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### Human Cloning: Beneath the Surface

In the 2000 science fiction movie The Sixth Day, the height of human cloning and the way people perceive it—or desire for it to be perceived—manifests in such a creative way that the whole concept transcends ordinary inquiry. It may prompt dozens of questions, some of which may begin with “can cloning really do this?” Not only does the film cover the gamut of the cloning process, but it also lacks one element—truth. This ‘Hollywood’ idea of cloning, along with that of books and television, influences humans to associate specific feelings or images with the process. Often culminating from wild imaginations, ideas of clones as “brainless monsters” or, in Arnold Schwarzenegger’s case in The Sixth Day, identity thieves—run rampant through the majority of movie-goers or anybody who picks up a book. The thoughts of identity theft or eventual loss of diversity due to cloning appear to be legitimate concerns and thus require focus. To the public, misunderstandings regarding the cloning process as well as a clone’s identity need immediate resolution so that it no longer plays the role of “entertaining movie plot” to non-scientists.

Before dismissal, it is first appropriate to examine the various claims that comprise the human cloning “scare.” A common concern stereotypes clones as devoid of physical or personality differences from those of the cloned individual. According to the misconception, the clone would begin life at the same age as the cloned individual and

possess the same memories, characteristics, bad habits, interests, and intelligence. Schwarzenegger's character in The Sixth Day, for example, never cognizes that he is a clone because of the shared memory that exists between him and his original self; from the moment he came into the world he knew where he lived, to whom he was married, whether he had children, and his birthday. This assumption ties in with others who believe when a body is cloned, so is the brain. In addition, a clone beginning life at the same age as the original creates the presumption of accelerated aging. Opposite misunderstandings also arise, with the idea that a clone is not the same individual, but a creature in a vegetative state wandering the earth as a duplicate of an original, acting as a soulless being. The foil to this languid character would be the picture of the conniving, manipulative clone—one whose ultimate desire is to replace the cloned individual, and live amidst a colony of other clones set out with the intention of taking over the world. Philip Kitcher, author of "There Will Never Be Another You" catches on to this pattern when he states, "We assume that human lives can be created to order, that it can be done instantly, that we can achieve exact replicas, and, of course, that it is all going to turn out disastrously" (53). Much like a gripping television movie, cloning, to some, evokes a sense of control possessed by scientists to "play God."

The general idea that clones would share all characteristics of their parent, including special talents, is demonstrated in the expression some commonly use in admiration of another person, which is usually, "if I could, I would clone you." Used sometimes by teachers to star pupils who exemplify prudent studying habits, by parents to their "perfect sons or daughters" in desire of having more children with identical demeanors, or the individual who wishes to clone himself or herself to distribute common

workloads, this mindset represents a way of thinking that, unlike the previous apprehensive accounts, desires such cloning outcomes. Arlene Judith Klotzko, a bioethicist, lawyer, and author of A Clone of Your Own? The Science and Ethics of Cloning explores the consistent curiosity of what it would be like to clone famous individuals such as Mozart (140). Another concern is that clones of less desirable individuals, like Adolf Hitler for example, could come back in large groups and ultimately regain power (139). Could the world's most famous or infamous celebrities, as one character's expression in The Sixth Day goes, "conquer death?"

Besides eliciting imaginative responses, human cloning may also prompt inquiry concerning medical solutions. In regards to families in unfortunate situations where relatives or children are on the verge of death, cloning may be seen as a resolution to the problem and perhaps assuage grief if the relative or child came back as a clone, providing the family a second chance. Another scenario, mentioned by Kitcher, paints the image of a son in desperate need of a kidney transplant, where a viable solution would be to clone the son and use the clone's kidney in hopes of saving the son's life (61). Some may consider this a positive solution because of the obvious emotional distress brought on by seeing a loved one in such a vulnerable state. The thought of prolonging one's life would offer both relief and a renewed sense of hope.

Before examining whether these hopes or fears could be fulfilled, a clear understanding of current cloning procedures is prudent. According to Klotzko, cloning can successfully take place in two different ways. "Nuclear transfer" describes a nucleus that has been moved from a body cell of a cloned being to an egg from which the nucleus has been removed (20). The nucleus plays a significant role in that it holds much of the

contents which account for an individual's genetic makeup—that is, the physical or internal features which distinguish one person from another. The egg also contributes greatly, because this is where human life develops in its earliest forms. Once an egg possesses a nucleus from the desired individual, cloning can finally begin. To examine nuclear transfer in a more scientific manner, the nucleus of an egg is removed, leaving “cytoplasm,” a substance which normally surrounds the central nucleus. As Klotzko states, “.cytoplasm plays a crucial yet still poorly understood role in the cloning process” (20), hence why it is not removed along with the nucleus. Aside from needing an egg, nuclear transfer cannot occur without tissue cells from the individual being cloned. These cells can be body, or “somatic” cells (26), meaning that they are not required to come from a specific location. Editor Paul Lauritzen agrees with this point in Cloning and the Future of Human Embryo Research by explaining, “When discussing nuclear transfer cloning, it is also important to note that the nucleus that is transferred can come from different sources” (9). In order for an embryo to commence growth, a “jump start” is required in the form of an electric current between the transferred nucleus and egg. Once an embryo forms, it is then inserted into a “surrogate” mother, who takes on the role of parent for the time being (Klotzko 20).

“Embryo splitting” or, in more scientific terms, “blastomere separation,” demonstrates the other form of cloning and consists of approximately what the first term implies. Once an embryo develops, the attempt is made to “split” it, which yields not multiple halves, but several entire embryos (Lauritzen 8). Lauritzen shows how this process could lead to success when he states: “it is possible to separate the blastomeres and to have them continue to develop as separate organisms that are genetically identical” (8). A clearer

example of the outcome of embryo splitting occurs when Klotzko describes scientist Steen Willadsen's work with cloning animals.

Steen did extraordinary things with embryo splitting. For example, he split two-, four-, or eight-cell sheep, cow, goat, and horse embryos, grew the twin embryos in temporary sheep hosts and then implanted them in surrogate mothers of their own species. (33)

From the above procedures, it is now apparent that cloning hardly connects with the fictional processes displayed in motion pictures. To the science fiction fan's dismay, there are no water-filled tanks harvesting massive numbers of developing humans, nor does their growth accelerate four times the rate of a "normal" human. The human would still be human, so one does not need to worry about a zombie or extraterrestrial resulting from cloning. Besides the stages leading up to the creation of an embryo, the rest of the cloning process takes place the old-fashioned way; the fetus would still require nine months inside the womb before birth, and from birth on, development would be no faster than usual. If Schwarzenegger's character, therefore, were a true clone, he would still be drinking formula from a bottle and having his diaper changed. Klotzko also briefly mentions this reality: "being born a baby there would always be some difference in age" (133). In regards to The Sixth Day, this age difference between Arnold and his clone would have been significant, meaning he had the potential to act as his clone's father. Although the truth might hurt all who enjoy a good "sci-fi" thriller once in a while, it still deserves recognition above all.

Now that the development and age misconceptions have been addressed, all remaining misunderstandings should be easier to dismiss. The thought that a clone could

therefore take the place of the cloned individual, acting as an ‘evil twin’ and show no recognizable differences (Klotzko 133) can thus be ruled out. Although it has been established that clones would never be the same age as their parent, what about similar characteristics? While the public may be accustomed to viewing clones as having no unique identities and sharing exact habits and memories as their counterparts, what most seem to forget is that there are already ‘clones’ living in the world today. Though created naturally, twins are essentially genetically similar (Klotzko 135); however from most people’s experiences with them, many could attest that each possesses unique differences. The same goes for clones and the reality that the human brain can never be replicated. George Johnson, former New York Times writer and author of ‘Don’t Worry: A Brain Still Can’t Be Cloned’ elaborates on this subject and thoroughly explains why individuality cannot transfer from parent to clone when he first explains the early development of the brain:

The precise layout of the cells, which neuron is connected to which, makes all the difference. Linked one with the other, through the junctions called synapses, neurons form the whorls of circuitry whose twists and turns make us who we are. (10)

What Johnson means is that, much like fingerprints, no two brains are the same. Random placement and position of neurons during fetal development, Johnson explains, “are thrown together more or less at random and then left to their own devices” (11). Once a person is born, further individuality forms due to what one experiences (Johnson 11). Experiences, additionally, can be interpreted in numerous ways, where the same experience could have multiple effects on people (Johnson 11). Klotzko further explains

this relevancy by saying, 'In a very real sense clones, twins, and the rest of us grow our own brain. Everything we see and hear, everything we touch and taste, what we learn, what we do—all these factors combine to make us who we are' (137-138). What this says about clones is that if twins can be raised in similar environments yet develop into separate individuals, clones will do the same. Richard C. Lewontin, author of 'The Fallacy of Biological Determinism' argues the inevitability of twin individuality when he gives the example of parents doing all they can to make twins similar, such as providing similar outfits, toys, and names (38). Despite this forced conformity, he affirms that: 'Even the most extreme efforts to turn genetic clones into human clones fail' (38), meaning that genetic clones will never possess exact similarities as their parents. This statement provides more credibility to Johnson's previous claims that brain development is unique to everyone, by showing an example of parents trying to make their children alike.

Gregory E. Pence, professor and author of Cloning After Dolly: Who's Still Afraid? indicates that clones would demonstrate more differences from their 'ancestors' than differences amongst twins due to development within an entirely different 'uterine,' or womb environment, as well as growing up in a different era (8). With this different era come a different political leader, different technology, different fashion styles, and different medicine. Some could still pose the question whether genetic inheritance of certain qualities is possible, which is very relevant. Regarding the studies of researcher Thomas Bouchard mentioned in Klotzko's work, the level of intelligence can be inherited from a parent to child, however its likelihood is around sixty to seventy percent (137). This shows a possibility that if the parent demonstrates high intellectual ability, so could the clone. The question, however, whether a clone would inherit specific qualities in

behavior from the parent still remains unproved and is caused more so by environmental experiences (Klotzko 137).

For the instructors or parents mentioned earlier who wish to clone their exceptional students and children, the above studies may not be very appealing. The truth is that even if a cloned child showed a high level of intelligence, they still may not possess similar organizational skills, discipline, or motivation as the cloned child. Their going through school with different teachers and classmates could also deeply impact their outlook on everything. If the bad experiences outweigh the good, then this would provide a less positive perception of the classroom environment, or even education in its entirety. Even twins, who may be in different classrooms while attending the same school, might acquire different outlooks simply by the teaching methods or personalities of their instructors. This concept also applies to the desire to clone famous individuals in hopes of acquiring another person with similar traits and talents. The example Klotzko provides of cloning the eighteenth century composer Mozart not only gives a detailed background of his life, but also tries to predict what his clone would resemble. Though it might be safe to say that the clone would be highly intelligent and musically inclined due to Bouchard's rates of sixty to seventy percent for intelligence and eighty percent for musical ability, the extent to which these qualities would manifest is still difficult to prove (Klotzko 144-145). Mozart's environment as a child and adult are better grounds for establishing what a future Mozart would or would not be like. When Klotzko examines his life, she notes that his musically inclined older sister caused a three-and-a-half year-old Mozart to desire piano lessons (141). With a clone, there would be no guarantee that he have an older sister, let alone want to learn piano at three-and-a-half

(141). It was also due to his father, Leopold, that Mozart acquired knowledge of the Italian culture and other aspects of music (141). If Mozart's clone has different parents, where none of whom may be as willing to devote him or herself to teaching Mozart Italian culture and music, his musical background may become limited. The busy schedule and thorough background from Leopold most likely also contributed to Mozart's success with "redefining" the opera (143). If born in today's world, Mozart would never have the opportunity to participate in this historic event, for Leopold would have already established this years ago. Klotzko makes an accurate observation by pointing out that musical influences today are totally different from those of the eighteenth century, and therefore it is possible that today's Mozart would contrastingly be drawn to rock music (145). Pence sums up the idea that cloning can produce unpredictable results in the statement,

Multiple copies of an ancestor's genes might bring multiple surprises. Having multiple copies of the ancestor's genome could create multiple chances to see the limitations of the ancestor's efforts, drives, attitude, or choices. When critics say human cloning is about control, always remember that the free will of cloned human beings cannot be controlled by their genetic ancestors. (4)

Because this is true, Mozart would not be born already knowing how to play the piano, or how to play his compositions. He would not remember his parents, influential older sister, or trips to Italy. Once an adult, Mozart could ultimately control his own life and decide upon his own career, which may or may not involve music.

Common concerns about cloning and its ability to solve medical issues tend to have ethical implications. Regarding the theoretical family provided by Kitcher that wishes to clone their son in hopes of providing him with a healthy kidney, this process may not prove successful as it would take a considerable amount of time. First, the family would have to wait nine months for the clone to be born, then wait until the child grew to an age where the kidneys would be fully developed and ready for donating. By this time, unfortunately, the son may have already passed away if unable to receive an eligible kidney, or his state may have worsened, bringing him closer to death. Thomas A. Shannon, author of 'Cloning Myths: Time to Take Thought' provides a different argument against those who consider cloning themselves for the convenience of having organs. He strictly reminds them that clones are no different than normal humans and would have their own "inalienable rights and vital interests—not to mention moral and legal standing" (10). This statement helps to reiterate that clones are simply like twins and possess the same rights as all. Even though twins might share a similar blood type, it is uncommon for one twin to act as an organ donor for the other. A possible solution to this problem may not arrive in the form of cloning humans, but in cloning individual organs. Though not yet a reality, the research towards successfully creating organs is currently under way. The processes to achieve this are mentioned in 'Three Concepts of Cloning Human Beings' by Doctor Ke-Hui Cui. Out of two methods, one poses a possibility of separate growth without relying on a human clone. This method, called 'type I' cloning, uses stem cells from the process of tissue cloning in order to grow specific parts (17). It does not involve creating an embryo, thus humans would not have to worry whether spare organs were coming from others born for this reason. The organ cloning process is long from success;

however another type of organ production could arrive in the near future. Another serious process that may give humans a second chance at life is the process of cloning pigs in order to utilize their organs for transplanting into humans. A process called ‘xenotransplantation,’ Professor Carl Gustav-Groth expects a good portent with the use of pigs for those in need of organ transplants when he wrote ‘Progress in Xenotransplantation: A Personal View.’ He mentions advantages such as less time for patients to wait for new organs, and a new abundance of them versus the organ shortage currently being experienced (179). Though both procedures are far from perfection, they would provide better avenues than cloning a human being solely for taking organs.

The other scenario of the family’s desire to clone a deceased loved one triggers complicated debate. While the relative could never return at the same age or retain the memories they have shared with family members, to some this may not be a big deal. Grief may play a large role on this decision, as well as the closeness of the deceased person to his or her family. University of Chicago professor Leon R. Kass provides a quote from a bioethicist regarding how to reason with cloning in the article ‘The Wisdom of Repugnance?’

The ethics must be judged [only] by the way the parents nurture and rear their resulting child and whether they bestow the same love and affection on a child brought into existence by a technique of assisted reproduction as they would on a child born in the usual way. (qtd. in Kass 20)

With that said, would the fact that the cloned family member would most likely be raised in a safe and loving environment still make it right for the family to do this? ‘Clonaid,’ a controversial company dedicated to its attempts at human cloning, seems to advocate the

cloning of lost relatives when its website explains,“.human cloning can give life a second time to the same genetic code who has died at an early age...” Although various opinions for and against this would manifest, what needs to be understood is that a loved one, especially a child, would not possess any previous knowledge of its parents or relatives. Besides having the same features, the cloned relative would be entirely unique.

Whether human cloning is moral or immoral, or useful or irrelevant, opposing sides will always exist within this debate. In George W. Bush's State of the Union Address for 2006, he clearly argues his position when he tells both houses,

Tonight I ask you to pass legislation to prohibit the most egregious abuses of medical research: human cloning in all its forms, creating or implanting human embryos for experiments. Human life is a gift from our Creator—and that gift should never be discarded, devalued or put up for sale. (1)

Starkly contrasting to this view, Clonaid seems to exhibit the urgency to successfully produce a human clone, as its site certainly demonstrates. To thoroughly comprehend the arguments on both sides, however, requires a thorough understanding of human cloning. Once this understanding is achieved, citizens with former misconstructions and fears can now participate in intellectual debate without feelings of incompetence or oblivion.

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