

## Research article

# Essay about Homo Juventus: A Brief History about the Formation of Anti-Aging Medicines Discourses Between 19<sup>th</sup> and 20<sup>th</sup> Centuries

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### Abstract

For millennia, humanity has been looking for a formula for long life and long youth. But, just in 19<sup>th</sup> century AD, science began developing a line of thought, which would produce effects to prolong life and youth. In the 80's of 20<sup>th</sup> century it was already completely researched an anti-aging medicine. With this advent came a new way of life, called 'ageless', people who try to never get old, it means, people who try to always look young. In the present essay, a historical analysis was made about the formation of anti-aging knowledge between 1889 and 1974, when the most important basis of anti-aging medicine was created. Despite it hasn't been possible to analyze the real effects of anti-aging practices inside people's organisms, outside effects have been more visible and efficient. At the same time, ageless lifestyle tends to grow.

**Keywords:** Ageless; Anti-Aging; Rejuvenescence; Youth

### Introduction

The pursuit of youth is a very frequent desire in many cultures, as it is possible to observe in folklore and literary manifestations of several ancient civilizations. Archaeological findings from Sumerians indicate the origin of myths and legends about eternal life. The quest for youngness and rejuvenescence goes back about five thousand years. Epic romances, like Gilgamesh's journey in Babylonian literature, and Pandora's jar in Greek mythology, are examples of the 'civilization and its discontents' with themes linked to death, and old age.

The Hebrew tradition brings some characters which had a fantastic longevity. Adam (930 years) Methuselah (969 years) and Noah (950 years) are examples that long life could be understood as a gift from God(s) [1]. Sometimes, legends and myths show that young appearance can be more important than long life. In Thitonus's disgraceful narrative, for example, the myth proposes that it is better dying, then living longer and getting older.

Maybe, that is why the fountain of youth is pointed as the most recurrent legend in many cultures. Hopkins [2], has found this theme in countries of Asia, Europe, America and Polynesian Islands. This legend was sacralized in the literature by Juan Ponce

de Leon story, who accidentally discovered Florida in 1513. He has sought a fountain that Native Americans used to renovate and refresh age by drinking or bathing in that water. The basis of this theme is the idea that exists some substance which has the power to enhance rejuvenation. The same idea is found in ambrosia as source of youth in Greek mythology. Beauvoir [3] believed that the fountain of youth came back strongly in the cultural renaissance period, by a tremendous valorization of youth appearance. As result, it was observed an intense prejudice against old people, mainly directed to old women, that was extended for all modernity and in the contemporary times.

According to Featherstone and Hepwoth [4], in the late 20<sup>th</sup> century, around the 80's, a new phenomenon could be observed in human aging (or anti-aging), separate from other experiences, like the 'third age'!. It was the emerging, in fact, of a lifestyle - or an ideology - called 'ageless', or 'mask of age'.

Initially, the phenomenon was mapped by researchers, looking for answers about the 'ageism'- or age discrimination against older people, at that time, an emergent subject of research in North America and Western Europe appeared at the same time. Woodward [5] observed American people using several intervention body techniques to achieve youth. Diets adoption, cosmetic products for 'anti-age', and even surgical procedures

for rejuvenation started becoming much more common. It was the beginning of materialization for older people generation who refused to be labelled as ‘old’, or ‘seniors’. In addition, it was becoming common the apparitions of ageless people globally famous during the 90’s, such as Madonna, Michael Jackson, Sophia Loren, etc.

For Gergen and Gergen [6], the focus of ageless people is the exteriority, the superficiality and esthetic, the persecution of joviality at any cost. The concern about health is secondary because it pre-exists a belief that longevity, or even eternity, are part of the natural cycle of life.

In a recent study carried in Rio de Janeiro (considered the capital of esthetic and fads in Brazil), it was noted that the pursuit of a youthful appearance is also changing social relationships and behavior of its followers. Ageless lifestyle has embraced young people affective-sexual relationships, as well as the internalization of their values and mannerisms [7]. To trail ageless routine, it’s necessary to be consuming continuously, a characteristic that fits the post-modern personality of consumerism pointed by Bauman [8].

Beyond some social, psychological and economic characteristics, those characters, that achieve visible youth effects, despite their age, have some habitudes, some routines, some procedures in common. Nowadays, it isn’t necessary to be a specialist to know how to search for eternal youth. That lifestyle must include, not one, but many practices, such as: rigorous diet, caloric restriction, antioxidants, vitamins and other supplements, exercises, cosmetic products, hormonal reposition or modulation, anti-aging drugs, Botox and hyaluronic acid injection and peeling, to cite the most usual ones. More intrusive methods can be also applied, as facial-lifting and other surgeries with rejuvenation purposes. Whereas that all depends of the age, and, for sure, how much people can expend in these projects.

Though being well-know, all these procedures came from systematic studies carried during decades and they form a new area known as anti-aging medicine. Clearly, what in the past were experiences in laboratories, carried by scientists, sometimes become a jargon of TV channels and common people. Also, the set of this knowledge became a kind of mantra for ageless lifestyle. In face of this reality, this essay tries to make a historical analysis of anti-aging medicine formation as a discursive production, as a medical specialty and as scientific representation of anti-aging, and ageless people.

## Material and Methods

In this short essay, it was made a historical analysis of anti-aging development medicine from the end of 19<sup>th</sup> century until the end of 20<sup>th</sup>, to be more accurate, between 1889 and 1974. It was considered that, the most important ideas of anti-aging

medicine, which are still in process of building, had been initially analyzed by scientists during the mentioned period. Basically, it was made an option to analyze each idea as soon as it appears in literature, following a historical line upon the time. It means that the development of these ideas, as well as their comprehension now, the internship of present researches and techniques were not object of study in this paper.

It is widely known that practices and studies that discuss the anti-aging and rejuvenescence theme exist since old Egypt and were still being studied by other ancient civilizations. The papers of Galeno, Aristoteles and Avicenna, are often cited in papers about history of anti-aging medicine. In the same way, vitalism<sup>2</sup> theory is always reminded [9]. Considering the used methodology, it has been discarded these studies. Researchers and studies widely recognized as charlatanism, as in the case of Serge AbrahamovitchVoronoff - who became famous and rich for his technique of grafting monkey testicular tissue on to the testicles of men for rejuvenation purposes – is equally left for another occasion.

The methodological approach was based on Archaeology, proposed by Foucault, that performs a historical analysis of discursive formation process, especially in the medicine case [10,11]. The term archaeology refers to the kind of research that is devoted to extract the discursive events, detecting their historical formation in a certain field of knowledge, the historical background, their implications and trajectories, detecting its appearance at a historical moment and its impact in social field.

In that way, it was tried to analyze the knowledge construction that constitute the spectrum of anti-aging medicine, as a medical specialty. Some papers and some authors, sometimes, are blended in geriatric and gerontological fields at the same time. Some papers, clearly focused in anti-aging medicine were found in geriatric journals. Some classical subjects of geriatric field, occasionally, are shared with anti-aging medicine - as the desire to extend life. Some authors also linked with geriatric, or gerontological knowledge could be references for anti-aging medicine - as Élie Metchnikoff. This common content was analyzed as part of anti-aging medicine, as well. Until the late of 20<sup>th</sup> century, it was very difficult to distinguish clearly, the differences between geriatric/gerontology and anti-aging medicine.

After this theoretical cutout, it was possible to start a search, on the internet, for archives about anti-aging medicine. Keywords as ‘rejuvenescence’, ‘rejuvenation’, ‘anti-aging’ were typed on scholar google, and, from this general research, some specific subjects, papers and books started emerging for this archaeological work. Physiology, biology, biochemistry, biotechnology and various medical specialties have been mapped as precursors of anti-aging medicine. It is important to say that despite these authors are being mentioned in this paper, as precursors of anti-aging studies, they are not specifically anti-aging medicine researchers.

## Results

The rejuvenation term precursor was the French biologist Émile François Maupas, in a study about a cellular organelle rejuvenation known as cilium, and published in 1889, in a zoology journal [12]. In this period, studies were starting to disconnect from vitalism theory, and looking for new answers for the aging and rejuvenescence questions. In general, the first findings deal with researches carried out in microorganisms, cells, plants, protozoans, small mammals, etc. Those studies were searching answers on how to find rejuvenation sources and prolongation of life at the internal and microscopic level. In the biological level, without any perceivable intentionality of reaching external, or esthetic effects of joviality.

The idea of rejuvenescence was not linked with the idea of a youthful appearance. In some cases, the idea of rejuvenation was related to the ability of an old organism to recover and regenerate itself. It could be understood as the resistance of young organisms to experimental conditions, or the environment ones, or even the capacity of an organism to grow and reproduce - to be considered a process of generation of new lives. They were also interested in the conditions that led to senescence, such as deprivation of food and consequently a fall in the body's metabolism [13, 14].

In Minot words: "The proper object, the final purpose of Biology, is the discovery of the nature and laws of life. Organisms are created young and grow old, and the old produce SENESCENCE, the procreation of the young REJUVENATION" [13]. In other words, the main objective was to analyze factors such as growth, aging and resistance of organisms, due to nutritional conditions (starvation), environmental (physical and chemical changes), as well as the possible differences of reactions between young and old organisms in certain environmental conditions [15].

Élie Metchnikoff, considered the gerontology's father, was a great defender of life prolongation. He believed that normal duration of human life was between 70 and 75 years. Who had died before this age would have died prematurely. For Metchnikoff [16], most time, the prematurely death was bound with maladies of the intestinal canal, erroneous diet, infant mortality, infectious diseases, such as pneumonia, tuberculosis, diseases of heart and kidneys, and cerebral hemorrhage. He thought that such cases of death could often be avoided and must be regarded as accidental rather than natural.

By an analysis of supercentenarian cases, the author believed that human beings could reach the age of 150, influenced by factors as heredity, race, gender (women live more than men). Some factors related to Metchnikoff for longevity remain nowadays in anti-aging studies, as sobriety (lack of stress), frugal lifestyle and daily diet. Also, some substances linked to longevity still have been studied at contemporary days, for example the 'spermine', as reported by Metchnikoff in a human experience:

I have selected that of an old lady of ninety-five years, afflicted with severe sclerosis of the arteries, with no appetite, a bad digestion and constipation. This patient had complained for several years of sacral pains, and moreover was nearly quite deaf and suffered from periodic attacks of malarial fever. The injections of spermine, given for a period of fifteen months, restored the old lady to such an extent that she recovered her power of hearing and felt the sacral pains only slightly and after a long walk. Her general condition was highly satisfactory [16].

Another important researcher was Charles Manning Child, an American zoologist. He dedicated many years of studies observing the capacity of planaria to regenerate themselves, after been cut in pieces. He was trying to find the biochemical keys for the organism rejuvenescence. Child observed that, after small pieces have been cut, they regenerate younger and live longer than the big pieces from original planaria: "And finally pieces from the bodies of very old individuals show greatly increased resistance after they have undergone form regulation, the whole animals living only a few days in alcohol, while the pieces after regulation may live for months" [15].

Afterwards, Child [17] concluded that it could be possible, but hard, to create conditions of rejuvenescence in human beings:

The higher animals and man senescence shows the same general characteristics as in the simpler organisms, but the capacity of the body cells for rejuvenescence is narrowly limited under any known conditions. Changes which appear to constitute a slight degree of rejuvenescence can probably be brought about in various ways in man and the higher animals, but they are at best very slight.

Thorburn Brailsford Robertson was an Australian physiologist and biochemist, well known around the world. In 1926 he was elected a foreign member of the Reale Accademia Nazionale in Italy, the oldest academy of science in Europe, to the biological Science section. At that time, maybe the most important position for a scientist. His researches focus was to analyze the factors that govern the growth and longevity of animals, and later, the chemical basis of senescence and rejuvenescence, based on studies with rats, mice and guinea-pigs [18]. But, he could not be forgotten in this paper, because he discovered something that would be a revolution in anti-aging studies, impacting researches until nowadays.

Robertson studied the 'tethelin' – it means 'growing' in Greek vocabulary – that he also called 'growth controlling principle'. It was an extract from the anterior lobe of the pituitary body removed from ox, that the author believed was close related with the phenomenon of growth in animals [19]. Some years later, this extract started to be called as human growth hormone (HGH), which became considered the precursor of the official beginning of anti-aging medicine in 1990, when an article entitled "Effects of

human growth hormone in man over 60 years old”, was published in the prestigious *New England Journal of Medicine* [20].

When Robertson started to study the effects of tethelin in animal growth, there was no method to extract, or to synthesize that substance. He had to perform a very complex chemical process to extract that principle from corpses’ glands. For this task, he had to use the biochemical abilities, as part of preparation method described below:

Fresh ox pituitaries are stripped of their connective tissue capsules and the anterior lobes are separated from the posterior lobes and from the parts connecting the two lobes. The anterior lobes are then ground up in a mortar with three times their own weight of a mixture of equal parts by weight of anhydrous sodium and calcium sulfates and the mixture is dried over a water bath. It is stirred occasionally to prevent caking. Drying under these conditions is extremely rapid and involves a minimum of exposure of the tissue to heated air. In the course of an hour a mixture of 60 gm. of tissue and 180 gm. of sodium and calcium sulfates becomes white and easily powdered. This dried mixture is returned to the mortar and pulverized as finely as possible and is then extracted with absolute alcohol at a temperature as near to that of boiling alcohol as possible [21]. The average yield from 300 ox pituitaries is found to be from 2.6 to 3 gm.; each anterior lobe, therefore, may be estimated to yield about 10 mg. of tethelin” [20].

First, Robertson observed the effects of tethelin in mice growth. After he noted that administration of tethelin would cause acceleration of growing carcinomas in rats, in about 30% faster than the control group, and the increase in the levels of metastasis [20,22]. Years later, he analyzed the implication of tethelin in increase of regeneration ability, and in longevity in white mice:

In the two groups of animals which received tethelin, however, the duration of life was greatly extended, exceeding the normal by 99 days, or 13 per cent of the normal duration of life in the males which received tethelin continuously, and by 81 days, or 11 per cent of the normal duration of life in the females which received tethelin intermittently in three periods of 1 month each prior to the 30<sup>th</sup> week [23].

In the late 30’s more studies about hormones emerged, and it became one of the most important basis of anti-aging medicine. In an experiment with old human subjects, Thompson noted that the administration of testosterone increased their muscle strength, body weight, sexual activity, self-confidence and a capacity to do their work [24]. Hormones started being the key for rejuvenescence and longevity. The practices of hormonal interventions started to become usual between aging process specialists [25]. When McGavack was looking for rejuvenescence effects, he had described tests with testosterone propionate, 17-methylandrostenediol, 17-androstenedione, and dihydrotestosterone (stanolone), administered intramuscularly and orally in men and women, aged

between 52 and 88 [26]. The measurable metabolic effects were mirrored in certain clinically discernible changes, namely, a gain of appetite and weight with a subjective sense of wellbeing. They also improved muscular strength, and mental activity

In 1935 Mc Cay, C. M., Crowell, M. F., Maynard, L. conducted a research with white rats, showing that caloric restriction should increase the length of life in around 30% [27]. The caloric restriction was much improved after the development of free radical theory, listed below, and it also became a pillar on anti-aging medicine.

In the end of 40’s and beginning of 50’s, Thomas Gardner appeared as a researcher of anti-aging substances. He started introducing the term ‘anti-aging’ in literature. In 1948, the author was studying royal jelly properties, investigating their chemical components [28]. He used *Drosophila melanogaster* as subject and ascertained that flies fed with royal jelly had greater longevity, as the example of queen bees - fed with royal jelly throughout larval and adult life -, who lived about ten times longer than worker bees. In 1951, Gardner was studying the anti-aging proprieties of vitamins and hormones. He noted that it was possible to increase between 10% to 46% in life duration of mice and rats, when administrating these substances [29].

In 1956, other important step was climbed in the construction of anti-aging medicine. Getting deep in the metabolism, Denham Harman, known as the ‘father of free radical theory on aging’, noted the effects of free radicals in aging process. He found evidences that OH and HO<sub>2</sub> were common free radicals normally produced in living cells, as interaction of the respiratory enzymes. Both involved in biologic oxidation-reduction reactions, that results in decrease of functional efficiency and cell reproductive abilities.

In addition, since genes would be expected to be attacked occasionally it would be anticipated that mutations and cancer would result every now and then. Aging and the degenerative diseases associated with it are attributed basically to the deleterious side attacks of free radicals on cell constituents and on the connective tissues. The free radicals probably arise largely through reactions involving molecular oxygen catalyzed in the cell by the oxidative enzymes and in the connective tissues by traces of metals such as iron, cobalt, and manganese. [30].

Two decades later, Harman would improve much more his studies, as it will be analyzed further on. In the 50’s we watched the arise of researches and practices towards skin rejuvenation more directed to an esthetic and superficial intervention as plastic surgeries<sup>3</sup>.

The juvenile appearance started becoming a more important target rather having a jovial organism. Based on deformities and facial abnormalities reconstruction techniques, usually utilized for people with hereditary problems, accident deformed victims or war

injured; it is now employed to pursue a jovial face appearance. It is like saying that, senescence, or even better, the old appearance, starts to be faced as a problem, that demands medical intervention. In the same way, old age starts to be recognized as a synonym of ugliness by the official discourse of medicine.

Hill and Silver enroll the psychodynamic and motivations for esthetic plastic surgery between 1939 and 1950 in many institutions of the United States [31]. The approval for senescence justification was based on the idea that an unsatisfactory appearance could inhibit person's narcissistic expression and lead to depression and alcoholism.

In the 60's, researches and techniques to promote jovial appearance by medical procedures were already widely diffused. For example, the use of face peeling, using chemical substances aimed to facial renews [32]. In 1965, Baker and Gordon also recommended face-lift and silicone injection, as valid procedures for facial rejuvenation, starting from 49 years old. Doctors recommended that the facial esthetic procedures should be accompanied by esthetic care on all the body, clothing and even patients' house ornamentation [33]. In 1968, started the first reports of face botox injections, but not directly linked with anti-aging therapies [34].

Studies focused on the implication of physical activities in the rejuvenation and prolongation of life, have maybe also started in the 60's. Lucas [35] pointed that sports have been practiced in America, for rejuvenation purposes since 1850, but, unfortunately, it was not found any study about the implication of sports and physical practices in rejuvenation, and prolongation of life before 60's. Cumming [36], assumed that incontrovertible evidences concerning the value of exercise in the prevention of disease, and in longevity are difficult to obtain. Even so, he believed that sport practices could increase longevity, avoiding heart diseases. By the other hand, according to Astrand [37], people could rejuvenate between 10 to 15 years doing sports, by the increase of oxygen transport in cells.

In the end of the 60's and the beginning of the 70's, researchers discovered implications of DNA, RNA, cellular membranes, cellular organelles and oxidative stress on aging process. Equally, they had a knowledge enlargement to produce anti-aging drugs [38,39,40,41,42,43]. Using those procedures to achieve the knowledge for anti-aging medicine basis we can consider that anti-aging medicine has all the keys to research until nowadays.

Most of the progresses were done during the 70's, concerning mainly the aging process in cellular level. Virtually, one century after Maupas experiments [12], the researchers got back inside the cell, their organelles, membranes and molecules. In 1971, Alexey Matveyevich Olovnikov, a Russian biologist, analyzed the problem of telomeres shortening, tying this phenomenon to the aging

process. He also predicted the existence of telomerase enzyme, as well as he established a relationship between telomeres shortening to cancer. He appointed the theory of marginotomy, possibly the last step for formation of all contemporary anti-aging medicine basis [40,41].

Marginotomy refers to DNA damage sequences located at the molecule extremities. More exactly, in the telomeres structure that suffers of shortening during duplicates, according to the time elapsed. This phenomenon had not been reported before in DNA's literature. It happens near the DNA helix and ends during replication, so, it is not possible for a polynucleotide chain to be completely copied under certain conditions. As effect of marginotomy, the author noted changes in the genes expression, and the death of cells, that should be directly implicated in aging process, and diseases development [41].

He suggested three types of polymerase-dependent marginotomy:

Proximal, distal and medial. Marginotomic shortening of replicas at their 5'-end, nearest to the point where the synthesis starts, is called proximal marginotomy or 5'-marginotomy; while that occurring at the 3'-end is distal marginotomy or 3'-marginotomy. Medial marginotomy occurs during replication of a broken template and is expressed as the sum of the two other types of marginotomy. Copying of template ends located medially, which are formed in the case of breaking of the replicon, may be accompanied by the usual marginotomic shortening of the copy of the 3' and 5' ends of the template in the region of the break. However, when the broken ends of the template are fused, the consequences of such inside-replicon medial marginotomy may be eliminated by a repair enzyme [41].

Olovnikov has been improving his theory of telomeres shortening for decades, and he is still researching and publishing about this topic at current time. In 2017, he published an article entitled "Interstitial telomeric repeats-associated DNA breaks" [44].

In 1972, Denham Harman, the same one who proposed the theory of free radicals in the 50's, made large advances in his investigation using mitochondria as a benefit for research advances. Using an analysis of injuries caused by free radical reactions in the mitochondria, and he made the oxidative stress theory foundations:

It is suggested that the maximal life span of a given mammalian species is largely an expression of genetic control over the rate of O<sub>2</sub> utilization which, in turn, determines the rate of accumulation of damage produced by free radical reactions in the mitochondria, the rate increasing with the rate of O<sub>2</sub> consumption. Free radicals "escaping" from the respiratory chain or formed otherwise in the mitochondria would be expected to produce deleterious effects mainly in the mitochondria because of their high chemical reactivity. Is this the cause of the increased fragility

of mitochondria with increasing age as well as the decrease in the number of mitochondria per cell? Are these effects mediated in part through alteration of mitochondria DNA functions? [39].

At that time, this approach offers the prospect of an average life expectancy increase over diseases such as cancer and cardiovascular disorders that were eliminated as causes of death, and a significant increase in the number of people who will live beyond 100 years.

As result of his theory, the rich antioxidants diet (by food, or supplements) started to gain space in anti-aging field. In experiments with mice, Harman observed the increase in average life span of mice, produced by adding antioxidants on the diet, as effect of the decrease at the level of deleterious free radical reactions throughout the all body [39]. But, the hard task to introduce changes in mitochondria oxidations, was let for the future.

In the same way, to Bindra, damages in DNA and cellular membranes were particularly related to aging. In resume, the hypothesis was that aging and senescence were primarily a loss of cellular information phenomenon originated at the molecular level. And, that “Interference with the cellular information flow could occur anywhere in the sequence from DNA to RNA to protein synthesis, building up to Orgel’s cytoplasmic “error catastrophe” due to impaired protein synthesis.” [42]. The author proposed the creation of anti-aging drugs –supported by a big pharmaceutical company. For example, drugs that were supposedly associated with enhance learning and memory, acting on brain’s RNA and protein synthesis, as 5,5-Diphenyl hydantoin. “The drug has been shown to improve the avoidance response and learning retention in aged rats”, according to Bindra [42].

## Discussion

Can anti-aging medicine change the life span for over 150 years in the next decades, in the way Metchnikoff promised a hundred and ten years ago? That’s not easy to predict since the knowledge, from any field, have been understood as more and more complex as time goes on.

What is possible to assert is that anti-aging medicine, in accordance with anti-aging Market, have been produced visible rejuvenescence effects, or aging retarding, each time more efficient, each time earlier. For example, cosmetic procedures that before were indicated for people over 50, are now indicated for people on the 20’s.

A very curious case, from the beginning of 21<sup>th</sup> century, was about the writer and singer Cindy Jackson that holds the title of highest number of cosmetic procedures, in Guinness Book, totalizing 47 surgeries between 1987 and 2005. At the age of 50 she was looking like a 25 years’ young woman. The apparitions of ageless people are becoming more and more usual. Not just

between artists and famous people, but between common people. Some cases are very widespread, like the apparition of an American woman named Anette Larkins, and an Australian woman named Carolyne Hartz, both aged over 70 but looking like 30, as effect of their natural and rigorous diet. Currently, it is getting usual finding cases of women aged around 40, looking like 15 years old girls, like the Japanese housewife Mizutani Masako, or the Taiwanese Zhang Tingxuan, both histories are very easy to find on the internet.

Hence, ageless people have a very specific way of life that can’t be compared, or confused with other aging experiences, like third age, or with people who look to age with health and quality of life, or ‘young old’ (young in spirit), because the simple fact of aging is considered a fail for them.

To follow rigorously this way of life and, for consequence, to show more effects of youngness, it demands very high costs. For that matter, the global market is monitoring very close these emerging consumers. Since 2015, two relevant reports were made by huge market research companies, suggesting profits of hundreds of billions of dollars for the next three years, in the global anti-aging market. The products and effects in this Market are deeply linked with the costs. For example, an instant cream box with fifty sachets to renew facial skin for a couple of hour’s costs something near fifteen USD. By the other hand, a treatment of modulation or hormonal reposition can cost ten thousand USD per year, or more.

In some countries, like Brazil, the Government asks geriatric and gerontologist experts advices when makes laws related to aging issues and for that reason, officially, anti-aging medicine is not allowed as practice for medical class in Brazil, according the ‘ Medical Act’, promulgated in 2013. By the other hand, in some USA States, anti-aging medicine is allowed and literatures, as well as some characters are becoming more known and more granted, like Doctor Jeffrey Life and his books.

If ageless people will become more longer than people that don’t follow this lifestyle, that is a question to be analyzed for the next decades. Anyway, it is very clearly that anti-aging medicine has a great power to produce effects of truth by their lectures, promises, practices and knowledge and a great power to link with market interests.

### Notes:

Third age is a term to refer of an experience, or model of aging, based in healthy habitudes and active life. For more information, consult: Laslett Peter. (1989). *A Fresh Map of Life: The Emergence of the Third Age*. London: Weidenfeld and Nicolson.

<sup>2</sup>Vitalism was a theory that beliefs that the phenomena of life, as aging and life span, was linked with a natural and vital force which each organism hold. For more information consult: Driesch, H. (1914). *The History and Theory of Vitalism*. London: MacMillan and Company.

<sup>3</sup>It would be recognizing as the beginning of esthetic - or cosmetic - medicine, as a specific field of practices and researches. But, it fits very well in the general practices and ideologies of anti-aging medicines, as well as in the ageless lifestyle, as had been reported before.

## References

1. Gruman GJ (1966) A History of Ideas About the Prolongation of Life: The Evolution of Prolongevity Hypotheses to 1800. *Transactions of the American Philosophical Society, Philadelphia, PA: American Philosophical Society* 56.
2. Hopkins EW (1905) "The Fountain of Youth." *Jour. Amer. Oriental Society* 26: 1-67.
3. Beauvoir S (1970) *La Veillesse*. Paris, Gallimard.
4. Featherstone M, Hepworth M (1991) *The Body: Social Process and Cultural Theory*. London, Sage.
5. Woodward K (1988) Youthfulness as a Masquerade. *Discourse* 11: 119-142.
6. Gergen KJ, Gergen MM (2000) The new aging: Self-construction and social values. In Shaie K W & Hendricks J (Orgs.), *The evolution of aging self: The social impact on the aging process* Nova lorque: Springer Publishing 281-306.
7. PEREIRA CS, PENALVA GA (2014) Nemtodasqueremser Madonna: represent a çõessociais da mulher carioca, de 50 anosoumais. *Rev Estud Fem* 22: 173-193.
8. Bauman Z (2007) *Consuming Life*. Politiy Press, Cambridge.
9. Haber C (2004) Anti-aging medicine: The history: Life extension and history: the continual search for the Fountain of Youth. *Journal of Gerontology. Biological Sciences* 59: 515-522.
10. Foucault M (1969) *L'archéologie du savoir*. Paris, Gallimard.
11. Stevenson C, Cutcliffe J (2006) Problematizing special observation in psychiatry: Foucault, archaeology, genealogy, discourse and power/knowledge. *J Psychiatr Ment Health Nurs* 13: 713-721.
12. Maupas EF (1889) Le rajeunissement karyogamique chez les Ciliés ». *Archives de zoologie expérimentale* 7: 149-517.
13. Minot CS (1891) Senescence and rejuvenation. *Jour. Physiol* 12: 97-153.
14. Child CM (1915) *Senescence and Rejuvenescence*. Chicado, University of Chicago Press.
15. Metchnikoff E (1907) *the prolongation of life. Optimistic studies*. London, Butterworth-Heinemann.
16. Child CM (1910) A Study of Senescence and Rejuvenescence Based on Experiments with Planariadorotoccephala. *Arch. Entw.-Mech* 31: 537-616.
17. Child CM (1928) Senescence and rejuvenescence from a biological standpoint. *Bull N Y Acad Med*. 1929 Jan; 5: 111-113.
18. Robertson TB (1923) *The chemical basis of growth and senescence*. Philadelphia/London: Lippincott Company.
19. Robertson TB (1916) The effects of tethelin: acceleration in the recovery of weight loss during inanition and in the healing of wounds. *American Medical Association* 66: 1009-1011.
20. Leitão AN, Pedro RMRL (2014) Anti-aging medicine: notes on a socio-technical controversy. *Hist. cienc. saude-Manguinhos* 21: 1361-1378.
21. Robertson TB (1916) On the Isolation and Properties of Tethelin, the Growth Controlling Principle of the Anterior Lobe of the Pituitary Body. *J. Biol. Chem.* 24: 409-421.
22. Robertson TB, Burnett TC (1916) The influence of tethelin, and of other alcohol-soluble extractives from the anterior lobe of the pituitary body, upon the growth of carcinomata in rats. *J Exp Med* 23: 631-639.
23. ROBERTSON TB, RAY L.A (1919) Experimental studies on growth, XI. The influence of pituitary gland tissue, tethelin, egg lecithin, and cholesterol upon the duration of life in the white mouse. *J. Biol. Chem.* 37: 427-443.
24. Thompson WO (1940) Endocrine problems in later life. *Medical Clinics of North America* 4: 79-91.
25. Townsend F (1946) Aging Processes in The Endocrine Glands. *Journal of Gerontology* 1: 278-280.
26. McGavack T, Weissberg J, Pearson S (1954) Effects of Androgenic Steroids in Aging Individuals. *J. Amer. Geriatr Soc* 2: 489-498.
27. Mc Cay CM, Crowell MF, Maynard LA (1935) The effect of retarded growth upon the length of life and upon ultimate size. *The Journal of Nutrition* 10: 63-79.
28. Gardner TS (1948) The use of *Drosophila melanogaster* as a screening agent for longevity factors; the effects of biotin, pyridoxine, sodium yeast nucleates, and pantothenic acid on the life span of the fruit fly. *J Gerontol.* 3: 9-13.
29. Gardner TS (1951) Gerontotherapeutics. *The Scientific Monthly* 72: 189-191.
30. Harman D (1956) Aging: a theory based on free radical and radiation chemistry. *J Gerontol* 11: 298-300.
31. Hill G, Silver AG (1950) Psychodynamic and esthetic motivations for plastic surgery. *Psychosom Med* 12: 345-55.
32. Baker TJ (1962) Chemical face peeling and rhytidectomy. A combined approach for facial rejuvenation. *Plast Reconstr Surg Transplant Bull* 29: 199-207.
33. Baker TJ, Howard LG (1965) Current Approaches to Facial Rejuvenation. *Southern Medical Journal* 58: 1077-82.
34. Green MW, Green LM, Rothrock JF (1968) *Managing your headaches*. New York, Springer.
35. Lucas JA (1968) A Prelude to the Rise of Sport: Ante-bellum America, 1850-1860. *Quest* 11: 50-57.
36. Cumming GR (1963) The heart and physical exercise. *Can Med Assoc J* 88: 80-5.
37. Astrand P (1969) *Sport for all: exercise and health*. Strasbourg, France. Council for Cultural Co-operation, Council of Europe, France.
38. Bjorksten J (1968) The crosslinkage theory of aging. *Journal of the American Geriatric Society* 16: 408-427.

39. Harman D (1972) The Biologic Clock: The Mitochondria? *Journal of the American Geriatrics Society* 20: 145-147.
40. Olovnikov A (1971) Principle of marginotomy in the synthesis of polynucleotides at a template. *Dokl Akad Nauk SSSR* 201: 1496-1499.
41. Olovnikov AM (1973) A Theory of Marginotomy The Incomplete Copying of Template Margin in Enzymic Synthesis of polynucleotides and Biological Significance of the Phenomenon? *J Theor Biol* 41: 181-190.
42. Bindra JS (1974) Anti-aging drugs. *Annu Rep Med Chem* 9: 214-221.
43. Harman D, Heidrick ML, Eddy DE (1977) Free Radical Theory of Aging: Effect of Free-Radical-Reaction Inhibitors on the Immune Response *Journal of the American Geriatrics Society* 25: 400-407.
44. Shubernetskaya O, Skvortsov D, Evfratov S, Rubtsova M, Belova E, et al (2017) Interstitial telomeric repeats-associated DNA breaks. *Nucleus* 8: 641-653.