SHOULD DESIGNER BABIES BE REGULATED?

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Abstract

Designer babies have been frequently used to help prevent genetic defect of offspring. The two main procedures that can help prevent offspring of having a genetic defect is by IVF, In Vitro Fertilization, or PGD, Preimplantation Genetic Disorder. It is a topic currently being debated ethically on whether it is okay to design a baby and how far people may take the procedures to design a baby before it gets out of hand. Two sides can be approached to this topic: Should designer babies be regulated or should it not be regulated? A concern that is plaguing the minds of many people is whether designing babies will lead to the creation of a super race. There are 7.3 million women (between ages 15-44) in the U.S. that are infertile. There are 2.1 million men and women in the U.S. who cannot conceive a baby (within 12 consecutive months).

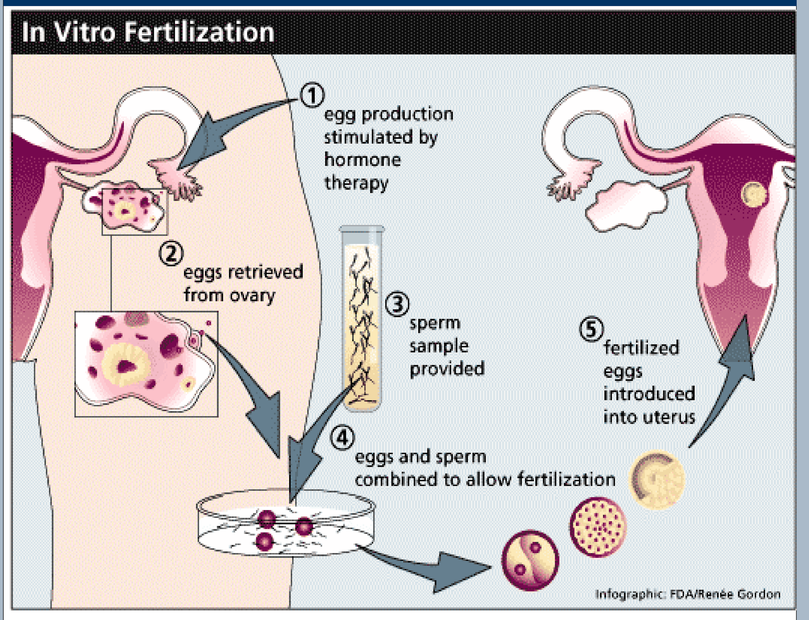
Introduction

Designer babies is a term journalist coined to describe certain branches in the field of assisted human reproduction. Its purpose and main goal is to give parents more control over their offspring's genetic outcome before they are even born. Designer babies can be related to the popular dystopian novel, A Brave New World. A Brave New World is a novel by Aldous Huxley (published in 1928) that depicts a society 532 years from now in which they create humans in bottles and those humans live pre-determined lives. Humans are created by The Director of Hatcheries and Conditioning and by the Bokanovsky's Process. In this process, one egg is divided into a bud and every bud grows into one embryo, which then grows into a full-sized adult. 96 babies come from one embryo."During the gestation period the embryos travel in bottles along a conveyor belt through a factory like building, and are conditioned to belong to one of five castes: Alpha, Beta, Gamma, Delta, or Epsilon." (Sparknotes). This is similar to "Designer babies" in our world today, in which we use processes similar to the Bokanovsky Process such as In Vitro Fertilization and PGD and the Director of Hatcheries and Conditioning are the doctors. This future has become more of a reality when the first "test tube baby", Louise Brown, was born on July 25, 1978 (Baird 12). She grew up to be as healthy as any normal baby could be. However, the procedures of designing babies we know now are not limited to just producing a healthy infant anymore. Embryos can be chosen so that the parent(s) can have their offspring fit the preference they had in mind. This, of course, provokes ethical questions such as the risk that the idea of eugenics will return and be open for the public to explore. These procedures are not available just in the United States, but as well as other countries such as the United Kingdom and Canada. They have had their own experiences with these treatments (Verlinsky 24). Designer babies are inevitable, sooner or later its regulation would be a topic of importance.

In Vitro Fertilization

Louise Brown, the first "test tube baby", was conceived with the help of a process known as in vitro fertilization (IVF). The process involves taking an egg cell(s) from the woman's ovaries, exposing it to sperm outside of the body, allowing fertilization, and putting a fertilized egg(s) back into the woman's uterus. It is a difficult process that requires money and patience because of its low rate of success. There are many risks to IVF. By the end of the experiment, 105 of 311 patients who underwent in vitro fertilization had successful deliveries (Lowe). There were also 40 patients who were in the middle of pregnancy at this time. Research shows that, in average, the probability of a successful treatment decreases as the woman's age increases (American Pregnancy Association). Despite the low rate of success and the burden it places on the mother, it's still a popular choice. One of the most well known success stories of IVF involves a woman named Nadya Suleman. Through IVF, she was able to give birth to octuplets. Suleman's status as a single, unemployed woman presents difficulties when it comes to caring for eight offspring (Scientific American). Legislators responded to this by taking action at a state-level, but the same cannot be said for the federal administration, which could establish some kind of regulation through the health care reform (Scientific American). IVF is regulated in other countries. In vitro fertilization is one of the few ways infertile couples could give birth to a child, but it is not the only way. Two other well known procedures are fertility medications and artificial insemination. Variations of IVF include gamete intrafallopian transfer (GIFT) and zygote intrafallopian transfer (ZIFT) (American Pregnancy Association). In vitro fertilization became the foundation which preimplantation genetic diagnosis was added on to.

IVF Visual

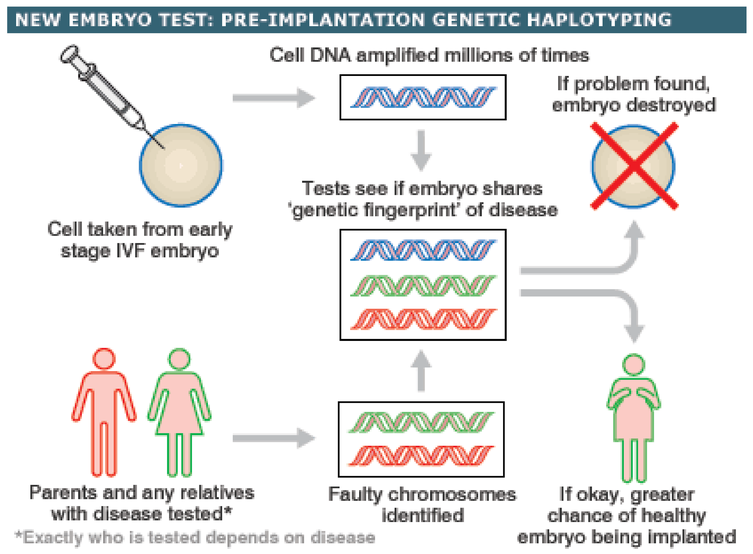


http://e-fertility.net/what-is-in-vitro-fertilization/

Preimplantation Genetic Diagnosis

PGD, Preimplantation Genetic Disorder, is a reproductive procedure that helps prevent birth defects and avoid genetic diagnosis or termination of pregnancy. It was discovered by Edwards and Gardner in 1968, but didn't show true success until 1990. PGD can be used to screen X-linked diseases, and chromosome translocations. It can help prevent diseases such as Tay - Sachs disease, Cystic Fibrosis, and Spinal Atrophy. There have been cases where it has been used for sex selection, but has been prohibited in many countries where PGD is allowed. There have been over 1000 live born children after treatment of PGD. The average cost of the 1st cycle of PGD is about $6000 and repeated cycles are about $4500. Preimplantation Genetic Disorder also helps with having an unaltered embryo from the beginning stages of pregnancy resulting in a healthy offspring, but requires the use of IVF. It holds 2 distinct purposes: aneuploidy screening to enhance In Vitro Fertilization success, the most common reason used, and detection of genetic disorders when family members are known to have or carry the disease. There a three major approaches to PGD: testing of eggs by removing the first and second polar bodies (PB_1 and PB_2), which is the secondary product of the division process in meiosis. This all occurs before the egg is matured and before the embryo is formed, embryo biopsy at day 3, and embryo biopsy at day 5. The general process of PGD involves one or two cells obtained from a 6-10 cell stage embryo, a stage reached 3days after insemination, or polar body biopsy. A past technique that has been used is zona pellucida is penetrated using acid or laser technology or two blastomeres are aspirated with a biopsy pipette. PCR (polymerase chain reaction) is then used to amplify DNA to detect single-gene diseases. Extreme precaution must be taken because contamination is crucial. In order for chromosomal analysis to be determined, Fluorescence in-situ hybridization must be used. A second technique, which is simpler and requiring less technology, is Polar body biopsy. Polar body biopsy can be done before fertilization by making a slit in the zona pellucida and drawing at the polar body of the egg with a biopsy pipette. Polar body biopsy only helps to determine the disease is found only for the maternal genes and may be unreliable. If these two procedures do not work, you can then use 2nd polar body, in which eggs are forced out after fertilization and after the completion of the meiotic division, (reproductive division of cells). There have been a few concerns about PGD. Some feel that the selection process and the perceived danger of creating designer babies. Many feel there should be a public discussion on what the acceptable and unacceptable limits for this technique should be (Lancet 1-3).

PGD Visual



http://www.impactlab.net/2006/11/14/first-uk-designer-babies-born-without-cystic-fibrosis-genes/

Why should Designer Babies be regulated?

•One of the main reasons why regulation has to be present for assisted human reproduction is the fear of eugenics. There has to be some kind of authority that can establish limits

• With its high cost, procedures such as in vitro fertilization and preimplantation genetic diagnosis can only be afforded by those of the higher class. There will be a great imbalance in society if being wealthier began to mean being healthier and superior in genetic structure.

• Like Ms. Suleman's case, patients who do not have a considerable amount of income could gain just enough money for the treatments. If their treatments are successful, they still will not have enough money to support their newborn children. This will not only be detrimental to the family that these patients are in, but it also takes away from the community that will support them through taxes.

• Others would argue that by choosing which embryos should develop and eliminating the rest, humans would be doing what the nature of life is supposed to be doing. This is more of an argument that begs for lines to be drawn between the advancement of technology and the role of nature.

• If the future sees a widespread use of IVF and PGD, there will still be people who will choose or have no choice but to give birth naturally without any genetic enhancements. In a world with healthier and much fit humans, normal babies will probably be discriminated against.

Why shouldn't Designer Babies be regulated?

• Even though the Pro-choice movement has different goals to those fighting against designer baby regulation, they still share the two most powerful things that support their causes: choice and privacy. Designer babies should not be controlled by any kind of authority because it is the women's choice to undergo the procedures and that hardly has anything to do with anyone else.

• PGD could help families who have had a long history of inherited diseases. With the diseased embryos eliminated, these families would no longer have to suffer the physical, emotional, and financial strain brought on by these ailments.

• Without any interference from outside organizations, researchers could study the human genetic makeup more efficiently and at a faster pace. The more the scientists find out about what each gene does and which changes have effects on them, the better they can prevent diseases from occurring.

Conclusion

It is understood that many couples do not wish to conceive a genetic defective child due to the hardships that come with having a genetically defective child. Designing a baby to help prevent birth defects is an ethically just reason to do so. Even though IVF and PGD do not guarantee healthy babies, the rapid growth of technology in this field of study, can cause many couples to go to the extreme to creating a perfect child. This can be proven to be an unethical reason to design a baby. If your child is already healthy why should you perfect them even more? There have been laws made in the UK, a popular country that uses both IVF and PGD regularly, which only gave licenses for using PGD for specific diseases such as, cystic fibrosis, hemophilia, Beta- thalassaemia, sickle-cell disease, Duchennes muscular dystrophy, fragile X-retardation, and Huntington's disease.

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