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(CHRISTIAN) BIOETHICAL DILEMMAS IN USING SYNTHETIC BIOLOGY AND NANOTECHNOLOGIES

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Abstract: Ethical dilemmas raised by the use of nanotechnology in medical practice can be viewed from several perspectives: religious spiritualist perspective, the perspective of human dignity (nanotechnologies can be thought of as an affront to human dignity), the issue of controversial choice. The article aims to expose some bioethical dilemmas in using synthetic biology and nanotechnologies. Nowadays is often brought into discussion the fact it is possible to appear in the future new human species resulted not via natural selection and evolution, but through the demiurgic effect of technology development in areas such as: synthetic biology, genetics, neurobiology and neurosciences, prosthesis technology and not least of artificial intelligence research. We will also refer into this paper at the possible raised challenges to ethicists who are oriented towards an ethics of species. Those challenges are raised right from the dawn of a consciousness of species, a social construction generated by changes of the meaning of belonging to humanity. During our article we argue that medical technology, especially genetics, medical assisted human reproduction and not least synthetic biology, require a rethinking ethical meanings of applying those technologies in everyday practices.

Key Words: nanotechnology, synthetic biology, ethical evaluation, dignity of human species

Introduction

The article aims to theorize some of the main ethical dilemmas derived from the possible using of nanotechnologies and of other emergent technologies into the human enhancement, especially in the medical system.[1]

We sustain a pro position for the technologies development and also for the human enhancements. We refer at those types of technologies that can prolong the human life and improve the quality of it.

The main topics of the paper are referring to the ethical dilemmas raised by the use of nanotechnology in medical practice and ethical implications of synthetic biology. We also suggest a critical analysis of nanotechnologies from ethical point of view. All topics are converging into some Christian basis ethical considerations of Transhumanist perspectives.

We consider that discussions about building a Christian bioethics should be carried in the anthropological perspective about the meaning of human enhancement.

Ethical dilemmas raised by the use of nanotechnology in medical practice

Media informs about the success of a team of researchers composed of Charles Lieber of Harvard University, Robert Langer of MIT University and Daniel Kohane[2] in the laboratory cultivation of human cells that have electronic sensors in the their structures. Researchers[3] mentioned have developed a blood vessel 1.5 cm long with integrated sensors capable to study the balance of acidity in the blood causing diabetic coma. In the future, the authors hope in the possible development of a communication system with nano-bearing cells for the release of a quantity of ultra-targeted drugs directly into damaged tissues (in this case, a dose of insulin release directly into the blood vessel). Other applications of nanotechnology mentioned can be achieved in areas such as: studying cancer and inflammatory phenomena, designing biocompatible defibrillators. Nanotechnologies together with prosthesis biotechnology open the way towards creation of bionic man seen as a symbiosis between biology and technology.

Ethical dilemmas raised by the use of nanotechnology in medical practice can be viewed from several perspectives:

- *Religious and spiritualist perspective*. The human being, is seen as a divine creation made in the image and likeness of God. This includes at least a potentially divine perfection. By mixing with technology, divine perfection is impaired. In addition, it can be considered an insult to human

divinity through the exercise of a demiurgic self-poetic power by the human being.

- *From the perspective of human dignity*, nanotechnologies can be thought of as an affront to human dignity by attempting to dismantle humanity as ethical value[4]. It creates the possibility of tele-manipulating the human being either through signals capable of altering human behaviour or through fear generated by control over someone's body which becomes exercisable directly by others[5].

- *The issue of controversial choice*. A patient in the position to accept a possible regenerative therapy intervention based on nanotechnology could be put into a situation of controversial choice that may involve: the right to life, the right to identity (given that nanotechnology may induce changes in the identity of the individual), the right to autonomy and the right to dignity discussed above.

Ethical implications of synthetic biology

The American Presidential Commission for the Study of Bioethical Issues identified five ethical principles relevant to considering the social implications of emerging technologies:

- *public beneficence* - The Commission define the "The ideal of public beneficence is to act to maximize public benefits and minimize public harm. This principle encompasses the duty of a society and its government to promote individual activities and institutional practices, including scientific and biomedical research, that have great potential to improve the public's well-being".
- *responsible stewardship,* reflects a shared obligation among members of the United State and global communities of scientist "to act in ways that demonstrate concern for those who are not in a position to represent themselves (e.g., children and future generations) and for the environment in which future generations will flourish or suffer".
- *intellectual freedom and responsibility,* "As a corollary to the principle of intellectual freedom and responsibility, the Commission endorses a principle of regulatory parsimony, recommending only as much oversight as is truly necessary to ensure justice, fairness, security, and safety while pursuing the public good.
- democratic deliberation, "reflects an approach to collaborative decision making that embraces respectful debate of opposing views and active"
- *justice and fairness.* "justice and fairness relates to the distribution of benefits and burdens across society".

The principles are intended to illuminate and guide public policy choices to ensure that new technologies, including synthetic biology, can be developed in an ethically responsible manner[6].

Synthetic biology does not soften edges, but creates life forms that are meant not to have any edges from the start. It does not add value to an existing organism; it brings into existence something that counts as valuable from our point of view. Seen from the perspective of synthetic biology, nature is a blank space to be filled with whatever we wish[7].

We emphasize the idea that we are now at the point where technology can create life. The myth of creation of the world out from nothing, and the creation of man from the dust is on the point of being transposed into technological reality.

Boldt and Müller argue that the transition from genetic engineering to synthetic biology marks a profound shift from the manipulation of existing species to the creation of new forms of life, a shift having considerable ethical significance. They note that the metaphors commonly used in synthetic biology which describe organisms as physical artifacts—"BioBricks,"living machines, hardware and software—"may in the (very) long run lead to a weakening of society's respect for higher forms of life that are usually regarded as worthy of protection."[8]

Susumu[9] considers that research in biosciences should be transparent to the value of life. One of the most significant projects in terms of ethical impact is the human genome sequencing project followed by the completion of the first cell with synthetic genome[10]. It is the ethical responsibility of those creating the purpose of synthetic biology products to focus on applications in order to protect nature and humans[11]. We speak today about the possibility of appearance of future new human species resulted not via natural selection and evolution, but through the demiurgic effect of technology development in areas such as: synthetic biology, genetics, neurobiology and neurosciences, prosthesis technology and not least of artificial intelligence research[12]. The dawn of a consciousness of species, a social construction generated by changes of the meaning of belonging to humanity, raises challenges to ethicists who are oriented towards an ethics of species[13]. In the same domain of ethical evaluation of technologies ethical concerns of robotics are included. Developed in the science fiction literature, the laws of robotics[14] are actually a series of principles of ethical nature designed to ensure coexistence between humans and any synthetic species developed based on artificial intelligence[15].

Critical analysis of nanotechnologies from ethical point of view

Savulescu[16] made a critical analysis from ethical point of view of technologies that allow the enhancement of human beings. In this evaluation are presented a series of pros and cons regarding the use of technology to improve the human condition, arguments that lead to the conclusion that it is morally wrong to opt for non-improvement of the

human being. As a diet providing adequate child development is considered beneficial and morally acceptable because it produces children's welfare, likewise the biological intervention is justifiable and it is wrong and unethical to give it up[17].

From a liberal perspective, we may partially give up autonomy if other values such as welfare become temporarily or particularly dominant[18].

Main theories on welfare such as: utilitarian, egalitarian, etc. are not presented by Savulescu[19]. Theoretical challenges of various ethical perspectives in simultaneously approaching autonomy and welfare are presented. In case of emergency situations research, when informed consent[20] is impossible, consent is presumed, application of hypothetical or presumed consent being recommended[21]. Hypothetical consent violates the liberal view on autonomy, as it allows for rational assumption of another person's decision to substitute its decision, allowing passivity for that person (an action that happens to it and consequently a limitation of its capacity as agent). Mark Stein and Julian Savulescu[22] state that hypothetical consent can be partially integrated in the libertarian view, which is in a less defensive position in terms of research on human subjects. In all cases, the hypothetical consent compromises the principle of autonomy in the name of welfare generation[23].

Based on the results of a team of geneticists from Ohio who managed to produce a genetically engineered mouse with outstanding performance in terms of physical strength, after alteration of genetic sequence that coordinates glucose metabolism, Julian Savulescu analyzes the impact of technologies to improve genome that become, nowadays, possible for humans. Improvement by genetic engineering of human beings is called by Savulescu[24] biological liberation and it is understood as overcome of biological and evolutionary constraints of the human species. Natural evolution biologically adapted the human species to a historical period in which food sources were not as abundant and easily accessible as today[25]. Julian Savulescu[26] argues that the new historical conditions justify the modification of the biological cycles and this is nothing but adaptation, meaning an extension of that natural selection by conscious intervention on biological determinants of human existence. Savulescu[27] is situated in a position to support the ethical trans-humanist project, arguing in favour of human enhancement, both individually and as species. Simple biological difference between Homo sapiens and a possible new species resulting from the improvement of homo sapiens should not constitute grounds for concern and conservatism of species, but rather an opportunity for moral improvement of humanity[28]. Openings made possible by medical technology, especially genetics, by medical assisted human reproduction[29] and not least by synthetic biology, require a rethinking of horizons of ethical meaning in everyday practices[30].

Savulescu, bringing into question the controversial choices, generated precisely by the principle of autonomy[31], creates the frame for anthropological opening, which places bioethics as the focus of philosophical reflection[32] on the significance of new scientific and social paradigms.

Transhumanist perspectives

Transhumanism appears as an intellectual, cultural and political movement dedicated to affirmation and transformation of the human condition through technologies[33]. Transhumanism is a technologically based philosophy and a social a movement that asserts that human beings can now use technology to control their own evolution and destiny, becoming, to all intents and purposes, god-like[34]. World Transhumanism Association defines transhumanism as a cultural and intellectual movement that affirms the possibility and desirability of improving the human condition through applied reason, particularly through the development and broad access to technologies that eliminate aging and through significant improvements made to intellectual, physical and mental ability of human species. As an academic field, transhumanism is defined as study of promises ramifications but also potential hazards that will enable us to overcome fundamental limitation of the human condition, as well as ethical studies related to it, regarding the development and use of such technologies[35].

The Philosopher George Dvorsky considers that

> "transhumanism is an emerging andbroadly based philosophy, bioethics, cultural phenomenon whose proponents believe thattechnology can and should be applied to improve the human condition. Transhumanists believe that humanity ought to enter into a post-Darwinian phase of existence where intelligences, rather than the blind forces of natural selection, are in control of their own evolution"[36].

Therefore, the transhumanist research assesses the potential benefits and risks of technologies to improve the human species. Overcoming the human condition is defined by Bostrom[37] as post humanism. Hughes[38] joins the transhumanist research on improving the human condition in technology with the post humanist studying the possibility of non-human intelligent species either equipped with artificial intelligence or artificially developed from current biological species including human. Transhumanist movement is criticized by prominent thinkers such as Francis Fukuyama[39] that consider it one of the most dangerous current philosophical ideas. Francis Fukuyama argue that transhumanist

technologies, particularly biotechnologies, will ultimately change the essence of human nature that serves as the basis for a common human dignity and the source of human traits that underpin morality.[40]

The transhumanist movement speculates some of the most important myths of humanity: youth without ageing and life without death. Bostrom[41] shows the omnipresence of this myth in human culture starting with the myth of Garden of Eden, The Epic of Gilgamesh etc. We add here the presence of this myth in popular tales such as the one whose title was paraphrased above. Another significant myth resignified by transhumanist thinking is the one of the civilizing solar hero who, through self-effort, overcomes the human condition becoming demigod, superman, etc.

Humanistic research extends on the ethical significance of technology and mutations brought to human condition by developing technologies. Transhumanist ethics brings into focus questions about the significance of the human species and its place in the context of possible future appearances of transgenic species, artificial intelligence, etc. In this regard, since the 1950s Asimov formulated the laws of robotics that put the robot in an inferior position to the human condition[42]. From an ethical perspective of species, we wonder to what extent is just to place a further species, which may be biologically and in terms of evolution superior to human species, in a low anthropological and ethical condition. The improvement of the human species will generate inequities[43] that could lead to the existence of a truly superior race anthropologically with biological, intellectual, sensory, superior capacity. This can lead to violating the dignity of the human species as a whole. Concerns about transhumanism regard social justice, reform of all human institutions etc.

We can argue that with the development of medicine in recent years, increasing life expectancy, lack of concern for survival, the human species emerged from binding frameworks of natural selection. This can endanger species' evolution lacking the need of improvement required in the fight for survival. Signs of such degeneration are presently represented by the large number of overweight people, the incidence of metabolic diseases, sedentary lifestyle etc. Regarding the transhumanist ethics it occurs in two dimensions: the skeptical bio conservative concerning the transhumanist evolutions and posthuman society and respectively the followers of transhumanism as intellectual, social, political and ethical solution of the contemporary humanism crisis.

Bioethical abolitionism[44] suggests overcoming slavery abolitionism bringing abolitionist movement toward militancy for the the abolition of all forms of suffering. The trend is a post utilitarian movement[45]. Democratic transhumanism[46] summarizes in the field of bioethics the libertarian values with those of social justice starting from transhumanist values. Libertarian transhumanism believes in the application of a strict libertarian policy in order to solve ethical transhumanist dilemmas.

Postgenderism[47] proposes overcoming gender-based society and eliminate sexual reproduction of the human species through medically assisted human reproduction etc.

It is time to insist on the spiritual aspect of transhumanism which may cause an overcome of the human condition with the risk of casting the human being from divine, from transcendence. In this respect, some researchers point out assuming an ontological loneliness of the human being in posthumanist conditions[48].

Transhumanism and Christian bioethics

One of the goals of transhumanist bioethics is to overcome the human condition of being mortal. The state of self-transcendence contravenes the Christian vision which enables man accession to deification only through Christian mysteries, which were made possible by the sacrifice of our Savior Jesus Christ. Hence, a bioethical vision in which the individual exceeds the human condition through any techniques that enable self-transcendence, either technology based on modern science, or magic of medieval type, violates Christian precepts. Transhumanist thinker, like medieval magician, is guilty of ontological self-sufficiency pride. Failure of any eschatology that does not include the redeeming presence of Jesus Christ puts the transhumanist effort in conflict with spiritual asceticism. The modern concept of autonomy and individualistic contemporary culture originates in the schisms and divisions that marked the Western thought. The separation of Aristotle from Plato, the separation of the Catholic Church from the Orthodox and the Lutheran of the Catholic, the constant polemics between Western thinkers have constructed the ideal of modernity, devaluing uniqueness and difference.

Transhumanist effort exceeds, in our opinion, the modern individualism in a transmodern sense of the individual connected in a network of interdependencies. Artificial immortality is not an individual given resulted from personal magic, but is the culmination of technological efforts of a humanity being on the way of self-transcendence. Justified cognitively in Cartesian conception regarding the thinking substance (rescogitans) and completed in Kantian criticism, the vision on the rational specific of the human being appears as a triumph of secularism[49] in front of a religiosity condemning the spirit to annihilation, reducing the human essence to the ontological status of creature. This ontological limitation reduces the status of the human being that revokes the quality of part of being itself. The need for transcendence is in our view a constitutive part of the human being. Against the medieval prohibition proposed to man by the Catholic Christian church to attend the divine condition, the modern spirit chooses the temptation of reason as the only way to make the individual be in a condition like God. If man cannot attend the divine condition, at least he could be compared to God

through discursive logocentric nature of knowledge. From idealization of reason to its secular absolutization was a single step that was passed by Descartes through doubt on anything other than reason itself. Absolutization of reason was completed by Kant by postulating the nature of the unknown thing in itself. Reason no longer has to seek transcendence in an absolute beyond. Freed from temptation of dialogue towards transcendent, the human species starts the apotheosis of the superman.

The dawn of biological liberation[50] finds the ideal superman as a base for building an ideology of artificial transcendence. The Orthodox vision of deification[51] as ontological status allows, opposed to the Catholic, the accession of human being to the ontological and being condition as partakers of divine status. God-man communion, the theandric that Tudor Ghideanu[52] speaks about, represents the spiritual archetype of communication with self, which generates the ultimate meaning of Christian life. Christians communicate in the process of praying and in the realization of the sacrament of confession.[53] At the same time, God communicates Himself through the sacrament of the Incarnation of His Son, sacrament whereby God is made visible, and the presence of the Holy Spirit makes possible the knowledge and love of God. In terms of Christian Orthodox, what gives life is the breath of God represented by the Holy Spirit and the presence of the Savior, in the Christian's soul.

In terms of bioethics, reporting to Christian view opens two perspectives: one of techno-optimists and one of radical mortalists[54]. Daly shows that in the center of Christian theology is the affirmation of birth, life, crucifixion, resurrection and ascension of Jesus Christ. In the author's opinion not only that there is a clear contradiction between efforts to extend life through technology, but they really are inspired by Christianity itself. Prolonging life through medical technology is not in itself against the will of God because, given the sanctity of life, efforts to maintain it can be considered a pious act. Daly[55] points out, in his article, the Cartesian and Baconian vision on the possibility of life extension with the progress of science. They legitimize, in Daly's vision, the transhumanist efforts to extend life expectancy and increase quality of life.

In our opinion the two ideals are not contrary to christian vision regarding the sacredness of human life[56] as long as the means of artificial life extension are legitimate. Through illegitimate means of extending life we can understand, for example, stem cells taken from human embryos produced during the process of artificial insemination and destroyed. Artificial immortality may be inconsistent with orthodox values when artificial prolongation of life prevents the soul, as a separate asset, pass in the afterlife through techniques of maintaining artificial life. Here we identify a dilemma stemming from a conflict of values: on one hand, life is sacralised and must be completed only when the Divine will requires, on

the other hand, life can be supported artificially for a very long time, through technology. Euthanasia practices of any kind are contrary to Christian vision because the source of life is God and its end should be also God's prerogative. Other arguments that Daly[57] brings to reconcile transhumanist efforts with the Christian view is that God continuously works in support of the human being and its salvation. Prolonging life through biomedical technology does not contradict this effort, but rather makes possible the divine work to restore heaven on earth.

In our opinion, the restoration of heaven on earth is rather a spiritual state in which human beings participate in the divine nature through the process of glorification than a process to defuse evolutionary tensions by increasing life expectancy and quality of life. Both processes the horizontal of extension of bodily life and the vertical of glorification may be necessary and welcomed by the human condition. Healings carried out by Jesus Christ shows that health and lack of suffering is praiseworthy according to Jesus Christ. This justifies the effort of medicine to discover new therapies to heal the suffering[58] and prolong life. Health is restored by the Savior under the urge that the healed to stop sinning. Transposing this urge to life extension efforts should be accompanied by an ethic of virtue that allows "improved" individuals not to sin against the human condition.

> "If the kingdom of God is here now, and includes healing the sick, how could the Christian deny cybernetic healing and biotechnology? And if so, why? The answers to these kinds of questions require a Christian theology that speaks of the relationship between God, humanity, and technology. It must grapple with the significance of human embodiment within creation, and how that relates to the 'brave new world' proposed by transhumanist. Ambiguous statements such as 'we are made in the image of God, therefore...' must clearly articulate what being human really means in the twenty first century, including theological reflection upon human life and death, the incarnation and the hope of physical resurrection"[59].

Cole-Turner[60] speaks of a partnership of man with God, a co-creation of the human condition. The man-God communion is in our view a process of divine-human co-creation. In this regard, we are talking about the idea of appreciative theology[61] that reveals collaboration between the human and the divine that catalyses the transformation of man in order to obtain life including eternal. This co-creation is justified in the divine urge addressed to Adam to rule the world. But this is a post-Fall perspective

(after the fall of man into sin) and therefore world domination can be understood either as enslavement of it, or as attracting it into a transfiguring process of participation in salvation of man. Returning to the arguments of Cole-Turner[62], he shows that technological practices to improve life including genetic technology can be considered a result of God in the sense of effective pursuit of creative processes that God makes. From Orthodox perspective, we can argue that the process of creation is a divine mystery and trying to imitate genesis through technology may have a connotation of taking the work of God in vain, which makes possible the sin of pride. Both Christian theology and transhumanist philosophy see death as an enemy. However, the answer to the latter differs radically. While Orthodox Christian response is under the resurrection mystery, the transhumanist concerns perpetuation or in the worst case prolongation of worldly life. Earthly immortality is a promise that Jesus Christ does for his second coming. But this should not take place before restoration of heavenly state of humanity as before the fall. In terms of improving the human being, some of the ethical implications of transhumanism may be:

- Man was created in the image and likeness of God; from this point of view, trying to improve the human condition is a sin against human beings as the image and likeness of God that can be ruined in an effort to improve humans (human enhancement). An additional sin can be considered to believe that human beings can suffer improvements which would be equivalent to consider that God, to whose image and likeness man was created, is imperfect. It can be argued that the actual human being is the result of the fall into sin and, although it was created perfect, it is in an imperfection condition; the results of this imperfection are disease, old age, suffering and death. Overcoming this limitation would be an overcome of Adam's curse whose lifting was done by the resurrection of Christ. In this sense, a Christian bioethicist might argue that prolonging life and eliminate suffering can be partial restoration of Heaven's state made possible by redemption of human sins and removal of Adam's curse through the sacrifice and resurrection of Christ. We believe that prolonging life is a justified effort, as long as through this, man is given the chance to actually get closer to God especially by living consciously the prolonged life as a divine miracle done by doctors who are nothing but instruments of divine work.
- Humbleness as Orthodox value should prevent the Christian in aiming at improvement of human life. The struggles of Orthodox Christian concern passion of the human condition as expectation of salvation. Compared to this, it can be argued that overcoming the human condition in the sense of self-transcendence removes the possibility of salvation as perfection of the human condition.

- Creating a superior race of enhanced human beings represents an extension of divine creation through the contribution of human technology. Philosophically, the issue regarding the ontological and anthropological status of these new species is arising. If these species are non-human, which should be the legitimacy of applying human rights to these identities? On the other hand, it should be justified the obligation of individuals belonging to species artificially created to respect the human rights of non-enhanced human beings. From theological point of view, the question is what would be the status of such individuals: Could they be considered persons? May they accede to salvation? In this regard, we will have to wonder how many genetic and technological changes the human being should bear to be considered as belonging to another species.

We also must mention some of the arguments against the human enhancement and artificial creation of life or of a new intelligence species.

A number of arguments against human enhancement technologies can be found in the commandment:

> You shall not make a graven image and any resemblance to anything from what is in heaven above, and from what is on the ground below, and of each are in the water under the earth! Do not worship them or serve them, for I the Lord your God, am a jealous God, punishing the children for the parents fault that I hate myself, to the third and fourth generation (Exodus: 20-4 ,5)

The interdiction has created controversy between scholasticism may be considered iconoclastic argument against human enhancement technologies.

> You shall not make for yourself a carved-image, or any likeness of anything in heaven above That is, or is on the earth beneath That, or That is in the water under the earth. You shall not bow down to or serve them, for I the Lord am a jealous God Your God, am a jealous God, visiting the iniquity of the Fathers on the children to the third and fourth generation of those who hate me. (Deuteronomy 5: 4-21: Exodus 20: 1 -17).

Command can be interpreted as explicit interdiction of artificial life even if it is to be robotic technology origin or emerging nanotechnologies. The same prohibition should apply cloning nanotechnologies, genetic modification, etc. Especially robots would seem to be prohibited as long as the classical representation of the robot is a humanoid form.

LaChat argues that artificial intelligence cannot have self-awareness and moral reasoning, so it cannot be considered as a person. In order to have a moral conscience an entity artificially created should be capable of feelings and emotions, in order to be added to the logical thinking. Without emotions, artificial intelligence transforms the robot into a moral judger so it competes with God. Construction of artificial intelligence "in the image of man" raises the questions of replicability of the human condition. Human experience must be duplicated by artificial intelligence in order to gain self-awareness[63]

In our opinion the argument is not fully plausible, because artificial intelligence will not be a new species of man just as man is not a particular species of God. In the hierarchy of being existence God, man, and artificial intelligence should have a particular position even if it is an ontological continuity of the parts.

From our point of view a new iconoclastic interdiction of artificial intelligence and enhancement technologies should be made because of the limited capacity of man to assess the consequences of their own creation upon the universe and other people.

Conclusions

During this article we discussed some of the main ethical dilemmas derived from the possible using of nanotechnologies and of other emergent technologies into the human enhancement, especially in the medical system. The identified dilemmas refers to the diminished dignity of the human being and the prejudice of divine side of human nature, nanotechnologies among other emerging technologies can be thought of as an affront to human dignity by attempting to dismantle humanity as ethical value. Another dilemmas brought by the use of the new technology is referring at the respect of the human being autonomy, aspect discussed in an elaborated manner by Julian Savulescu. The manipulating of human behaviour can be such an affront of the human dignity.

We treated also the issue of further artificially created life forms and new intelligent species, based on that we referred at the religious prohibition of artificial intelligence. We adhered to the American Presidential Commission for the Study of Bioethical Issues who proposed five ethical principles relevant to considering the social implications of emerging technologies: *public beneficence, responsible stewardship, intellectual freedom and responsibility, democratic deliberation, justice and fairness.* Therefore we expressed our consideration regarding the genuine human form of life and the full respect for human kind.

NOTES:

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