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## **Exploring the Boundaries of Bodiliness: A Theological Challenge to Transhuman Advances**

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**Abstract:** Human beings have now the power to alter their very nature through a programmed change in their biological character. Earlier humans wanted to resemble the gods, separate themselves from their body or get near the arena of higher spirits on the ladder of low and higher natures. Today's cutting-edge technologies may overtake the performances of human limitations with the rise of biotechnological developments, like genetic engineering, gene therapies, nanotechnologies and stem cell researches. Now "superhuman" performances can be achieved by altering bodily elements. Humans want to be creators. This new power of "Playing God" brings forth many ethical problems.

This article discusses the ethical dilemma connected with bodily enhancements, transhumanism and instrumentalisation of the human body. It pleads for greater human sensitivity and responsibility in fostering human dignity while engaging in technological innovations. It asks for a "permanent confrontation with technology," for technology should not overtake humans but should always remain a human act. It recalls the plea of Pope John Paul II: "If the scientific research in this area should serve the person, it must be accompanied by a careful ethical reflection on every step, which reflects in corresponding legal norms for keeping the human life intact. Life can never be degraded to an object."

Keywords: Bodiliness, Body; Dignity of humans; Ethics of body enhancements; Human life; Transhumanism.

## 1. New Creators

Humans have now the power to alter the nature of their existence through a programmed change in their biological character.<sup>1</sup> As Ludwig Siep writes in an angelic language: “Humans want[ed] to resemble the gods, separate themselves from their body or near themselves to the arena of higher spirits on the ladder of low and higher natures.”<sup>2</sup> Technologies may overtake the performances of human limitations with the rise of biotechnological developments, like genetic engineering, gene therapies, nanotechnologies and stem cell researches. Now “superhuman” performances can be gained by altering the human bodily elements. Humans want to be creators. This new power of “Playing God” brings forth many ethical problems.

Here are a few examples of biotechnologies which sprang up powerfully all over the world in the late 90s: Today there are genetically engineered plants. The pesticide manufacturers can make more money with their products. About 70% of genetic engineering falls into this category. There are plants genetically engineered to produce plastic. There would not be much of a dependency now on the Middle East for petroleum. The Chinese tried with human genes into tomatoes and peppers to make them grow faster. One may not thus be a pure vegetarian any more. In Canada geneticists put human genes into fish to make them grow faster. In the United States several companies tried to place human genes into pigs in order to genetically match them to human individuals with a view to organ compatibility. Will they be human-pig or pig-human? Are humans disturbed by such projects? Not everything may be bad with genetic engineering. The question would always be a matter of demarcation.

In the bioethics discussion one argues about the difference between therapy and enhancement, between the fight against illnesses and the improvement of physical structures and performances, between making people better and making better people. While the therapy aimed to reduce pain and suffering may be morally allowed

and may appear anyway quite safe, but the permission to improve upon or better the human body is ethically problematic.<sup>3</sup> This article asks a few moral questions with regard to the enhancements of human bodiliness. Is it immoral to alter the biological nature of the human being? To what extent can we set limits to the moral understanding of human body in the wake of new biotechnologies?

## **2. Going beyond the Boundary: Transhuman Enhancements**

The word “enhancement” is used in biological sciences in the sense of improvement or expansion of diagnostic, therapeutic, preventive or palliative possibilities. The enhancements of human beings can happen not only intergenerationally in the heredity process, but also already during the life-time within one’s own bodily existence. Enhancements in this sense, whether it is already now possible or considered possible in future, can aim at expanding physical qualities like the physical attractiveness (“physical enhancement”), or increasing cognitive abilities like memory performance (“intellectual enhancement”) or formation of certain behavioral attributes like for example the aggression (“moral enhancement”).<sup>4</sup> Such human enhancements raise questions regarding the boundaries of human bodiliness.

To what extent can we make justifiable changes while treating illnesses in the human bodiliness is a central question in genetic engineering, especially in pediatrics, application of psychotropics, cosmetic surgery and doping of the sport.<sup>5</sup> The enhancement debate raises three ethical questions:<sup>6</sup>

- Firstly, regarding the compatibility with the objectives and goals of medicine which are traditionally seen as the restoration and protection of health.
- Secondly, regarding the worthiness of enhancement in a health system against the background of scarce resources in public health.

- Thirdly, regarding the principal ethical legitimacy of enhancement and the moral status of the *conditio humana*.

Are we allowed to do what we can do? Is it necessary to creatively alter human nature, or invent a new generation of human beings?<sup>7</sup> The fundamental newness of the human being is not just about altering bodily functions and performances but also about the imitation of performances beyond human nature. In this way human nature, whose abilities would be as different as the abilities of a new biological species from those of the existing human being, may have other capabilities and performances of a technical application, which might appear to be a different “generation.”<sup>8</sup> Hence the basic question is to what extent human creativity can be applied and allowed to the transmogrifying of the human body while maintaining the integrity of the human bodiliness?

### **3. Arguments for and against the Transhuman Enhancements**

The prevailing arguments for and against a foreseeable human enhancement are:

- a. The enhancement through biotechnical measures may be seen necessary so that the mankind does not perish because of inner conflicts and problems.
- b. It may be necessary for aesthetic reasons to increase the abilities of humankind in order to bring about perfection and ennoblement.
- c. It may be allowed for hedonic reasons so that experiences of the increased pleasure as well as the fulfilment of one's dreams of the luck becomes possible.
- d. It may be allowed for moral reasons so that more good actions become possible in the world.

- e. It may be allowed for theological reasons, as though the creator wanted the perfection of his creation that is the further development of the natural evolution through his capable creatures to bring into completion.

*Arguments against these premises:*

- a. The increase of intellectual abilities as a solution to the problems of ever complex social, economic, technical and ecological interactions is held as a survival necessity. It is a caricature of human contingency. The increase of intelligence is likewise considered to be a solution to the genetic problems, although concepts like “increase in abilities” and “problem solution” are quite vague and uncertain. It is really a want of the elites. A biotechnical improvement of humans may create more and new problems than solutions.
- b. Naturally one could admire the performances of a biomechanically improved human being like that of a “high-bred” car. But whether the biotechnical complement or perfection of a person is a desirable goal in itself doesn’t follow from it. Creating a human being with superhuman biological qualities may be an aesthetic ideal for some, but these subordinate subjective aesthetic reasons for it are not objectively or broadly recognized.
- c. The hedonistic premise appears more convincing. It is hardly disputed that all people strive for happiness. However, we don’t know what joys and disappointments of elevated physical capabilities are in store. The promising privilege of elites could lead to a reinforced reign over the “not-improved.”

- d. We don't know how human emotions and wishes would change through an improvement of genetic manipulations and installations. There is no compulsory ethical command to manufacture higher humans.
- e. In modern times, technical options like the utilization of nuclear energy may be brought as justification of a task to bring creation to its completion. However, a matter of creation moving towards perfection could be spoken only with the reference to the power of an infinite Creator. This understanding itself makes humans to be within creation and to avoid creating new inventions beyond any boundary. To lead creation back to completion by humans appears a far too daring thesis. We can neither protect creation nor bring it to completion. Neither is it a human task.

#### **4. Prohibition of Transhuman Enhancements**

The arguments for the biological expansion of the human body are far from convincing. The fundamental reasons for the prohibition against human enhancements are:<sup>10</sup>

##### **4.1 It harms the interests of others**

By manufacturing new humans with extension of basic physical possibilities, the people with inferior competences would be pushed to the periphery. The danger appears in competition that the "supermen" would lose respect for the less fortunate and would possibly oppress them with the prosperity of their new talents and with the domination over the common wealth. Biotechnical interventions to a highly productive improvement of the genome, especially the cloning of favorable genome, are technically extremely costly. So it becomes a commercialization of genes by the elites. Thus, the public virtues of justice, equality and solidarity are forced into greater problems.

## 4.2 It violates human dignity

The cure is accepted as legitimate goal, because it restores health. But the fundamental alteration of human nature would go against human dignity. Whereas a therapy is viewed as ethically justified, even if it involves interventions in human nature, as the purpose is the correction of a defect or illnesses, but the enhancement is, in contrast, thought to disturb the qualities and abilities of future human natures, as it would have an enormous influence on the natural development of humans with an attempt to play God.<sup>11</sup> As Heyd says, "An enhancement is rejected because it implies the refusal to accept the given natural qualities of the humankind and because it is presumptuously striving to create new types of natures, of which it could be established, that they are not human."<sup>12</sup> The dignity of the human being is violated with such enhancement of intellectual or physical abilities, because the identity of the human nature is disfigured. Genetic alteration attacks the very plan of life directly.

## 4.3 It damages the common good

The private acquisition of an improved biological provision would place society before the problems of equality and justice, when we hold that the biological disadvantages are reduced through the idea of social justice.<sup>13</sup> The standards for public equality would be lost through a biological constitution, whose joys and sorrows, performances and deficits, health and illness would seriously deviate from the previous experience and these would only be subsidiary. A number of public goods would be endangered. This does not mean that the development of medical therapies against degenerative processes of the body would be forbidden altogether. They are however to be avoided if they are performed through a mechanically manipulated superman, for no good reasons can be adduced in its support.

# 5. The Human Nature within the Boundaries of Bodiliness

What is the nature of the human being, and how does it show itself? Can nature be directive of the orientation for a being.

that it may be artificial or culturally conditioned? How can a reference be taken on nature in practical sense, if nature is equally understood in the double aspect of interior and exterior, of predetermined and socially given, of naturalness and artificiality as well as culturality? The founding fathers of the philosophical anthropology agreed upon an opinion, that the “nature of the human being” would distinguish itself through a “double character.”<sup>14</sup> The human being intervenes in nature since the beginning of his existence. He must even do this in order to assert himself against the adverseness of the nature and in order to be able to survive. On the one hand, the nature of the human being is regarded as naturally given, on the other hand from the creativity perspective as culturally made.<sup>15</sup> Eric Parens puts it in different terms of distinction as “gratitude” and “creativity”:

As it emphasizes on one side our obligation to hold it before eyes, that the life is a gift and that we must learn to let things just as they are, on the other side it emphasizes also our obligation to change this gift and to demonstrate our creativity.<sup>16</sup>

For Reiss and Straughan:

Nature and all things, which are natural, are valuable and good in themselves; on the other hand all forms of genetic manipulation are unnatural in a sense that they are directed against nature and above all when they intervene to cross over the borders of their types; all forms of genetic manipulation therefore are wrong in its very essence.<sup>17</sup>

We understand by moralization of the human nature with Wolfgang van Daele: “What has become technically available through science should be made again through a moral-control normatively unavailable.”<sup>18</sup> A new regulation demand originates mostly with new technical developments. The human creature is a protection-good and it belongs to the human creature that it has the same protection-worthiness in his various stages. The Arguments of Species-belongingness, of Identity, of Potentiality and of Continuity can be considered as decisive guide for the application of the protection-worthiness of all born and unborn humans.<sup>19</sup> Therefore, a new development of transhuman enhancements might create new



problems in the principles of the protection-worthiness of humans. For human nature is an “indisputable part of our basic moral assessments provided we want to hold on to the subject-being as principle of morality.”<sup>20</sup> Charles Taylor says that nature is a constitutive property of us, which has a morally decisive role on life-goods and as such a moral source of its own kind.<sup>21</sup> Hence, nature, which plays an indisputable normative role, cannot be reconstructed.

Further, Habermas defends humanity in his critique of human nature against enhancement technologies, and he is correct as the enhanced individuals would have no ethical freedom and autonomy.

Eugenic interventions aiming at enhancement reduce ethical freedom insofar as they tie down the person concerned to rejected, but irreversible intentions of third parties, barring him from the spontaneous self-perception of being the undivided author of his own life.<sup>22</sup>

Human cloning is the most unnatural of all types of gene-technology and is consequently the most controversial. Cloning is not only unnatural, but it is also totally artificial. It goes against human nature. Enhancing natural bodiliness of humans is going against the very nature of humans. Protecting human bodiliness is to protect human nature and humanity.

## **6. Instrumentalizing Human Bodiliness Goes against Human Dignity**

The human being is an end-in-himself. He is never to be treated only a means, but as an end. Therefore all interventions are morally forbidden which use humans as mere means (= Total Instrumentalization). In a pluralistic society, where there is no one single or uniform human picture, the dignity of the human being is preserved and safeguarded by the wisdom of the people through the Constitutions of Nations. It is a suitable criterion. In the *Universal Declaration of Human Rights* (1948), recognition “of the inherent dignity and of the equal and inalienable rights of all members of the human family” is said to be “the foundation of freedom, justice, and peace in the world.” At least thirty-seven national constitutions ratified since 1945 refer explicitly to human dignity. The moral

criterion of self-purposefulness or end-in-itself or dignity of the human being is founded and justified both philosophically as well as theologically.

Theologically the dignity, the self-purposefulness or being end-in-themselves of the human being results from the God's image and likeness. Every human being is endowed with this dignity and therefore to be loved for their own sake. Dignity demands charity and protection, for it is a genuine example of the love for the neighbor.<sup>23</sup> As Fukuyama says, "Denial of the concept of human dignity – that is, of the idea that there is something unique about the human race that entitles every member of the species to a higher moral status than the rest of the natural world – leads us down a very perilous path."<sup>24</sup> Human dignity can become the necessary prerequisite for every moral action, as it is the embodiment of morality. When we go beyond the boundaries of human bodiliness with the use of technology, then the human image and dignity gets into danger.

In the words of the moral theologian Josef Schuster, the arguments can be summarized as in the following:

The human image doesn't get into danger if the goals of genome research and its application to the human being serve therapeutic purposes. However it would be strange, if we would turn down the genetic engineering completely, for it can heal the illnesses genetically. But it becomes controversial and debatable if the human being is defined by his genome. That is biologically unacceptable and philosophically nonsensical.

Certainly the human image stands in danger, if we want to produce a new design of the human being through genetic engineering... If we clone Einstein, can we be certain, that the copy would not become a playboy or a crafty rogue or a proficient carpenter out of this intelligent man, but definitely it wouldn't be a second Nobel laureate for physics.

Again the human image gets into danger if it decreases the acceptance of disabled and sick people...

the human image gets into danger if being human is reduced to a biological thing.<sup>25</sup>

In the context where genes alone are enough and capable of making new humans with sounding-good slogans like “new genes – new humans”, the German bishops have come out very strongly with their positions safeguarding the human dignity:

Because the human being is not a product of coincidence, and because he didn't make himself, he doesn't exist in an absolute autonomy. As the final creature, he can guarantee himself neither sense nor value of his life. He lives within an already given boundary, which he may not cross over. His dignity is founded on God's image and likeness of humans. It means that he is unconditionally loved and approved by God for all his performances, abilities and inabilities. The human dignity is therefore inviolable and comes to all human beings, independently of the assessment of others or his own self-assessment, to the born and unborn, to the healthy and sick, to the disabled and dying.<sup>26</sup>

The question of human dignity should not be decided by the vote of the majority. Human dignity is not available for voting. The Article.1.1 of *Grundgesetz* (the Fundamental Law) of Germany says: “The dignity of the human being is inviolable. The obligation of all the state force is to preserve and protect it.” This value of human life from its beginning to the end belongs to this pre-givenness, over which there can be no voting. (Art. 19. 2 GG). As Fukuyama says:

Human beings had dignity because they alone had free will – not just the subjective illusion of free will but actual ability to transcend natural determinism and the normal rules of causality. It is the existence of free will that leads to Kant's well-known conclusion that human beings are always to be treated as ends and not as means... It would be very difficult for any believer in a materialistic account of the universe – which includes the vast majority of natural scientists – to accept the Kantian account of human dignity.<sup>27</sup>

## 7. Need for a Greater Human Sensitivity and Responsibility

Theologically it is well-founded that each human being is unique and distinct, that each one is called by the creator into the existence and that s/he can answer this call in freedom. The Bible expresses this in the act of naming: God calls each and everyone with a name and wants that we answer him. In this ability to answer, our reason must take responsibility. Reason has to take its own course. The potential of the genetic engineering leads some to promises of everything-makeable-euphoria; while others turn to it with a total refusal. Both are wrong. It is necessary to support ethically correct goals and methods in the genetic engineering; and to look through the wrong objectives of the genetic engineering for evaluation and correction. We need neither to believe everything that it promises nor to do everything that it may make possible. Sensitivity and moral competence are required.

It is not disputed that the prenatal diagnostics protect the life of many children in the womb, as mothers and fathers expect a healthy child. At the same time the information of a certain hereditary illness in unborn children may become a death sentence. The problem is that through diagnoses more problems are created than promising therapies. People do have the right to have children if they are biologically capable, but they do not have any 'right' to use cloning, or genetic engineering. Rights don't exist in a vacuum; they are socially negotiated within a context of fundamental values. The question of access to particular technologies is a matter of public policy and depends on the social consequences of allowing that access, for example, to the nuclear technology, or dangerous pathogens and drugs. Science is at the service of humans and we have the right to choose the science which we want and to define our own vision of good progress. We should reject a science which is not in the public interest and which disfigures human dignity and destroys God's creation. Nor do we need a science which would create more divisions among humans. As the WTA FAQ states:

If some form of intelligence amplification becomes available, it may at first be so expensive that only the wealthiest can afford it. The same could happen

when we learn how to genetically enhance our children. Those who are already well off would become smarter and make even more money. This phenomenon is not new. Rich parents send their kids to better schools and provide them with resources such as personal connections and information technology that may not be available to the less privileged. Such advantages lead to greater earnings later in life and serve to increase social inequalities.<sup>28</sup>

In his book “Our Posthuman Future: Consequences of the Biotechnology Revolution,” Francis Fukuyama raises the broader issue of performance enhancement: “The original purpose of medicine is to heal the sick, not turn healthy people into gods.”<sup>29</sup> He and others point out that increased use of such drugs could raise the standard of what is considered “normal” performance and widen the gap between those who have access to the medications and those who don’t — and even erode the relationship between struggle and the building of character.

## 8. Conclusion

Technology will always be a part of human life. It will be an important part of our future, but not the future. The human being as rational, reflective nature will always remain a superior to the technology. Technology should not decide for humans. Technology must have progress and enrichment. It may not be thrown away or pushed to an oppression or suppression. If it is properly used and ethically guided, then “technology as a part of human nature will not become a danger to them.”<sup>30</sup> The existing atomic weapons have the potential to wipe out all the life on our planet many times immediately. It is therefore in no way that we win only more power through science and technology; but we also become ourselves more and more victim of this power increase. Therefore let us not forget what Franz Böckle said: “The more science and technology place us in a position to reach what we want, all the more helplessly we come before the question, what we actually want.”<sup>31</sup>

Erik Strub inspires us with a positive note, “Technology would remain a human act in the sense of human when we give serious

thought to its concrete possibilities with constant discussions. Our task is the permanent confrontation.”<sup>32</sup> Moral consciousness for it may, should, must, can and will grow with such concrete possibilities. I would like to end this paper quoting Pope John Paul II who states categorically:

The latest developments in the area of the genetic engineering entail a danger, which excites a deep apprehension. If the scientific research in this area should serve the person, it must be accompanied with careful ethical reflection on every step, which reflects in corresponding legal norms to the protection of the integrity of human life. Life can never be degraded to an object.<sup>33</sup>

In his encyclical *Redemptor Hominis*, Pope John Paul II defends human life and dignity from a theological view point and categorically states that the human person is precisely a unique, singular and unrepeatable being, who cannot be manipulated or subjected to transformations that alter his/her given bodiliness. There is a boundary. That boundary should be respected. Problems in human conditions do not give us an unwarranted freedom to seek the solutions outside the boundary tarnishing human nature, bodiliness and dignity. If we cross the boundary, it goes against the very foundational aspect of humanity. Science and technology need religion and ethics. Science can help protect human bodiliness and religion can protect science from distorting human bodiliness.

## Notes

1. H. Tristram ENGELHART, Jr. “Die menschliche Natur – kann sie Leitfaden des menschlichen Handels sein?: Reflexionen über die gentechnische Veränderung des Menschen,” in *Die Menschliche Natur: Welchen und wieviel Wert hat sie?*, Kurt Bayertz (ed.), Paderborn: 2004: 33; DRZE. *Enhancement: Die ethische Diskussion über biomedizinische Verbesserungen des Menschen*, Bonn, 2002: 15-16.
2. Ludwig SIEP, “Die biotechnische Neuerfindung des Menschen,” in *Kreativität*, Günter Abel, (ed.), Deutscher Kongress für Philosophie, Hamburg, 2006: 306.
3. Cf. A comprehensive report of “President’s Council on Bioethics of USA: Beyond Therapy. Biotechnology and the Pursuit of Happiness. A

Report of the President's Council on Bioethics, US Government Printing Office, Washington DC (15.10.2003) <[http://www.bioethics.gov/reports/beyondtherapy/beyond\\_therapy\\_final\\_webconnected.pdf](http://www.bioethics.gov/reports/beyondtherapy/beyond_therapy_final_webconnected.pdf)>.

4. Cf. DRZE, Enhancement. Die ethische Diskussion über biomedizinische Verbesserung des Menschen, Bonn 2002: 15-16; LeRoy, Walters and Julie Gage Palmer. The ethics of human gene therapy, New York, 1997: 108.
5. Cf. Christian LENK, Therapie und Enhancement. Ziele und Grenzen der modernen Medizin, Münsteraner Bioethik-Studien 2, addition. Münster/Westf., Univ., Diss., 2001: 15. Quoted in DRZE 2002: 16. *Italics mine.*
6. DRZE, Enhancement, 16-32.
7. For the conception of a genetic enhancement of humans Cf. Gregory Stock, Redesigning Humans: Our Inevitable Genetic Future, Boston, 2002.
8. Ludwig SIEP, "Die biotechnische Neuerfindung des Menschen," 311.
9. Ibid., 311-313.
10. For this Cf. Ludwig SIEP, "Die biotechnische Neuerfindung des Menschen," 317ff.
11. Cf. David HEYD, "Die menschliche Natur: Ein Oxymoron?" in Die menschliche Natur. Welchen und wieviel Wert hat sie? Kurt Bayertz (ed.), Paderborn, 2005: 64.
12. Ibid., 64.
13. Cf. John RAWLS, Eine Theorie der Gerechtigkeit, trans. by H. Vetter, Frankfurt/M. 1975.
14. Cf. E.M. ENGELS, "Natur- und Menschenbilder in der Bioethik des 20. Jahrhunderts. Eine Einführung," in: E.M. ENGELS (ed.) Biologie und Ethik, Stuttgart, 1999: 1-42; here 30. Also Cf. Jans Clausen, "Die Natur des Menschen: Geworden und gemacht.." 391.
15. Jans CLAUSEN, "Die Natur des Menschen: Geworden und gemacht. Anthropologisch-ethische Überlegungen zum Enhancement." Zeitschrift für Medizinische Ethik 52 (2006): 391-401; here 392.
16. E. PARAEMS, "Creativity, gratitude, and the enhancement debate," in: ILLES (ed.) Neuroethics. Defining the Issues in theory, practice, and policy. Oxford, 2005: 75-86, here 77; Cf. also Jans Clausen, 392.
17. M.J. Reiss and R. Straughan, Improving Nature? The science and ethics of genetic engineering, Cambridge, 2001: 60. Cf. Jans Clausen, 393.

18. Quoted by Jürgen HABERMAS, *Die Zukunft der menschlichen Natur. Auf dem Weg zu einer liberalen Eugenik?* Frankfurt/M, 2001: 46; Original: W.van den Daele, "Die Natürlichkeit des Menschen als Kriterium und Schranke technischer Eingriffe," in *Wechsel Wirkung*, Juni/August 2000: 24-31.
19. Cf. Ludger HONNENFELDER, "Die Frage nach dem moralischen Status des menschlichen Embryos," in O.Höffe et.al (eds.) *Genetechnik und Menschenwürde*, Köln, 2002: 79-110. I.c.; auch Honnenfelder, "Bioethik und die Frage nach der Natur des Menschen," 335.
20. Ibid., 336.
21. TAYLOR, *Quellen des Selbst*, Frankfurt/M, 1994: 178.
22. Jürgen HABERMAS, *The future of human nature*. London: Polity Press, 2003: 23.
23. Cf. Ibid. For original see Bruno SCHÜLLER, *Die Begründung sittlicher Urteile. Typenethischer Argumentation in der Moraltheologie*, Düsseldorf 1980: 321.
24. Francis FUKUYAMA, *Our Posthuman Future: Consequences of the Biotechnological Revolution*, London: Profile, 2002: 160.
25. Josef SCHUSTER, "Gentechnik und Ethik." <<http://www.sankt-georgen.de/leseraum/schuster4.html>>. 1-4.
26. Die deutschen Bischöfe 69, *Der Mensch: sein eigener Schöpfer? zu Fragen von Gentechnik und Biomedizin*, (ed.) Sekretariat der Deutschen Bischofskonferenz, Bonn, (7.März 2001): 1-13, here 5.
27. Francis FUKUYAMA, *Our posthuman future: Consequences of the biotechnological revolution*. London: Profile, 2002: 151.
28. See <http://www.transhumanism.org/index.php/WTa/faq21/65/>
29. Francis FUKUYAMA, *Our Posthuman Future: Consequences of the Biotechnology Revolution*, Farrar, Straus, & Giroux: 2002. See. <http://www.nytimes.com/2008/03/09/weekinreview/09carey.html>
30. Katharina MERGEL, "Ist Technik die Zukunft der menschlichen Natur?" <<http://www.histech.rwth-aachen.de/default.asp?dokumentID-200.>>
31. Franz BÖCKLE, "Probleme der Organtransplantation in theologisch-ethischer Sicht." In: *Organtransplantation: Beiträge zu ethischen und juristischen Fragen*. Richard Toellner [ed.]. - 1. Revised. - Stuttgart (Medizin-Ethik; 3) 1991 : 89-96. Cf.. Franz Böckle, *Verantwortung der Wissenschaft*, 1983.



32. Erik STRUB "Ist Technik die Zukunft der menschlichen Natur?" Dieser Essay war ein Beitrag zum Essaywettbewerb "Ist Technik die Zukunft der menschlichen Natur," Forschungszentrum Karlsruhe. <http://www.erikstrub.de/essay.pdf>.
33. Vgl. JOHANNES PAUL II., "In der Achtung der Menschenrechte liegt das Geheimnis des wahren Friedens. Botschaft zur Feier des Weltfriedenstages 1. Januar 1999," in: OR (D) 29/I (1999): 7–8, here: 7.