Opinion
Volume 11:2, 2021

Human Genetics & Embryology

ISSN: 2161-0436 Open Access

The Ethics of Human Genetic Engineering and Embryo

Tim David*

Managing Editor, Human Genetics & Embryology, Heathrow Stockley Park Lakeside House Heathrow, UK.

Introduction

Reprogenetics is a subset of preimplantation genetic diagnosis, which is a well-established medical practise (PGD). PGD (prenatal diagnosis, or testing of foetal tissue for the presence of disease genes) allows couples at risk of transmitting a genetic disease to ensure that their future children are unaffected by the disease without having to go through the difficult process of prenatal diagnosis (i.e., testing of foetal tissue for the presence of disease genes) and having to make the difficult decision of terminating the pregnancy. PGD is taking a single cell from an eight-cell embryo (produced through in vitro fertilisation) and testing its DNA for the presence of one or more disease-associated genetic changes. The mother's uterus is then only implanted with embryos that do not have the illness mutation. PGD was originally utilised in clinical treatment in the early 1990s to determine the sex of embryos in order to reduce the risk of passing on fatal sex-linked illness genes to offspring. If there is a family history of Duchenne muscular dystrophy (DMD), for example, parents may choose to have their embryos screened to distinguish between female and male embryos before implanting solely the female embryos. (DMD is an X-linked recessive disorder that primarily affects men.) Since the 1990s, PGD has been used in the clinic for anything from embryo sexing to single-gene diagnostic testing for diseases like Huntington's disease. PGD is now used by reproductive physicians to diagnosis over 170 different illnesses, with cystic fibrosis and haemoglobin abnormalities being two of the most frequent. A third, and more contentious, application of PGD is for the purpose of detecting chromosomally defective embryos in order to improve the poor pregnancy rates and high miscarriage rates associated with in vitro fertilisation operations (which are often due to chromosomal abnormalities). While some experts have suggested that this sort of PGD should be normal for in vitro fertilisation operations since it boosts their success rate, others have cautioned that data has yet to establish that PGD improves pregnancy rates or reduces miscarriage rates after in vitro fertilisation. PGD has recently been used by at least two British couples to screen embryos for the presence of BRCA mutations linked to an increased risk of breast cancer. Both couples came from families where breast cancer has run in the family for several generations, and both couples desired to rid their family of the disease once and for all. The Human Fertilisation and Embryology Authority (HFEA) in the United Kingdom must approve all PGD operations, and these examples initially stumped the HFEA. The fact that testing positive for the BRCA1 or BRCA2 variants linked to breast cancer simply signifies that an individual is at risk for developing breast cancer sparked debate among HFEA members. Breast cancer-related embryos aren't all the same. "Knowing more about our genes may actually boost our freedom by helping us grasp the biological obstacles—and opportunities—we have to work with," Green says. Green envisions a time when our scientific understanding of the genetics of obesity, for example, will have progressed to the point where "eventually, without destroying embryos at all, we may employ gene-targeting tools to change foetal DNA sequences." No youngster would have to endure a lifetime of dieting or the health and appearance issues that come with fat. The same can be said for cognitive issues like dyslexia. Given that most human qualities are impacted by several genes interacting not just with each other, but also with the environment, many scientists doubt that such a day will ever occur. Similarly, not all embryos with BRCA mutations linked to breast cancer will acquire breast cancer as adults, and not all embryos with changed genes will have the desired features. The transition from embryo to adult is extremely complicated and difficult to anticipate. But, what if science surprises us and that day comes? "The opponents' worries may be less troublesome than they look," Green claims. He claims that in the pursuit of perfection, parents will not love their children any less, and children will not feel compelled to live up to perfectionist expectations; if they do, the problem is with the parenting, not the genetic modification. While Green acknowledges that some societal repercussions, such as the creation of a "genobility," or ruling genetic class, are concerning, he also sees PGD as a means for bridging the class difference by "genetically vaccinating" individuals against future problems like as obesity and dyslexia. Green's own cited statistic—that 80% of Green's students said in a study that society should not advance in the path of human genetic engineering, a figure that matches public opinion polls on the subject—is referenced by Hayes. "[Green] would be well to listen to what medical students, the vast majority of Americans, and the world community appear to be saying...[We] don't want to run the massive dangers to the human community," Hayes says. stating that, while PGD technology has the ability to eradicate many terrible diseases, it also has the potential to cause significant harm: "If misapplied, [these technologies] would worsen existing inequities and reinforce current forms of discrimination...the development and commercial promotion of human genetic alteration would almost certainly result in a techno-eugenic rat-race." Even parents who are opposed to genetic manipulation of their offspring would feel obligated to compete in this race.

***Address for Correspondence:** Tim David, Managing Editor, Human Genetics & Embryology, Heathrow Stockley Park Lakeside House Heathrow, UK.*

Received 08 November 2021; **Accepted** 20 November 2021; **Published** 25 November 2021

How to cite this article: Tim Davi. "The Ethics of Human Genetic Engineering and Embryo Screening" Hum Genet Embryol 11 (2021).