

Neanderthal Cloning Through Genetic Engineering and the Ethical Dilemmas that Ensur

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Abstract

Discussed is a reaction to an article published by National Geographic titled, "Return of the Neanderthals" and written by author Virginia Hughes. I argue that at this point in our understanding of molecular technologies, the procedure of bringing into existence a living Neanderthal should not be attempted. While the science behind this procedure as in addition to the potential advances it could bring towards the betterment of modern society are truly fascinating, the resurrection of an extinct species so close in relation to our own brings with it many ethical concerns. These ethical concerns, which stem from the possible harm of surrogates, harm of society, and harm of the Neanderthal need to be considered and properly thought through before a momentous progressive step of science such as this is taken. This opinion was ultimately formed from the analysis of our current molecular technology and its past track record regarding cloning, contrasting the anatomy of *Homo Sapiens* with Neanderthals, and the opinions of experts within the field of genetics and law.

Keywords

Cloning — Genetic engineering — Neanderthals

Discussion

As an individual who is fascinated by the potential advances science can bring to modern society, the article, "Return of the Neanderthals", published by National Geographic immediately grabbed my attention. Virginia Hughes, the author of the article, explains that due to our knowledge in the field of genetic engineering and our subsequent ability to map out the genome of the extinct Neanderthal species, experts are now beginning to debate whether scientists should use this knowledge to clone a living, breathing Neanderthal. Throughout the article, Hughes does not appear to show particular bias toward one side of this debate as she raises the pros and cons from those who would be for or against this possible procedure. Following my first reading of the article, I found myself enthralled at the idea of resurrecting a species that is more closely related to *Homo sapiens* than any other species we have been able to interact with in approximately 28 000 years (Keenleyside, & Lazenby, 2015). Not only did I find the idea of simply interacting with a Neanderthal interesting, but the societal advances that could arise from studying this extinct species 'in the flesh' led me to initially believe that I would be in support of the procedure. Experts like George Church, a professor of genetics at Harvard Medical School, believe that treatments to human specific diseases like HIV could be developed from studying a Neanderthal (Zorich, 2010). Church also argues that because Neanderthals had cranial capacities between 1,600 cm³ and 1,300 cm³ (Stringer, 1984), they could potentially be even more intelligent than modern humans and that collaborations with beings more intelligent

than us could lead to successful dealings with epidemics and even to becoming a multiplanetary species (Zorich, 2010).

However, after a deeper thought on the subject, I came to realize that while this subject is of course rooted in the scientific advancements of today, it is also surrounded by ethical dilemmas that must be discussed and worked through if this concept is to safely come to fruition. We as modern humans now have an enormous responsibility as we enter an age where science can allow us to artificially create beings and consequently, shape our own evolution. If we are to remain adherent to the moral principles we strive to uphold, this must not be taken lightly.

Perhaps a pertinent area to start when beginning to discuss these moral dilemmas I conceptualized would be with the technique used to achieve this Neanderthal clone. I do not believe the proposed technique to achieve a 'resurrection' of a Neanderthal is refined enough yet for it to be moral for scientists to apply it to human subjects. For over two decades, genetic engineers have managed to produce numerous animal clones (Zorich, 2010). The technique used for these achievements, most commonly known as nuclear transfer, involves removing the nucleus from an egg cell of the closest living species to the species which is intended to be cloned (Zorich, 2010). This cell is then inserted with a nucleus containing clone DNA and that egg cell is then implanted into a surrogate for the clone to be grown and subsequently born (Zorich, 2010). When hypothesizing how a Neanderthal would be cloned, a very similar technique would be applied. However, because we are the closest living relatives to Ne-

anderthals and our cells are very different, a new technique known as MAGE would be used to alter human stem cells so that their DNA would match that of Neanderthals (Zorich, 2010). This cell would then be implanted into a blastocyst and a human surrogate would be used to grow and give birth to this neo-Neanderthal (Zorich, 2010). This final stage of using a mammal surrogate to develop and give birth to the clone is what is similar between the two techniques, and it is also where questions of its ethics must take place. Our attempts at cloning have been dismal as the majority have resulted in either sick or dead animals. For instance, as with the cloned Pyrenean Ibex; out of the 57 developed embryos, only 5 survived the full pregnancy term, 4 of whom were stillborn and the one clone that survived died within hours due to a lung disorder (Zorich, 2010). This was not at all an outlier either. This would give the possibility that, if applied to human surrogates, there would be a terrifying trial-and-error period where numerous women would either have miscarriages, produce a stillborn or give birth to an otherwise defective offspring. Even the notion of this period sounds medieval to me as we would knowingly be risking lives trial after trial. We would also be subjecting the woman surrogates to possible horrific trauma caused by these potential outcomes. Not to say that I have or ever will know from a first-person view what it is like to miscarry. However, from experiences conveyed to me by others and from assisting a woman who had miscarried first hand while attending my placement with the Peterborough Police during my time at Fleming College, I am able to sympathize for just how traumatic it must be. I therefore cannot in good conscience support this procedure.

As Church puts it when discussing this potential process, "... Now I need an adventurous female human" (Hall, 2013). Being adventurous is certainly a quality the subject will require, but I believe they will need to be more than that. They will need to be willing to accept not only the potential emotional trauma described above, but also the physical harm. I therefore believe it would be unethical to clone a Neanderthal due to the potential harm it can inflict on the surrogate as well as the clone. When considering this physical harm of the surrogate, you must first look at the evolution of *Homo sapiens* and the physical features that we possess as a result, specifically regarding the pelvis. Obstetric dilemma is a term used to describe the torturous process that giving birth has become for humans (Keenleyside, & Lazenby, 2015). It is a result of the pelvis being reshaped to provide a smaller birth canal which was brought on by the transition to bipedalism (Keenleyside, & Lazenby, 2015). If a human female attempted to give birth to a much more robust species than the gracile *Homo sapiens*, this could lead to a very dangerous and potentially impossible birthing process (Keenleyside, & Lazenby, 2015). A cesarean section would likely be required in all cases which could be seen as the solution. However, there are still dangers that can come from this procedure such as infections and even mortality (Nielsen, & Hökegård, 1983). The potential for harm does not end only with the surrogate however. Hypothetically,

if a Neanderthal was successfully born, who is to say that he or she would not refuse to be tested on. According to Lori Andrews, a professor at Chicago-Kent College of Law, there would be no doubt that this Neanderthal would be afforded human rights under the Constitution and International Treaties (Zorich, 2010). This means the Neanderthal could choose not to be subjected to experimentation. That being said, if this were to occur, what kind of life would this individual subjected to? It is difficult to imagine they would not be shunned by at least portions of society due to the multitude of physical differences observed between Neanderthals and humans with the former being more robust, having a larger nasal cavity, and a flatter and bigger cranium (Keenleyside, & Lazenby, 2015). Physical (in addition to other) forms of harassment could ensue from this while the Neanderthal attempts to live their life. The clone may also feel alienated in a second way as it is well documented that one's connections with their culture and society are crucial in the development of one's personhood. Without proper nurture, societal relationships, and not having any members from their species alive, that individual may not have a proper concept of their identity (Edwards, 1999). This could be disastrous for the clone's consciousness and may lead to self-harm.

The potential for harm does not end with only the surrogate and neo-Neanderthal. I believe it would be immoral to practice cloning as it may incite violence between particular groups within our society. From observing the significant amount of divisiveness we have around the world today, undoubtedly chaos will ensue from the practice of this scientific technique when taking into account the risks involved and its implications. One of the most prominent examples I can think of would be between the scientific community supporting this procedure and the church. For centuries there has been a well-documented conflict between science and religion (Draper, 1875). Regarding cloning specifically, the Roman Catholic Church under Pope Benedict XVI have taken a stance against human cloning (Enescu, Mitrut, Iovanescu, Ioana, Burada, & Anca-Stefania, 2017). Islam has also done the same in accordance to their tenth commandment (Enescu, Mitrut, Iovanescu, Ioana, Burada, & Anca-Stefania, 2017). We have now for the first time in history entered an age where mankind can artificially create beings, boiling humans and other species down to a chemical 'recipe' that can be followed. This is nothing less than ground breaking and it is clear that some individuals from a religious perspective see this as humans 'playing god'. For something that has the potential of being a prospectively prominent threat to one's faith, I have no doubt that a conflict will appear between these two communities that may lead to violence in extreme cases. This of course is not to say that technology should never advance if there is opposition. However, when a discovery has the potential to cause as much controversy as cloning would, it is important that it is not taken lightly and time is spent to ensure the process is as safe and reliable as possible.

This is of course all one man's opinion, and the perspective of others will depend on their definition of morality. To determine if not only this procedure should occur and what guidelines it must adhere to, but also any other that sparks controversy I believe we must ask ourselves, how far are willing to go for our society to advance? And if society is to advance, is it truly worth it at the cost of our own humanity?

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