science and of the industry, in its broadest sense. Lastly, Venter acknowledges that, with so many unfavored regions in the world facing an inadequate energy supply, the most valuable resource of any economic activity, it is time for most of humanity to embrace the infinite grounds of synthetic biology. Thus, it is an ethical imperative to continue with the investigations on the digitalization of life.

2. Telomeres and telomerase: some notions on aging

María Blasco is the director of the *Centro Nacional de Investigaciones Oncológicas* (National Center of Oncological Research, CNIO in Spanish) located in Madrid. She, with a group of researchers, works on a project about the role of telomeres in aging, as they are proteic structures that protect the end of the chromosome that shortens each time a cell divides. The length of the telomeres is one of the most precise and trustworthy biomarkers of the passing of time in the organism[5] and of the reactivation of telomerase.

The group led by Blasco injected mice with a viral vector that carried a copy of the telomerase gene of mice. Furthermore, they injected middle-aged and old mice with the viral vector, obtaining the following results: The lifespan of the middle-aged mice increased by 24 %, and 13 % in the old mice. Blasco explains these results supported on cell life and functioning. Each time a celldivides, it must duplicate its genetic material, which is packed in chromosomes, because in each division chromosomes get shorter and shorter[6]. Now, what is shortened is the telomere, a DNA and proteic structure that protects the ends of each chromosome.

The above-mentioned means that the more the celldivides, the shorter the telomere gets. The shortening of the telomeres gives an approximate of how many times the cell has divided[7], which also marks its age. Now, and this is the novelty of Blasco's work, she discusses the role of telomerase reactivation. Telomerase is an enzyme that allows the telomere DNA to grow again.It reverses the shortening process because it rebuilds the telomeres that protect DNA.

Telomerase avoids short telomeres in each cell. This is important because the shortening provokes considerable damage that leads the cells to stop dividing or opt for "suicide"[8]. In both cases, tissues lose their regenerative capacity. Blasco is convinced that one of the effects of senescence in organisms is the shortening of

5 BLASCO, María; SALOMONE, Mónica. *Morir jóven, a los 140.* Paidós: Barcelona, 2016. P. 14.

6 Ibid. 20

7 Ibid. 20

8 Ibid. 21

telomeres because, as it was said before, tissues lose their regenerative capacity. This is the first factor that backs the hypothesis that states that by curing the aging process, diseases are also cured. She believes that this is the first time aging is treated with a strategy directed to the process of aging itself[9].

Therefore, the objective of her research is to revert this process through the cellular reactivation of telomerase, as this would allow plenty of benefits for health and physical conditions such as sensibility to insulin, osteoporosis reduction, improvement of neuromuscular coordination and improvement of other parameters associated with aging.

3. The immortality of cerebral information: genetic openings, nanotechnology, and robotics pointing to the surging of singularity

From 2013, Ray Kurzweil was caught up by Google's IT resources. His work in Google focuses on the understanding of natural language. Despite the advancements made in semantical connections the mega-searcher does when we write down a series of keywords, it still does not index all of the semantic content of the millions of webpages and book pages. The large amount of information stored by this mega-searcher[10], and the development of deep learning systems and techniques may let us, says Kurzweil, lead computers to analyze semantical meanings, which will allow the construction of a system (an AI brain) with the capability of organizing, building, and rebuilding concepts, and then, making inferences itself. In other words, it would be the door that opens the digitalization of cerebral information.

For Kurzweil, the future of computer science is the digitalization of consciousness and intelligence. Kurzweil introduces the notion of *singularity*, a reference to the fact that progress in IT grows exponentially, which is visible in the fusion of human biology with AI, nanotechnology, and robotics. The American futurist bets on the immortality of the human species, which implicates the derogation of the human limit to synthesize the strengths of human intelligence and artificial intelligence[11] that, after overcoming the human brain, will signify the inverse engineering of the human brain, that is to say, human brain will be reconfigured and redesigned, which is a direct derivation of the development of a higher resolution through software scanning.

9 Ibid. 22

10 This information comes mostly from the most than a billion users Google has annually. See: Berardi 2017.

11 KURZWEIL, Raymond. *La Singularidad está cerca: Cuando los humanos transcendamos la biología.* (C. García Hernández, Trad.) Lola Books: Berlín, 2013.

From the work of Craig Venter, Kurzweil establishes a relation between genetics, nanotechnology, and robotics, analyzing how they pave the way for singularity. These disciplines have a common origin, as the three were developed in the first years of the 21st Century. Kurzweil establishes the possibility of DNA reprogramming from Venter's synthetic life to predict the radical extension of life, the elimination of diseases, and the expansion of the human potential through the genetic advances of technological equipment[12]. Kurzweil also establishes that the development of the synthetical life through DNA reprogramming may solve some problems that are of vital significance for the United Nations, such as hunger in the least developed countries.

Kurzweil also foresees that a strong AI will be the most critical transformation of the 21st Century because human biology would dominate, in that given case, its intelligence, and would have discovered means to overcome its limitations.

Even as singularity will presumably eliminate the distinction between work and game due to the easing of the access to information, Kurzweil anticipates that information will gain value, leading to an increase of the importance of the protection of the intellectual property. From that reality, Kurzweil analyzes the risks and benefits that come with singularity. He considers, as Venter does, that developing and fostering technologies that improve and protect the human species is a moral imperative.

4. Reach, uncertainty, and challenges: looking at the developments of AI

In his book, *Superintelligence*, Nick Bostrom studies how an intelligence superior to human intelligence may occur, that is to say, an intellect that exceeds the cognitive performance of human in almost every area[13], something that may happen in a few decades, or a century. Bostrom calls this the period of intelligence explosion, an analogous term of Kurzweil's singularity as the possibility of the explosion of intelligence from the perspective of an artificial superintelligence[14]. However, Bostrom tries to separate himself from Kurzweil as he says that the term *singularity* may lead to confusion and to fields that, for their nature, lack scientific rigor.

Now, if this intelligence explosion and the development of superintelligence occurs unexpectedly in a way human beings cannot perceive it [15], humankind would not control the system, which may lead to its demise. Bostrom's warning starts with a

12 Ibid, 2013.

13 BOSTROM, Nick; SAVULESCU, Julian. *Mejoramiento humano*. (I. Ramia, & A. Jiménez, Trads.) TELL: Madrid, 2017. P. 22.

14 Ibid. 2

15 BOSTROM, Nick. *Superinteligencia*. *Caminos, peligros, estrategias*. (M. Alonso, Trad.) TELL: Madrid, 2018. P. 53.

parable of a group of birds that say they should find a young owl and raise it as their servant, which would help them to avoid doing the tasks they do not want to do, such as building their nest. Bostrom says that making a superintelligent machine without having complete control over it may compromise human life because if the device is not created with enough care, it would overcome humankind and humans will not be able to stop them, as the device is more intelligent than human beings [16].

Even an intelligence designed solely to answer questions is not safe. It could determine that to achieve its final goal of answering questions, it must fill the universe with its database and processors to answer them better, or it could destroy everything in the world that can ask complicated questions to it, that means, killing humans, and replace them with something simpler[17]. The difficultyabout superintelligence, says Bostrom, would consist in teachinghuman moral values to a computer. Human beings have been discussing which values should predominate for three millennia, and they have not advanced much in that discussion. That means the task today is to establish which are the values that must become a part of the axiological scale of IT systems.

It is vital to discuss the chapter of the book that enounces the paths and possibilities for achieving superintelligence. Bostrom exposes four areas he considers that will pave the way for the explosion of intelligence: artificial intelligence, full brain emulation, biological cognition, brain-computer interfaces, and networks and organizations. To the question of which of those is the most plausible path, Bostrom does not hesitate in answering that AI has the biggest potential.However, he believes the brain emulation path may have a possibility to achieve true superintelligence. The track towards cognitive improvement is feasible, especially those that are based on genetic selection -the selection of embryos through iteration-. The problem is that this route, in comparison with AI, is notably slow because improvements would be gradual. Similarly, biological superintelligence will be relatively weaker than AI superintelligence.

It is also necessary to highlight the cognitive improvement area, as it is the one that directly affects human nature. Bostrom says that it seems likely that in this century, we will see unprecedented developments in nanotechnology, biotechnology, IT, cognitive science, and other disciplines that will provide the opportunity to change the human condition[18].

16 Ibid. 116

17 Ibid. 116.

18 BOSTROM, Nick; SAVULESCU, Julian. *Mejoramiento humano*. (I. Ramia, & A. Jiménez, Trads.) TELL: Madrid, 2017. P. 21

This presents excellent benefits and enormous risks. Among the benefits, Bostrom (2017) counts improving intellectual capacity, potentiating the brain, reducing diseases, delaying aging, and, eventually, overcoming death. Now, the risks that human improvement brings are directly proportional to their benefits. The world of life will be affected because ethical questions will arise with every progress and advancement of the human condition. A border will be marked between the improved human being and the mere human being.This will lead to a change in the ontological concepts regarding human existence as the improved human being will not be familiar with notions such as aging, sickness, anguish, and death.

One of the conclusions Carlos Álvarez[19] reaches in his doctoral dissertation is related to the way contemporary technologies are changing the ontological determinants. These, that were absolute in the classical metaphysics, are now subject to change. That means they will become ephemeral notions that exist at an ontic level. Even as technologies lead to questioning the classical ontological determinants that were the most unquestionable, they also lead to the questioning of reality, and what seemed impossible is now an imminent possibility towards the future. Technology has broadened the horizon of possibilities in such a way that it has overcome the imaginative capacity of the human being, generating the construction of unthinkable worlds.

Hence, the improvements that the authors propose, such as neurobiology, molecular biology, emotional digitalization, and genetics are the ones that, initially, lead to the biomedical and ontological transformation of death as they transform it from an ontological determinant to a factual possibility.

5. Death as an ontological determinant: the biotechnological reaction towards Heideggerian existentialism

Until not so long ago, death was considered a necessary condition of life, a marker of human life which occurrence was possible at any time. Nonetheless, the achievements of molecular biology and AI have opened the possibility of thinking about death as a type of ontic (factual) notion, susceptible of modification, even thinking of it as a sickness. In this view, death is a sickness that must be cured, and the way to do so is biotechnology. Therefore, it is vital to explain the concept of death as an ontological signifier in depthand in the elements that constitute it: universality, necessity, and irreversibility.

19 ÁLVAREZ, Carlos. *Acerca de lo vivo y lo trágico en los sistemas autónomos de armas mortíferas. Dimensiones filosóficas*. Doctoral Dissertatio. Oviedo, España: Universidad de Oviedo. 2018.

To this end, the spotlight will be put over the work of Martin Heidegger on death. To understand this idea radically, its most profound ontological reference must be searched. It is located between paragraphs 46 and 53 in *Being and Time* (1927). The German philosopher presents death as an existential structure of Dasein, understood as its most proper possibility[20]. This "taking charge" of death implies necessity because its occurrence is unavoidable, and, as it was said before, death is always present. Its imminence does not admit any other destiny because, as a possibility, the Dasein cannot overcome the likelihood of death. Death is the possibility of the radical impossibility of existence. Death is revealed as the most proper, irrespective, and unavoidable possibility. That means it is an outstanding imminence[21].

In such a way, death must be assumed from the moment we are living. It is not a theoretical knowledge, but it is understood in each moment a personlives. The possibility of death cannot be overcome, it is uncontrollable and irreversible. You can fight against it but never defeat it. Human beings surrender to death and accept that its reality escapes any human intervention. The Dasein exists; thus, it is thrown out into that possibility. The Dasein is surrendered to its death and, therefore, it is a part of its being-in-the-world. It is something that humans do not know consciously immediately or regularly[22]. The Dasein understands death is right there, but he wants to forget about it; howeverit is unavoidable.

From this, two aspects must be highlighted. First, ift death jumps from an ontological to an ontic level, humans may reach a theoretical knowledge of it and consider it a sickness. Second, if death is not imminent, following Heidegger, the doors of Dasein would be shut. In other words, the human being would stop thinking of himself as a being that uses his life towards personal growth. If death is not imminent, many human disciplines and activities such as politics, psychology, biology, medicine, among others, would, without a doubt, change radically. If the notion of death moves from necessity to non-necessity, the world of life[23] will change dramatically.

20 HEIDEGGER, Martín. *Ser y tiempo.* (J. E. Rivera Cruchaga, Trad.). Editorial Universitaria: Santiago de Chile, 2015.

21 Ibid. 273.

22 Ibid. 273.

23 I based this idea on another work of mine (translation is mine): "Even as this concept is based in the form Husserl uses it in *The Crisis*, that is to say, as the only effective-real world, the world given effectively, and perceptively, the experienced and 'experienceable' world (Husserl 2008, 92), in this work, this concept is not taken in a technical manner. The world of life is conceived in a general way, it does not end in Husserl, nor is it framed on the ideas of Heidegger, Unamuno, or Habermas. In our study, we understand the world of life as the world as it is effectively and permanently given to us in our mundane concrete life, in the open infinitude of possible experiences (HUSSERL, Edmund. *La crisis de las ciencias europeas y la fenomenologia trascendental*. (J. V. Iribarne, Trad.) Prometeo

The idea of death as something necessary, irreversible, and universal is part of the common language, but human beings attempt to avoid it. Even as death, in a daily sense, signifies something indeterminate, death reveals that humans are in a backward position from death. Death is understood as something indefinite that will come in its given time, but that, for now, is not there for us and, thus, is not a threat[24] but death is universal. Humans understand that they are all going to die, but they live as it will not happen.Humans try to escape that reality as they live.People live as saying: Yes, we will die eventually, but not yet[25]. Now, biomedical technology is transforming this "improper" attitude towards death (as something that will happen eventually but is not part of Dasein itself) into the most proper attitude of Dasein's being.

To problematize the subject of study of this article(the possibility to overcome death)it is necessary to remember that, for Heidegger, death is unavoidable and imminent. Hence, any attitude in front of death that leads to forgetabout it, is a groundless meta-speech. That means it is an improper attitude. The most proper position of the Dasein is living towards death.

Now, the technological progress mentioned above leads us to suspect of the qualification of death as an ontological determinant of existence. In front of the possibility of death becoming a sickness that can be cured, the human being is not only led to stop thinking in his demise butforgetting death as an imminent possibility would also become the proper attitude of his nature. In other words, it is not enough to forget about death for a moment as we live, but death would become a solvable issue, thanks to technology. With a biomedical and ontological transformation of death into sickness, it becomes a servant of the Dasein[26], and,, in this position, it would signify the death of the imminent possibility of death.

Understanding the transformation of death from an ontological determinant to a mere ontic possibility is deeply important because it is the base for the transformation of the social organization of the world of life. The existent relationship between an

Libros: Buenos Aires, 2008. P. 94). In other words, the concrete historical world, with its traditions and variable representations of nature, always linked to its historical circumstances, and, at the same time, the world of the immediate sensible experience, correlative to the space-time nature (IRIBARNE, Julia. "Estudio Preliminar". En *La crisis de las ciencias europeras y la fenomenología trascendental*. Prometeo libros: Buenos Aires, 2008. P. 39). It is the life as experienced by individuals, the world buil by those who inhabit and live it". ÁLVAREZ, Carlos. *Acerca de lo vivo y lo trágico en los sistemas autónomos de armas mortíferas. Dimensiones filosóficas*. Doctoral Dissertatio. Oviedo, España: Universidad de Oviedo. 2018. P. 302.

24 HEIDEGGER, Martín. *Ser y tiempo.* (J. E. Rivera Cruchaga, Trad.). Editorial Universitaria: Santiago de Chile, 2015. P. 275.

25 Ibid. 277.

26 Ibid. 282

ontological determinant and the ontic element has a direct effect in facticity. It can be said, almost with complete certainty that, individuals act in concordance to the things they think. In other words, human actions are directly proportional to the concepts humans have about the fundamental structures of life. The idea that is closer to this investigation in that aspect is death. The concept, whether it is conscious or unconscious[27], that we have of death affects how we face it. That does not only occur in the daily life of Dasein; it can also be seen in the different scientific disciplines when they establish their methods and techniques.

For example, clinical psychology has developed therapeutical techniques to handle patients when they face one of the irreversible processes for a human being, namely, death. When facing the death of a loved one, people develop feelings of sadness that provoke grief. Freud defined grief as the reaction in front of the loss of a loved one or an abstract idea that is equivalent to a loved one such as the motherland or liberty[28]. Freud also says that these events lead to a loss of interest in the world, especially in anything that does not reminds of the loved one, a loss of the capacity of choosing some other object of love, and a sense of estrangement from any productive task unrelated to the loved one[29]. Now, helping people deal with the changes that the loss of a loved one may cause is one of the tasks of clinical psychology.

Against this loss of a loved one, psychology has proposed diverse techniques and therapies to confront grief without generating a trauma that affects the emotional stability of the patient. These therapeutical techniques have been built under the perception of death as an ontological determinant. That is to say, that if death is understood as a necessary, universal, and irreversible event, therapeutical techniques must adjust to these determinants.

For example, for psychology, considering death as an ontological determinant, a constitutive element of therapy is the relationship between the patient and the deceased. This relation is qualitatively different from any other relationship the patient establishes because the deceased is, in a way, a non-being. It has been taken away from his loved ones but is still an object of their concern. That is seen in the way they prepare honors for the deceased, visit him in the grave, and any other act they find suitable to honor their memory. People do this because the departed is *something else* that a mere object to be used in the surrounding world[30]. So, in a way, the deceased

27 It is not significant to the end of this work to discuss how these ontological determinants are formed in our intellect.

28 FREUD, Sigmund. "Duelo y melancolía" (1917 [1915). In: Sigmund Freud, *Obras completas*. Vol XIV (J. L. Etcheverry, Trad., págs. 235- 256). Amorrortu editores: Buenos Aires, 1992. P. 241.

29 Ibid. 242.

30 HEIDEGGER, Martín. *Ser y tiempo.* (J. E. Rivera Cruchaga, Trad.). Editorial Universitaria: Santiago de Chile, 2015. P. 261.

is a non-being, but it is still experienced as grief for his loved ones. Yet, they do not experience what happens to the departed, meaning that we do not undergo the "dying" of others, but we experience the process of their death[31]. Hence, the individual who loses a loved one gives way to anguish as he does not understand what happens with his loved one as the grieving person is consumed by fear of the unknown[32].

Concerning this reality lived by those who have lost a loved one and, under the ontological relationship between the deceased and his loved one, psychology has characterized grief in different phases. The first of them is denial, which happens immediately after the loss, where the individual enters a state of shock that causes an emotional and cognitive blockade. The second stage is anger, which is a consequence of the loss' frustration. Posteriourly, there is a period of hope, where the affected individual starts to retake his routine. Then, the patient undergoes a period of the depression, where he assumes the reality of his loss in a definite manner, causing feelings of sadness and hopelessness. Grief finishes with acceptance, where the individual understands that death is irreversible, universal, and necessary.

Now, it is vital to discuss the consequences of the progress of medicine and biotechnology on the biomedical and ontological transformation of death. Retaking the example of grief, one may question what adjustments would undergo the therapeutical techniques for that process. In this case, death is not an irreversible, universal, and necessary ontological determinant, but an avoidable event. Biomedicine would lead to the transformation of the fundamental structure of death, as it would be defined as an avoidable decease. That is why it is necessary and significant to reflect upon this issue and conduct investigations like this one.

Precisely, that is one of the Heideggerian theses that must be confronted: death as a possibility is the possibility of being for Dasein[33]. With the progress of medicine and biotechnology, death is not imminent, but a mere possibility that can be manipulated. Hence, it is vital to continue analyzing the crossroads that may cure the sickness of death.

31 Ibid. 262.

32 For a more thorough development of anguish as the fear of nothing, see: ÁLVAREZ, Carlos "La angustia, principio de posibilidad del conocimiento." *Perspectivas*, 29 (2), 2016. P. 28-34.

33 HEIDEGGER, Martín. *Ser y tiempo.* (J. E. Rivera Cruchaga, Trad.). Editorial Universitaria: Santiago de Chile, 2015. P. 283.

6. Aging as a challenge to overcome: beyond the ontological determinant

Once the need to analyze the "death of death," a term proposed by José Luis Cordeiro[34], has been exposed, it is necessary to continue with a reflection upon aging. Following the proposed plan, now the paper studies the configuration of senescence in its actual conceptual state.

Defining aging will be almost impossible after the death of death, as it will not be conceivable to delimit a plurality of experiences that would be lived in such stage of life into one concept, as, currently, the elderly is understood as a destiny that overtakes human life in every aspect, which causes bewilderment as our existence has passed through a metamorphosis[35]. Francisco Mora, parts from De Beauvoir thesis' about the complexity of establishing a moment that marks the beginning of aging. This stage brings plenty of changes, albeit its manifestations vary between individuals. Mora[36], in his work *El Sueño de la Inmortalidad* (The Dream of Immortality), seeks why some people go through successful aging, and others do not. In the report of his more than 20-year long research, he takes two significant examples. Mora found successful aging in an 82-year-old man who says he woke up every morning (translation is ours):

> Looking up to the color of the sky with illusion. I enjoy a good meal. My eyes are still filled with joy anytime I see a beautiful woman. A great book, a good thought, fill me with the value of being human, as when I was young. And I still evoke the fresh feeling, as when I was a kid picking up almonds, of the cicadas singing in the middle of the summer. I don't know what it means to feel old. I just feel alive[37].

Mora also adds about unsuccessful aging, quoting an evocation of Fernando Rojas in *La Celestina* (The Celestine) (translation is ours):

> As far as I can tell, aging is nothing but an accumulation of ailings, a house of thoughts, a friend of grudges, continuous grief, an incurable injury, pity of the past, shame of the present, sad care for what is to come, a neighbor of death, a flooded branchless hut, a wicker staff that breaks with little pressure[38].

In this couple of paragraphs, Mora shows how two different people in a similar stage of life, live aging in such a radically different way. For this author, the key

34 CORDEIRO, José Luís; WOOD, David. *La muerte de la muerte. La posibilidad científica de la inmortalidad física y su defensa moral*. Deusto: Barcelona, 2018.

35 BEAUVOIR, Simone. *La vejez*. (A. Bernárdez, Trad.). Suramericana: Buenos Aires, 2013. P. 351.

36 MORA, Francisco. *El sueño de la inmortalidad. Envejecimiento cerebral: dogmas y esperanzas*. Alianza: Madrid, 2014.

37 Ibid. 18

38 Ibid. 20

to successful aging is in the capacity every individual has to adapt his life to the society he lives in, maintaining physical and psychological independence from his surroundings[39]. Hence, he has an interest in finding what the essential aspect of aging is. A first idea Mora wants to dismount is that senescence is a disease, as it was a malfunctioning organ. Aging is a stage of life, and the way it is experienced depends deeply on the environment.

Likewise, Simone de Beauvoir does not consider the relation established between aging and sickness as a legitimate relation. For her, an illness is an effect, a consequence of something that happens in life, such as an accident. Aging is not like this. Instead, it is something essential to human life, is a natural law of life. The French philosopher is conscious that there is a temptation to confuse the irreversible condition of aging with an incurable disease[40].

As a consequence of this comprehension of aging, many experiments and advances in biomedical technology have been affected. Human experimentation has been delayed, precisely because aging is not considered a disease. The World Health Organization (WHO) and the Council for International Organizations of Medical Sciences (CIOMS)[41] have established guidelines for human experimentation, where it is only possible after complying with a demanding protocol, and as long as the testing refers to illnesses. This is why some works, such as the one of Maria Blasco, that point towards delaying or impeding aging, have not conducted tests on human beings.

Now, it is true that there is a reciprocal relationship between aging and sickness. In multiple cases, bodily ailings are the ones that provoke premature senescence. Likewise, aging, with all of its ailings, predisposes the body to many different pathological disorders, especially infectious, cardiovascular, degenerative, and respiratory diseases. Some diseases, due to senescence, can barely be endured in silence. It is not common, says De Beauvoir, to find and elderly without an ailing, or what could be called 'aging in its pure state.'[42]

39 Ibid. 28

40 BEAUVOIR, Simone. *La vejez*. (A. Bernárdez, Trad.). Suramericana: Buenos Aires, 2013. P. 352.

41 The WHO and the CIOMS are entities that guarantee the efficient application of the fundamental ethical values that guide biomedical research in human beings. On an international level, there are diverse declarations and guidelines that regulate biomedical research. The most relevant are: The Nuremberg Code (1947), the International Covenant on Civil and Political Rights (1966), the Declaration of Helsinki (1964), and the Proposed International Guidelines for Biomedical Research Involving Human Subjects of the CIOMS (1982).

42 Francisco Mora (2014) rebukes this idea. He does not agree with De Beauvoir, as he believes aging without sicknesses is possible. For this, see Noelia Bueno's (2015) work on the experience of death in technoscientific societies. BUENO, Noelia. "The Experience of Death in Techno-Scientific Societies: Theoretical Discussion and Consequences for the End-of-Life Decision-Making Processes". En: *Illness, Crisis & Loss* 1–19, 2015. DOI: 10.1177/1054137315606837

Nevertheless, Francisco Mora turns towards a novel conception of aging, contradicting De Beauvoir. Contrary to the idea of aging associated with the generation of diseases, as a genetic project that forces the apparition of illnesses on this stage, Mora believes human beings can build their own genetic plan for aging. He believes that aging is the only stage where individuals may start a new program of life, a unique process in the history of biology[43]. Mora says that the genomic project works perfectly from fecundation to 30 years old. From that point, the rigidity of the genetic program that controlled development up to that moment starts deteriorating, until it eventually stops working.

This loss of rigidity of the genetic program leads to the understanding that aging is not a part of a life program that must be followed necessarily. As there is no genetic project for aging and the fact that existence leads us unavoidably to death, human beings are free and responsible for their aging. Mora is based on the data of recent research to discuss the presence of a series of genes with open programs, capable of working positively during aging if individuals consciously demand their functioning[44]. These genes are in the disposition to work if they are ordered. This "crouched genes" are located in some areas of the brain.

The thesis proposed by Mora seems to fit in nicely with the theory of the telomeres and telomerase previously exposed. For Blasco[45] aging is related to the shortening of telomeres. It is a process that leads to the apparition of diseases, which leads to a deterioration of the organism and eventual death. Francisco Mora knows these cellular processes do not occur in all cells of the body, but mostly in brain cells. Neurons do not have a cellular clock, and many of them, such as those on the cerebral cortex, do not divide once they are born and reach their development[46]; thus, they do not have an aging program as they are not even programmed for being replaced. Neurons are what they are, from their beginning until the process that ends with their development. Considering this particularity, Mora[47] proposes to dive in successful aging, taking care of neurons to reprogram them, ordering them to have calm aging. Good alimentation, social interaction, meditation, and self-control techniques help individuals to achieve this.

43 MORA, Francisco. *El sueño de la inmortalidad. Envejecimiento cerebral: dogmas y esperanzas*. Alianza: Madrid, 2014. P. 81.

44 Ibid. 80

45 BLASCO, María; SALOMONE, Mónica. *Morir jóven, a los 140.* Paidós: Barcelona, 2016.

46 MORA, Francisco. *El sueño de la inmortalidad. Envejecimiento cerebral: dogmas y esperanzas*. Alianza: Madrid, 2014. P. 77.

47 Ibid. 2013

As it was seen before, today, aging is not only related to sickness, but it is considered as a cause for cancer. Maria Blasco[48] establishes a direct relationship between old age and cancer. She says one of her proposals is to attack aging directly to attack cancer. However, others, such as De Beauvoir, think that old age does not have any direct relationship with cancer, as she believes that if it generally occurs between 50 and 80 years old, it is because of the way cancerogenic agents act[49].

For centuries, humanity has resisted considering aging as a disease. This has led to the idea that it is a state of human life, such as being born, growing, reproducing, and dying[50]. These events of life are unavoidable. Hence, what one must do in front of aging is not prevent it, but knowing how to reach it. That is why modern medicine does not attempt to assign a determinate cause on biological aging. It is considered a natural process of life, just as birth and death[51]. Hence, when facing senescence, what should be looked for is the best way to live it, as it is an unavoidable and irreversible phenomenon[52]

But again, María Blasco[53] opposes this vision. She considers that, with the activation of telomeres with the enzyme telomerase, aging may resemble "pure" aging, that is to say, aging without sicknesses.De Beauvoir considered this a beautiful way of aging, and itcan be attained through molecular biology.

It was said before that Mora seemed to differ with Blasco, as he believed that aging is not necessarily related to a particular genetic program. In other words, he believes there is no direct relationship between old age and sickness. Now, Blasco acknowledges that the emotional state of individuals influences their physical state and their telomeres, as psychological stress is associated with higher oxidative stress, less telomerase activity, and shorter telomeres, which are determinants of longevity and cellular senescence[54].

For Blasco, stress affects health, changing the rhythm of cellular aging. Even as they reach the conclusion through different paths, Blasco and Mora's bet is not different. On the one hand, they coincide when saying that the environment and the

48 BLASCO, María; SALOMONE, Mónica. *Morir jóven, a los 140.* Paidós: Barcelona, 2016.

49 BEAUVOIR, Simone. *La vejez*. (A. Bernárdez, Trad.). Suramericana: Buenos Aires, 2013. P. 38

50 To dig deeper in the resistance and other positions in the history of aging, see *The Coming of Age* by Simone de Beauvoir, especially the first chapter, where she exposes the topic of aging and biology prodigiously.

51 Ibid. 32.

52 Ibid. 46.

53 Blasco, 2016.

54 Ibid. 131.

emotional state have a direct influence on the way we approach old age. On the other, both dream of defeating aging, sickness, and, why not, delaying death.

Conclusions

As it was seen, in the last few decades, the progress in biomedical technology, genetics, robotics, and AI have changed notions and concepts the philosophical tradition regarded as universal, necessary, and irreversible. These categories, such as mortality, temporality, senescence, among others, lost their character of ontological determinants, as they now are a factual may-be. Until not long ago, death was considered a necessary condition of life, something inherent to human existence, and that was possible at any moment. However, the achievements of molecular biology and AI have opened the possibility of thinking of death as an ontic idea, a factual reality that can be changed, to the point it can be thought of as a disease. From this perspective, death is an illness to be cured, and the way to do it is biotechnology.

From the ideas mentioned above, a series of question come up that could serve as the base for future investigations, such as:

- What would happen if the necessary and irremediable possibility of death was not part of human life?
- If death has always modeled different aspects of human life, how will these aspects will change after the fact that death is conceived as a sickness that can be cured?
- How the ideas individuals have over the body and aging have will be affected?

These openings promoted new proposals to characterize this biomedical and ontological transformation of death, as an ontological determinant, into sickness, a step that is possible from the progress and advancements in medicine and biotechnology that have to be an integral part of the philosophical discussions of our time.

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