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***Human Germline Genetic Enhancement: An Ethical Assessment***

The advancement of biotechnologies has spurred growth in the number of prospective parents choosing to use assisted reproductive technologies (ART) to ensure that their children are born healthy. Moreover, numerous prospective parents are turning to ARTs (such as preimplantation genetic diagnosis) in order to select traits of their future offspring that are deemed desirable or superior in society. One emerging alternative biotechnology to standard reproduction is that of human germline genetic modification (HGGM). In HGGM, scientists use molecular editing tools to alter the genes in human gametes (sperm and eggs) or embryos. Such gametes or embryos can be used to conceive babies with modified genes. Prospective parents who wish to eliminate diseases from their future offspring, which otherwise would have been passed down to the embryo, choose to use HGGM for the purpose of therapy -an intervention that treats a person who suffers from disease, disability, or impairment with the goal of bringing them back to normal health. On the other hand, prospective parents who wish to enhance the traits of their future offspring choose HGGM for purposes of enhancement - an intervention that changes and perhaps improves upon the normal function of the human body and mind.

The idea of HGGM until recently was nothing but farfetched science fiction. However, when Chinese scientist He Jiankui revealed in 2018 that he had illegally used CRISPR technology, or gene editing, to create the first human genetically-edited babies, it generated a debate for the considerations regarding its effects on the future generations. In the paper, I first look at the implications of genetic modification on future offspring. Secondly, I consider what

this means to the persons implicated in the manipulation and for society at large. Finally, I consider questions of eugenic discrimination raised by the prospect of so called “post-humanism,” that is, the idea of engineering a new human species with genetic characteristics radically different from the ones we currently know. My analysis of bioethics literature leads me to conclude that the use of HGGM for enhancement purposes is unethical. In this paper I will focus on human germline genetic *enhancement* (HGGE), where enhancement is defined as an improvement of an ability from normal to above normal, for non-disease related purposes, because this has the most troubling ethical ramifications.

### 1. Germ Line Modification: An Analysis of the Bioethics Discussion

A significant concern about HGGE is the possible effects of the future offspring. How the parent-child relationship is affected? What are the consequential stereotypes about children of HGGE? Are there unforeseen biological effects on children of HGGE? Open access to HGGE technologies can, potentially, become a popular alternative to procreation. Prospective parents might choose to genetically enhance their embryos to ensure beneficial characteristics for their future offspring. Does this genetic enhancement violate the child’s right to autonomy for the future, by pointing the child towards particular choices and foreclosing other life plans that they might have pursued? Could designer children ever be fully free?

For Habermas, one of the alarming effects of HGGE is that a child who will have been the “product” of enhancement will never be able to confront his or her parents as a moral equal. This imbalance of power in the parent-child relationship will further be extended to an asymmetry in the moral community, where individuals will not recognize one another as moral equals. Although Daniel Koshland, a former editor of *Science*, predicts that children produced

through “germline engineering” will compete and fit in very well with children conceived the natural way, most disagree. According to Macintosh, genes are not the sole determinants of traits, and traits do not inevitably lead to success. Once children are born from HGGE, they could be characterized as superior; this, in turn, could lead to class divides and social inequalities. This could potentially violate human dignity by opening up the possibility of discriminatory practices.

Furthermore, modification seen as beneficial at one point might later become harmful, due to a deterioration in the altered genes ‘functional’ capacities or the emergence of new diseases. The precautionary principle holds that if we cannot predict the effects of enhancements, the default option should be to ban them, or to impose serious restrictions on their use beyond therapy. Many genes are believed to be pleiotropic, which means that they influence a number of different traits. Some pleiotropic genes deemed undesirable, such as those that increase susceptibility to a disease, may also have positive effects, such as decreasing susceptibility to another disease. Therefore, prospective parents choosing to alter undesirable genes in an embryo could have multiple consequences to a developing human or future child.

Another concern is how the use of HGGE technology could affect society, specifically regarding equality of access to enhancement technologies. Since HGGE is expected to be an expensive alternative to standard procreation, access is likely to be limited. If wealthy parents design children with superior traits, and these children transmit their genes to descendants, this leads to class divides and social inequalities. Fukuyama, who served as a member of the President’s Council, argues that the possibility of “buying” genes for one’s children will have a

detrimental social effect, aggravating existing inequalities by turning financial disadvantages into biological ones. In the future, he speculates, large gaps between the genetic haves and have-nots will make the cooperative relations characteristic of liberal societies unlikely. Similarly, In *Our Posthuman Future*, Fukuyama expresses one main concern to be the gap that will appear between technologically enhanced posthumans and unenhanced humans. In a society where one generation could potentially determine the characteristics of the next generation could inevitably lead to a society divided between those who can afford to purchase “good” genes, and those who will certainly lose the status of moral dignity.

Finally, the use of HGGE poses the question of a possible posthuman future as well as possible new eugenics. Procreation is very important to individual meaning, dignity, and identity. Since HGGE can influence human nature, it is quickly becoming a turning-point in the whole evolution of life, questioning the notion of what it is to be a human being. HGGE threatens to turn humans into fundamentally different kinds of beings, so different that humans would be called “posthuman,” thus opening up a dystopic posthuman. Dystopic posthumanism is characterized by an objection to the use of technology to modify or enhance humans beyond broadly accepted natural and cultural limits. Dystopic posthumanists view the introduction of enhancement technologies as an imminent crisis that can have disturbing or dire repercussions on the fundamental meaning of human nature. Since a fixed and stable human nature is essential to our notion of human dignity and our human rights, society must do everything possible to protect it and the social values that are grounded in it.

Dystopic posthumanism subscribes to the moral claim that human enhancement is intrinsically wrong, and the political claim that it should be banned or restricted. This claim

comes from an ethical dispute at the core of which lie incommensurable views of human nature. The moral quandary arises when medical means are employed for non-medical ends, unrelated to curing or preventing diseases. Dystopic posthumanists believe there is something wrong with the effort to select genetic qualities, to try to control or exercise dominion over the genetic traits of the next generation because it threatens something intrinsically valuable, more valuable than any of the benefits that science and technology promise to deliver: human nature. Human nature is deployed here as a moral category: that which is natural is morally valuable, and that which is unnatural is morally dubious. Human nature relates to some fixed essence shared by all humans. Human nature, as opposed to that which can be manufactured, chosen or perfected is grounded in lexicon of givenness, authenticity and continuity. Dystopic posthumanism frames the question of the givenness of a human being or of the human being coming to be, into the question of the quality of that birth, and therefore, whether a human being has the characteristics that a previous generation has envisioned for that being. The notion of givenness suggests that an individual's life is predetermined and unpredictable, and that altering, choosing and being able to foresee what life would be is detrimental. For Habermas, like for Sandel, the givenness or our genetic makeup acts as a starting point for the self that resides necessarily beyond human will - of the self to the self, or of others to that self.

Habermas argues for human nature as something fixed and given that can be unequivocally distinguished from the realm of the artificial and manufactured, augmented by the normative claim that human nature should be distinguished and protected from the realm of the artificial because it is intrinsically valuable. Moreover, Michael Sandel has written about the given and the gifted nature of being human and argues for a secular appreciation of the

gifted quality of life that enhancement technologies undermine. He believes these technologies represent what he sees as a flawed vision of freedom that destroys an appreciation of the gifted character of human powers and achievements. In *Human Nature in an Age of Biotechnology*, Leon Kass, a dystopic posthumanist who chaired the President's Council of Bioethics under George Bush, believes that these types of technologies represent a first step in the engineering of humans towards an "inhuman" future. This is mainly due to what is seen as a relentless desire for mastery over nature and human nature as the main impetus towards human enhancement. Here, the posthuman implies a final technical conquest of man over his own nature; a type of voluntary dehumanization that makes the human less than what she/he was intended to be by nature - by transforming him/her into raw material - and more than what she/he was intended to be - by locating the meaning and source of life within her own will and power.

A posthuman future could potentially also be a eugenic future. All eugenic practices originate from an intention to affect what kinds of children will be born. For dystopian posthumanist writers the debate on HGGE often shadows the eugenic projects of the early twentieth century, where the use of genetic technologies is associated with historical attempts for biological improvement through reproductive control. In modern cases, the focus is on society at large, more specifically, 'New Eugenics'. New Eugenics can emerge as a kind of 'Homemade Eugenics' oriented towards individual children. Here, prospective parents are free to make their own decisions about the kinds of children they wish to have on their personal conception of human excellence. In support of this claim, Agar argues for a "nature principle": "If we are permitted to leave unchanged a given genetic arrangement in the genomes of future

children, we are also permitted to introduce it". Agar suggests that the only restriction on genetic enhancement is the possibility of harm to the resulting child. Similarly, John Harris argues that a concern for the welfare of the future of the human race implies that we have an obligation to pursue enhancements. He upholds that there is nothing morally wrong per se in practicing eugenics because eugenics does not deny the "genetically weak" the right to reproduce, rather it allows them to produce healthier children. Savulescu has also argued that this principle also extends to moral enhancement, arguing that if superior moral traits are genetically determined and can be screened for, then people have a moral obligation to select "ethically better" embryos. There is a consensus among these authors that the "new" eugenics is voluntary; it is about enhancing people's freedom rather than reducing it. Conversely, Sandel writes that enhancement differs little from the "old" eugenics, insofar as both make children into products of deliberate design. This privatized version of eugenics poses the question of who can afford enhancement. This could potentially lead to a deepening of the gap between rich and poor, a growing intolerance towards human capacities that will differ from those defined by that financial elite, and the absence of choice on the part of parents who will want their children to be able to compete with "enhanced" children in the future.

"I will stop here. The last half of my paper is a detailed discussion of my personal views on this. I look forward to your questions and hearing your opinions about this. Thank you."