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[Genes in his Jeans]

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If you asked women who were considering sperm donation what their ideal donor was like, you would probably receive answers like “smart,” “kind,” “tall,” and “healthy” (“What Women Want”). They would want their donor to be the perfect man, so that they would have the perfect child. Now imagine someone who you would see going to a clinic to donate their sperm. Is that man a fit and handsome stock broker, right off Wall Street, or is he a poor college student with bad acne looking to make some extra cash? To say the least, sperm donors span all walks of life. Women flip through hundreds of applications when trying to choose which donor will be the father of her child, and only general information is given to her about each donor. It is hard to imagine how one of the biggest decisions of her life will be based off which self-proclaimed personality traits she likes best.

One of the greatest concerns when selecting a sperm sample is the state of health of the donor. Every mother wants a healthy baby, and in order for this to happen with donor-conceived children, both the mother and father need to be healthy individuals. You would assume that sperm banks only accept donors with a thorough health history and health risk evaluation, and you would probably also assume that they require tests for life-threatening diseases, such as cystic fibrosis. Both of these assumptions are false, unfortunately. Sperm banks have few universal requirements when it comes to the health of the donor. They usually test for STD's, blood type, and ask about family history. They also exclude men who are “high risk,” meaning they have been exposed to certain diseases. According to the article “Information about Donating Sperm,” by Fertility Associates, “we have to exclude people who have a higher risk of passing on infections, including people with an increased risk of having been exposed to HIV; who have received some types of blood products; and who have used nonprescription,

injected drugs.” In other words, the only exclusions sperm banks have regarding health are assumptions the donor makes about his health. The donor gets to decide if he will be truthful and tell the clinic that he has shared heroin needles with his friends, or if he is going to lie so that he can pocket some cash. The worst part about this theoretical situation is that the clinic would have no idea if he is lying or not if it does not require thorough testing. Thus, a mother might choose the potentially risky donor to father her child, simply because the sperm bank did not require any further testing of the donor.

The amount of screening a sperm bank conducts is partially regulated by different national administrations and departments, and partially by individual banks. There is no federal law that regulates any aspect of sperm donation, thus different sectors of the government, like the Food and Drug Administration, set guidelines for the sperm banks to follow (Almeling). The FDA requires that donors provide medical records and be tested for the Human Immunodeficiency Virus (HIV), types 1 and 2, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), *Treponema pallidum*, *Chlamydia trachomatis*, and *Neisseria gonorrhoea* (“What You Should Know”). All of these diseases are sexually transmitted from one person to another; there are no diseases listed that are inherited by the child from the parents. It is then possible, from the lack of thorough regulation of sperm donors, that a donor-conceived child could inherit any disease, except for a STD. A donor-conceived child could inherit the non-curable cystic fibrosis disease, but not *Neisseria gonorrhoea*, which is treatable (“Gonorrhoea”).

As technology advances, we are given more tools to help better our lives, and one recent biological advancement is the ability to sequence an individual’s genome. By having this knowledge at hand, we are able to determine the different genes a person possesses, and the genes they carry but are not expressed. A gene will “determine things

such as your blood type, hair color, and eye color, as well as your risk for certain diseases. [Genetic] Testing can find gene or chromosome changes that may cause medical problems” (“Genetic Test”). By implementing genetic testing of donors to sperm banks, we will be able to have a clear understanding of their current health situation, along with the diseases they may be carriers of, but do not express.

There are endless benefits to genetic sequencing sperm donations, but some of the most prominent ones are the donors’ carrier status, ancestry, wellness, and trait report. A carrier report will tell if the donor is a “carrier for certain inherited conditions” (Barajas). This is extremely important for sperm donors because they may be unaware of the genetic risks they are carrying. The screening techniques of sperm banks today have no way of telling completely if a donor is a carrier, besides asking if certain diseases are in their family history. But even oral indication is not enough support to take a donor’s position because even a slight genetic mutation could cause the donor to have a new gene expressed, which could code for a fatal disease. An ancestry report will tell where the donor’s DNA is from, specifically what ethnicity they are. This information is provided on the donor’s resume, but it is self-reported, like everything else that is on it. In addition, America is a giant melting pot where every ethnicity comes together to create one nationality. Sperm donors will likely have many ethnicities, due to the many different nationalities in America (“Mixed Sperm Donors”). Thus, they will not know exactly what ethnicity they are. The ethnicity of the child is important because the parents might want a child that resembles them, and to prevent discrimination of the child (“Mixed Sperm Donors”). Once again, the only way to know for sure what the ethnicity of the donor is, is to sequence a portion of the donated sperm sample. In

addition, the most important benefit to genetically sequencing the sperm donor's genome is to find out the truth behind their health. A wellness report can tell you everything from your lactose tolerance to the diseases you may carry. Being a carrier means that you have the gene, but it is not expressed due to repression. Prospectively, you can prevent donor-conceived babies from having any identifiable disease and from being lactose intolerant.

A trait report from genetic sequencing has many benefits, but admittedly some concerns. It would tell exactly what genes the donor has that creates his physical appearance. This information would allow the mothers to know exactly what genes their baby will likely get. On the other hand, there is the argument that providing this information will create "designer babies," which is selecting the exact traits a child will have. "Designer babies" are children that have altered genes for personality, appearance, gender, and intelligence, with the purpose of creating a more desirable child ("Designer Babies"). This is a misconception, though, because the child has an equal chance of getting either parent's traits. There is also not enough information currently available to make any conclusions about the possibility of "designer babies." Dr. Danielle Simmons, author of the article "Genetic Inequality: Human Genetic Engineering," is training in the specialty of neurodegenerative diseases. She writes, "The safety of the procedures used for preimplantation genetic diagnosis is currently under investigation, and because this is a relatively new form of reproductive technology, there is by nature a lack of long-term data and adequate numbers of research subjects" (Simmons). The overall idea is that genetic engineering is too new to make any conclusions about it.

The possibility of designer babies evokes the idea of "playing God," and choosing the course that nature will follow. This conception, again, is false. There is no technology

available that will let you pick the exact traits that your child will have, and exclude the bad traits. Yes, you can pick a sperm donor with certain traits that you want your child to have. In reality, though, everyone chooses who they will have a child with. If you get married and decide to start a family, you are technically “playing God,” by picking the traits in a man that you will pass onto your child. Picking a spouse and picking a sperm donor are the same, in the sense that you are choosing who will father your child and what traits your child will get.

Another question that arises from the idea of genetically sequencing sperm donations is if couples looking to have a child naturally should get their genes sequenced? The answer is that it would greatly benefit the couple if they did. As stated earlier, an individual can be a carrier for a deadly disease, but not express the gene. It is possible that both the parents carry the same repressed gene for a disease, and could pass it onto their child, who then will die from the disease. Knowledge of their genome will help perspective parents make informed decisions about the conception of their future child.

Sharine and Brian Kretchmar would have benefited from genetically testing sperm donations back in 2010, when Sharine conceived her second child through sperm donation. She gave birth to a baby boy, named Jaxon, who was unable to have a bowel movement after birth. Jaxon’s parents were informed that he had cystic fibrosis, a disease that causes the lungs to be coated with mucus, and would live an unhealthy life. The Kretchmar’s were then informed, after genetically sequencing Mrs. Kretchmar’s genes and the sperm donor’s genes, that they both were carriers for the cystic fibrosis gene (Mroz). Genetically testing sperm donations would have benefited the Kretchmars tremendously because they would have known that their donor carried a fatal disease

that their child could inherit. This is not an uncommon story among parents who choose to conceive a child through sperm donation, unfortunately, and it could have easily been prevented by genetic sequencing.

Theoretically, what would have happened to the Kretchmar family if genetic sequencing was available at the sperm bank? They could have been informed about the cystic fibrosis gene that Mrs. Kretchmar carried and have made an informed decision about using the sperm donor they selected. If the gene sequencing technology was available at the sperm bank, then the Kretchmar family would not have had a child with cystic fibrosis. Tanya Lewis, author of the article “A New Test Aims to Eliminate the Risk of Having a Baby with a Rare Genetic Disease,” discusses the company GenePeeks. She says that “GenePeeks is doing something no other company has done before: By taking a look at the DNA of a prospective parent together with that of a potential sperm or egg donor, they can predict, with what they claim is 99% sensitivity, the risk of having a baby with a rare genetic disease” (Lewis). If the sequencing technology that GenePeeks uses was available at sperm banks, then the number of babies born with diseases would consequently decrease dramatically. Thus, the Kretchmar family could have potentially avoided having a baby with cystic fibrosis. It is important to keep in mind, though, that GenePeeks is a genomic company, similar to 23andMe. They receive a profit every time they sequence a genome, and are primarily concerned with their financial profit rather than the knowledge received of their customers.

The benefits for genetic sequencing are endless and priceless, as declared by epidemiologists and geneticists. These scientists “claim that genetics has an increasing role to play in public health policies and programs in the future. Within this perspective, genetic testing and screening are instrumental in avoiding the birth of children with

serious, costly or untreatable disorders” (Sleeboom-Faulkner 10). With the upcoming use of genetics in government and the ability to conceive healthier children, genetic sequencing is producing more benefits as the days go by.

The confidentiality argument about sperm donors has been an issue ever since it became an option for conception. Some donors plainly do not want to be identified, for various reasons. This could be because they do not want the child to come find them later in life, or because it makes their experience as a donor more personal than they want it to be. Other donors are hesitant to donate because of the information they are required to provide which is very basic and general. The donors that fear this do not understand that you could not go looking for him based on the information they provide the mothers on a résumé. Ravelingien and Pennings said in their article “On the Right to Know and The Use of Double Standards: Response to Open Peer Commentaries on ‘The Right to Know Your Genetic Parents: From Open Identity Gamete Donation to Routine Paternity Testing’” that sperm donors are “caught in a vicious circle: those who prefer anonymous donation are reluctant to press their claims because confidentiality matters to them and they are intimidated by the force of the rights-based discourse of openness” (8). All of these concerns, though, could be eliminated with genetic sequencing.

If genetic sequencing was implemented into sperm banks across the nation, donors would not need to provide any information other than their name for the bank’s archives. This removes the personal aspect for the donor because they simply go to a clinic and donate. They do not need to spend time ranking their ability to do math or what deciding which personality traits are the most prominent. The donors are now exactly that: donors. They do not have to fear the day when the children conceived come

knocking on their doors. There are no strings attached anymore; it is simply business. Genetic sequencing would tell the mother and child everything they could ever want to know about the donor, and more accurately than the donor could himself.

But is this not more personal than before because so much more information is given to the mother and child? It is true that the amount of information given to the receiving family is more than they would receive using today's donor résumés, but the information is not changing. The child is going to receive half of his/her genes from a donor, so it is more ethical to inform the mother about everything she will be receiving through sperm donation, rather than an estimation. The technology is available to do this, and it needs to be utilized in order to inform mothers and create a generation of healthy children.

For mothers, the benefit of genetic sequencing is simple: they get a healthy child. But for the children, the benefits go far beyond health. They are told everything they could possibly even wonder about their biological father, which is a huge advancement from the information donor-conceived children are currently given. Countless books have been written coaching parents on how to tell their child that their father is not actually their biological father. Each book claims that the hardest part of that process is telling the child that they do not know very much information about their biological dad ("Telling Your Child"). The children wonder and are hungry for knowledge about who they are, sometimes feeling a loss of identity. Needless to say, if the sperm that was used to conceive them had been sequenced, then they would not have to wonder. All the information would be given to the child from the very beginning, and they would not

have to feel lost. Donor-conceived children would then be able to have a life more symmetrical to that of a naturally conceived child.

If genetic sequencing becomes a standard at all sperm banks, it is very likely that genetic sequencing will spread to other agencies in the future. Prospectively, the technology will become more conveniently available at paternity offices to help solve the age-old mystery of “who’s the father?” Currently, a blood test is required of the father, which prevents many of them from taking the test because of a fear of needles. As genetic sequencing becomes more widely used, the method of genetic retrieval is becoming easier. A buccal (cheek) swab is being used instead of a blood draw, making it easier for fathers to take the paternity test. As the barriers for genetic sequencing are being removed, more children are becoming more knowledgeable about their genes and who they are biologically.

Looking to the future, there will likely be a push for the national government to make laws regarding genetic testing. As genetic sequencing becomes more widespread, the government will need to create regulations in order for the ethical and strictly child-beneficial use of sequencing. Regarding paternity testing, the Department of Health and Human Services says that eight states “do not have the full authority to administratively order genetic testing as required by welfare reform” (3). It is crucial that the laws concerning genetic sequencing become uniform across the nation as it becomes more prominent in society today. If not all states have the same laws about genetic sequencing, there is a possibility unethical use will occur in our nation from lack of common guidelines. Genetic sequencing has countless benefits for those who choose to use it, and the laws concerning it need to become uniform across the nation.

The move towards genetic testing will also help to inform adopted children about both of their parents, and even help the adopted child's offspring to know who they are biologically. My friend's mother was adopted from Scotland, and she wanted to learn about who she was. Thus, she spent five years with a private investigator and was eventually able to find her birth mother. Her birth father, although, refuses to meet with her, so she does not know about half of her background. That leads to my friend not knowing about a quarter of his genes and background. Both he and his mother could discover the other part of their identities, which they could learn no other way than through genetic sequencing.

For any woman looking to use sperm donation as a conception method, I urge her to look into the genetic sequencing of her chosen sperm donor. The countless benefits, from ancestry to carrier status, make genetic sequencing a useful tool that can almost guarantee a healthy child. There is no logical reason why genetic sequencing should not be used in sperm banks, and there needs to be a greater push to make genetic sequencing a requirement by all sperm banks. Is the ideal sperm donor still someone who is "smart," "kind," "tall," and "healthy?" If you want to know for sure that your sperm donor has these characteristics, then genetic sequencing will tell you.

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