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To Clone or not to Clone: A Look at Why Cloning Fluffy and Fido Might not be in the Best Interests of Society and May Inevitably Pave the Way for Human Cloning

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**TO CLONE OR NOT TO CLONE: A LOOK AT
WHY CLONING FLUFFY AND FIDO MIGHT
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SOCIETY AND MAY INEVITABLY PAVE THE
WAY FOR HUMAN CLONING**

Penelope Ann Tsernoglou
April 25, 2004

I. INTRODUCTION

Dolly was the first. Others soon followed: goats, pigs, and mice to name a few. Recently the world has witnessed the first birth of a cloned companion animal, CC the cat. This is a huge step in making cloning more acceptable within American society because humans relate far more to their pets than they do to any of the other animals cloned to date. So what happens when the cat or dog who you have become so attached to is suddenly taken away from you? And it will be. Pets will almost always die before their owners due to their relatively short life-spans compared to humans. Genetic Savings and Clone has the answer! Or at least they want you to think they have the answer. For \$895+ shipping you can store your pets DNA to be cloned at some unknown point in the future. Other facilities also offer these services.

The research to clone pets all started with a mixed breed dog named Missy who was lucky enough to be adopted from an animal shelter by a wealthy couple. When Missy began to age, her owners realized that they couldn't let go and financed the Missyplicity project. After several years of research, Texas A&M produced a cuddly little kitten named CC. Dogs will prove harder to clone because our knowledge of their physiology is extremely limited.

The birth of CC is significant for many different reasons. The cloning market will soon open up for companies like GSC to exploit pet owner's emotional attachments to their faithful companions. American children may soon be spared from the inevitable lesson that everything dies. And eventually, the cloning of companion animals will soften the hearts of the public and the media and make way for human cloning. Today it is CC, tomorrow it may be a human child.

While laws are currently in place restricting human cloning and laws completely prohibiting research on human cloning are on the table, once passed these laws will soon give way to public demand. One important factor remains- a clone is not a resurrection. The human fixation on immortality has taken on many different forms which manifest themselves in our modern world in the form of scientific advances. Dr. Frankenstein may be a thing of the past, but there's a new doctor in town. This doctor doesn't promise to resurrect your dead corpse, but instead, he offers something better, an entirely new life! Researchers deny making such promises, but when people face death, even the smallest hope of rebirth may be enough for them to lay down their life savings.

Unfortunately, the reality is that most clones at best strive to be an identical twin, and at worst, fail to be born at all. Out of 87 embryos, only one CC was born. Furthermore, the health implications to clones are staggering. Considering the fact that a clone is no more like its genetic donor than a dog of the same breed and the numerous complications and unanswered questions involved with cloning we have to ask ourselves: is GSC really interested in soothing the broken hearts of lost pet owners? I think not.

Nevertheless, scientists will not cease to move in the direction of accomplishing everything that is possible in the never-ending quest of testing the outer limits of discovery and human accomplishment. With something as controversial and exciting as cloning, there will always be funding, whether it is government, private or otherwise. Eugenics catastrophes of the past seem far away and remote when we envision the new prospects of advancement offered by cloning. Reproductive cloning began with farm animals, we're successfully working on companion animals and the possibility of a human clone looms on the horizon. Like in-vitro fertilization and euthanasia in the past,

first come the animals and after years of research and perfection of the processes, the application to human beings is virtually inevitable.

U.S. Laws that restrict and ban human cloning are weak and limited in scope. They will soon crumble to public demand and commercial powerhouses like GSC. Moreover, without international regulations, nations who refuse to ban or restrict cloning will leave the United States behind and move on to explore this new frontier of scientific accomplishment with or without our blessings.

II. HISTORY OF REPRODUCTIVE ANIMAL CLONING: FROM DOLLY TO CC

A. Timeline: From Dolly to CC and Beyond.

Dolly the sheep was the first mammal cloned from the cell of an adult animal.¹ Dolly was born in 1996 at the Roslin Institute in Scotland under the supervision of Ian Wilmut.² The birth of Dolly marked a new era in cloning technology. Cloning and all of the possibilities that go along with it became a reality almost overnight.

In 1997, the world saw the first cloned cow.³ Gene, the cow, was cloned from a fetal cell. Soon after, Researchers at The University of Hawaii Medical School were able to clone a mouse from an adult cell.⁴

The year 1998 marked the beginning of the Missyplicity project, an important milestone in cloning history.⁵ Missy was a mixed breed Australian Shepherd adopted from an animal shelter by a wealthy entrepreneur.⁶ Missy's owner John Sperling became

¹ Genetic Savings and Clone, About Cloning-Historical Timeline, available at www.savingsandclone.com/cloning/timeline.html

² Id.

³ Id.

⁴ Id.

⁵ Id.

⁶ Genetic Savings and Clone, About Us-Missy: Our Inspiration, available at www.savingsandclone.com/about_us/missy.html.

so attached to his dog Missy that he set out to have her cloned and backed the “Missyplcity Project” based at Texas A&M with unlimited funding.⁷

Also in 1998, the first cows cloned from adult cells entered the world as did the first goat cloned from an embryonic cell.⁸ The first pigs, the first goat and the first mouflon cloned from adult cells also came into being in 2000.⁹ In 2001, the first endangered species, the Gaur was cloned and the first rabbits were cloned from adult cells.¹⁰

2001 also marked the birth of the first cloned companion animal, CC the cat.¹¹

After CC, a mule was cloned from a mule fetus, and a horse, rats, and an African wildcat were all cloned from an adult cell.¹² Animal cloning research is ongoing and more species are being added to the list every year.

B. Operation Copycat: The Birth of the First Cloned Companion Animal and the Process of Nuclear Transplantation.

After 2 years of research, the Missyplcity project failed to successfully produce a cloned dog.¹³ Researchers at Texas A&M embarked upon a new research project known as “Operation CopyCat,” backed by Genetic Savings and Clone.¹⁴ Because cats are frequently used as research animals, much more is known about their physiology. In addition, the ovulation cycle of dogs has proven hard to predict.¹⁵ The first attempt to

⁷ Id.

⁸ See Note 1, *supra*.

⁹ Id.

¹⁰ Id.

¹¹ Id.

¹² Id.

¹³ Id.

¹⁴ Id.

¹⁵ Genetic Savings and Clone, About Cloning- Dog Cloning, available at www.savingsandclone.com/cloning/dog_cloning.html.

clone a cat involved adult fibroblast cells obtained from an adult male.¹⁶ The cells were fused with cat ova from which the metaphase chromosomes were removed.¹⁷ Out of 188 nuclear transfer procedures, only 82 cloned embryos were produced.¹⁸ These embryos were transplanted into seven surrogates.¹⁹ Only one queen became pregnant with a single baby, but the fetus did not develop and had to be surgically removed after 44 days of gestation.²⁰

The second attempt to clone a cat involved nuclei from the cumulus cells of an adult female cat named Rainbow.²¹ Embryos from both fibroblast and cumulus cells were transferred into a recipient female named Allie.²² After 22 days of gestation, pregnancy was confirmed and a kitten was delivered by caesarian section on December 22, 2001, 66 days after the embryo transfer.²³ That kitten was CC.²⁴ CC was a normal and healthy kitten who now lives with one of the researchers.²⁵ CC's coloring led researchers to believe she was cloned from a cumulus cell.²⁶ CC is not the spitting image of Rainbow (whom she is a clone of).²⁷ Rainbow's coloring varies substantially from CC's.²⁸ Calico cats cannot be cloned identically when it comes to their coat coloring.²⁹ This is due to an effect called x-linked inactivation which involves the random

¹⁶ A Cat Cloned by Nuclear Transplantation, Brief Communications, Nature, Vol. 415, February 2002, available at www.nature.com, 2002 Macmillan Magazines Ltd.

¹⁷ Id.

¹⁸ Id.

¹⁹ Id.

²⁰ Id.

²¹ Id.

²² Id.

²³ Id.

²⁴ Id.

²⁵ Genetic Savings and Clone, About Cloning- Cat Cloning, available at www.savingsandclone.com/cloning/cat_cloning.html.

²⁶ See Note 17, *supra*.

²⁷ Id.

²⁸ Id.

²⁹ Id.

inactivation of one of the X chromosomes.³⁰ Since all females have two X chromosomes, one might wonder if this phenomenon could have a more widespread impact on cloning in the future.

C. Genetic Savings and Clone

In response to the interest generated by the Missyplicity Project Genetic Savings and Clone was founded in the year 2000.³¹ Genetic Savings and Clone is probably the first company to recognize the mass-market potential of cloning technology, but certainly not the last.³² “In a capitalist economy, consumer demand and the ability to fill it are all the justifications you need,” said Lou Hawthorne, owner and founder of GSC, in defense of the company’s imperatives.³³ \$895 plus shipping and handling stores the DNA of your beloved pet to be cloned at an unstated date in the future for a high, but still undetermined cost.³⁴ When an emergency arises, such as unexpected death or terminal illness, another \$500 will speed up the process and ensure that your pet’s DNA can still be saved.³⁵ Another leading gene bank, Lazon Technologies, encourages pet owners to preserve material from a healthy animal in the event that it becomes lost, unable to reproduce or dies unexpectedly.³⁶

Since the announcement of CC’s birth, several hundred people have contacted

³⁰ Genetic Savings and Clone, About us- X-linked Inactivation, available at http://savingsandclone.com/cloning/x_link.html.

³¹ See Note 3, *supra*.

³² Wes Allison, “How Many Lives Now?,” *St. Petersburg Times*, Feb. 24, 2002, p. 1-A, available at <http://pqasb.pqarchiver.com/sptimes/doc/110025263.html?MAC=a0ea72cd074180b3f4ad6>.

³³ Genetic Savings and Clone, Ethics and Discussion- Ethical Debates, Lou Hawthorne, *Journal of Applied Animal Welfare Science*, Vol. 5, No. 3, 2002.

³⁴ Genetic Savings and Clone, FAQs- General FAQ, available at www.savingsandclone.com/faqs/general.html.

³⁵ *Id.*

³⁶ Lazon Biotechnologies, Companion Pets, available at www.lazon.com/companionpets1.html.

GSC alone to store their pet's DNA.³⁷ Hundreds more had already sent in samples and paid the fee.³⁸ GSC is investing millions of dollars in embryo assessment technology in order to maximize the efficiency of pet cloning.³⁹ GSC says they want to ensure that each cloned embryo transferred to a surrogate is normal and will develop into a healthy cloned pet.⁴⁰

In recent news, GSC announced "The First Nine Lives Extravaganza" will take place in Sausalito California.⁴¹ A few lucky pet owners will be presented with the world's first commercially cloned felines.⁴² The price, 50,000 US dollars.⁴³ On this one time only occasion, there is in fact a money back guarantee if you are not completely satisfied with your cloned cat.⁴⁴ GSC believes that their new cloning procedure, known as chromatic transfer will greatly reduce any possible health problems in cloned animals.⁴⁵ They also promise to offer dogs in 2005 for commercial cloning, but space is limited, so interested pet owners are encouraged to sign up now.⁴⁶

D. Competition on the Horizon: "Foreverpet"

Genetic Savings and Clone may have thought they had the market on pet cloning cornered, but look out GSC, here comes Geneticas Life Sciences.⁴⁷ Geneticas emerged on the cloning scene in 2003 as a powerhouse international alternative to GSC, Lazon

³⁷ See Note 32, *supra*.

³⁸ *Id.*

³⁹ Genetic Savings and Clone, About Cloning- Health Issue, available at www.savingsandclone.com/cloning/health_issues.html.

⁴⁰ *Id.*

⁴¹ Genetic Savings and Clone, Inc.: Gene Banking and Cloning of Exceptional Pets, available at www.geneticsavingsandclone.com.

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ "Pet Cloning Gets Competitive," December 3, 2003, available at www.betterhumans.com/News.

and the other growing DNA storage and pet cloning companies.⁴⁸ Geneticas proposed to offer the first “allergy free” kittens by 2006, and plans to launch the world’s largest equine cloning bank in 2005.⁴⁹ Geneticas has already begun Geneticas Ark which is allegedly the world’s largest DNA storage bank for endangered species.⁵⁰ Geneticas boasts the “Ark” as the “greatest conservation project.”⁵¹ Furthermore, Geneticas offers “Foreverpet” services as a low cost alternative to GSC and company.⁵² Foreverpet will store your pet’s DNA for as low as \$19.95 per month, but makes no promises that cloning will ever be possible and offers no cost estimate for the cloning procedure.⁵³

III. WHY CLONE?

A. Cloning To Replace a Lost Pet: Just How Similar Will It Be?

Perhaps the most common answer to why one would want to clone Fluffy or Fido once he is dead and gone is that the owner misses all of the special things about Fluffy that made him the “perfect cat.” Cloning an entirely new Fluffy who can come into the world as a happy kitten with lots of long years of companionship ahead seems to be a distraught pet lovers dream. However, even GSC and the other companies who capitalize on rich pet lover’s desires to replace their lost pets caution that cloning isn’t for everyone.⁵⁴ If the customer is interested in cloning because they want to get the same pet back, then GSC says cloning is not going to do that for them.⁵⁵ However, if the customer

⁴⁸ Id.

⁴⁹ Geneticas Life Sciences, “Specialized Divisions,” *available at* www.geneticas.com/divisions/html.

⁵⁰ Id.

⁵¹ Id.

⁵² Id.; “FOREVERPET, For More Than a Lifetime,” *available at* forever.pet.com.

⁵³ “FOREVERPET, For More Than a Lifetime,” *available at* forever.pet.com.

⁵⁴ Genetic Savings and Clone, Our Services- Is Cloning Right for You? *Available at* www.savingsandclone.com/services/right_for_you.html.

⁵⁵ Id.

merely wishes to save his pet's unique genetic endowment, then cloning is the answer!⁵⁶ GSC tells pet owners to hold off if their pets are unremarkable.⁵⁷ Now I don't know about you, but I happen to think each and every one of my cats are very remarkable creatures.

Unfortunately these distraught pet lovers will soon learn that a clone is not a duplicate. In fact, if you want to clone your calico cat, she won't even have the same physical markings.⁵⁸ While this phenomenon seems to be limited to calico cats only, cloning is very much in its infancy and new developments and breakthroughs are the norm. In order to clone an animal, researchers have to reprogram the DNA to exactly the state it was in when the animal was a fertilized egg.⁵⁹ Genes that govern temperament and disposition are just as likely to be incorrectly reprogrammed as genes that control coat coloring.⁶⁰ Moreover, in a roundtable teleconference with Lou Hawthorne of GSC, David Magnus from the Bioethics center at the University of Pennsylvania suggested that we don't know enough about behavioral traits to say whether or not they are determined by the genes or the genome.⁶¹ He finds the idea that people grieve for the genetic component of their lost pets implausible.⁶² Hawthorne, on the other hand believes that the two of the three key components that make up behavior are clonable.⁶³ Of experience, intelligence and temperament, GSC strives to clone both intelligence and

⁵⁶ Id.

⁵⁷ Id.

⁵⁸ See Note 31, *supra*.

⁵⁹ Genetic Savings and Clone, Ethics and Discussion- Ethical Debates, "Round-Table" Teleconference, (transcript, Feb. 22, 2002) with Lou Hawthorne, Lori Gruen, Ph.D, David Magnus, Ph.D., and members of the medial, Moderator Suzanne Turner- public relations consultant, available at www.savingsandclone.com/ethics/debates6.html.

⁶⁰ Id.

⁶¹ Id.

⁶² Id.

⁶³ Id.

temperament.⁶⁴ Hawthorne promises that if people aren't satisfied with the cloned animals, GSC will find other homes for them.⁶⁵ A refund, however, is not in order.⁶⁶

B. Working Animals.

One type of “special” animal that GSC intends to clone for the benefit of society is the “working dog.”⁶⁷ Exceptional dogs can be trained to perform valuable services for society, including assisting individuals with handicaps, rescuing disaster victims and detecting arson, explosives and drugs.⁶⁸ When a guide dog becomes unavailable to perform due to early illness or death, their human must cope not only with the loss of the animal who has become a part of them, but with the training and acclimating of a new dog.⁶⁹ GSC believes that a clone would somehow reduce this transitional period and has already begun storing the DNA of “world-class” working dogs for little or no cost to the owner.⁷⁰

In fact, numerous training programs for guide dogs are already in place around the nation including Leader Dogs for the Blind, a Michigan based program that accepts dog students from animal shelters and humane societies.⁷¹ The Guide Dog Foundation for the Blind raises its guide dogs from birth and enters them into puppy programs until they are old enough for training as a guide dog.⁷² Training for humans with the dogs is provided

⁶⁴ Id.

⁶⁵ Id.

⁶⁶ Id.

⁶⁷ Genetic Savings and Clone, Social Benefits- Working Dogs, available at www.savingsandclone.com/benefits/working_dogs.html.

⁶⁸ Id.

⁶⁹ Id.

⁷⁰ Id.

⁷¹ Leader Dogs for the Blind, A 65 Year Tradition, available at www.leaderdog.org/abt-hist.html.

⁷² Guide Dog Foundation for the Blind, Puppy Program, available at www.guidedog.org/Pupprog/pupprog.htm.

free of charge.⁷³

Currently, with the costs associated with cloning, it is hard to believe that guide dogs could be provided to the public free of charge. Not only would the price of obtaining a cloned guide dog be prohibitive for many individuals that utilize this service, but the cloned dog would not be any more familiar with the guided human than a new dog. Also, many qualified dogs would miss out on the opportunity to serve humanity if the same dogs were simply cloned over and over again.

C. Endangered Species.

Hundreds of species die off each year due to the devastating effects humans have had on the environment and the creatures that inhabit our planet. Humans increasingly hunt, poach and encroach on the habitats of endangered species with wanton disregard. Again, GSC has the answer.⁷⁴ Rather than successfully addressing the real problems, GSC suggests that cloning might solve the problem by increasing genetic diversity and ensuring the survival of an endangered species.⁷⁵ GSC and many others believe that cloning can increase genetic diversity among a population of endangered animals and increase the likelihood that the species will go on to see another era.⁷⁶ In fact, according to GSC, “cloning may be the only way to prevent the loss of a species.”⁷⁷ However, at least one zoo director, Lee Simmons, states that cloning is actually counterproductive to the creation of genetic diversity because it simply creates more animals that are closely

⁷³ Id.

⁷⁴ Genetic Savings and Clone, Social Benefits- Endangered Species, available at www.savingsandclone.com/benefits/endangered.html.

⁷⁵ Id.

⁷⁶ Id.

⁷⁷ Id.

related to one another.⁷⁸ The breeding of closely related animals is discouraged because offspring have shorter life spans and may not reproduce again.⁷⁹ Never before has nature been able to reverse the process of natural selection and survival of the fittest. With cloning, human beings may be able to bring back the animals they carelessly destroyed and disregarded until near extinction. Is this truly the lesson that society needs to learn? I think not.

Zoos appear to have taken an interest in cloning research as well.⁸⁰ Some of these same zoos allegedly sell adult wildcats to canned hunting ranches to make room for cute little babies.⁸¹ Will these zoos clone endangered species to release them into the wild or do they merely want to exhibit them for personal gain and then sell them to the highest bidder?

C. **Animal Health Research.**

Pet cloning research will greatly increase our knowledge of the dog and contribute to cures for common canine disease.⁸² Additionally, contraceptive and sterilization methods will inevitably improve with the development of canine and feline cloning technology, which involves extensive research about the animal's reproductive systems.⁸³ Even the health problems seen in clones can serve to benefit animal health research.⁸⁴

These same health problems are seen in natural reproduction (at a much lower rate of

⁷⁸ Joanne Young, "Amid Controversy, Animal Research Advances," Lincoln Journal Star, Medical Ethics: Tough Choices- Cloning, available at http://net.unl.edu/newsFeat/med_eth/me_cloning3.html.

⁷⁹ Id.

⁸⁰ See Note 62, *supra*; San Diego's Frozen Zoo, ScieTech, San Diego, Oct. 14, 2002. CBS News, San Diego's Frozen Zoo, Oct. 15, 2002 available at www.cbsnews.com/stories/2002/10/14/tech/main525521.shtml.

⁸¹ Animals In Print, The On-line Newsletter, From 31 Oct 2001 Issue: Canned Hunts: The Other Side of the Fence, available at www.all-creatures.org/aip/nl-31oct2001-canned.html.

⁸² Genetic Savings and Clone, Social Benefits- Animal Health Research, available at www.savingsandclone.com/benefits/health_research.html.

⁸³ Id.

course), in both animals and humans, and research to prevent these problems in clones could certainly carry over to decrease birth defects, stillbirths, and neonatal deaths in normal mammalian reproduction.⁸⁵

IV. WHY NOT CLONE?

A. Animal Welfare Concerns.

As in all animal research, there will always be concerns for the research subjects, the unwitting animals, forced to give their lives for the sake of science. While the Animal Welfare Act provides guidelines to maintain an acceptable level of care and establishes Animal Care Committees within each research institution to approve and monitor animal research projects, many still question the use of companion animals in cloning research.⁸⁶ Since cloning is not completely understood, many believe that it is not safe. Surrogate mothers are at a much greater risk for serious complications and even death.⁸⁷ However, it is the clones who will suffer the most. Miscarriages, birth defects, serious illnesses and premature death are the norm for animal clones.⁸⁸

Approximately one fourth of all animal clones have experienced a clone related health problem, from mild to deadly.⁸⁹ Health problems in clones appear to stem from

⁸⁴ Id.

⁸⁵ Id.; Jose B. Cibelli, Keith H. Campbell, George E. Seidel, Michael D. West, and Robert P. Lanza, "The Health Profile of Cloned Animals, Nature Biotechnology, Jan. 2002, Vol. 20, 2002 Nature Publishing Group, available at <http://biotech.nature.com>.

⁸⁶ 7 USC § 2131, Animal Welfare Act.

⁸⁷ Genetic Savings and Clone: Ethics & Discussion- Ethical Debates. Hillary Bok, Ph.D, "Cloning Companion Animals is Wrong," Journal of Applied Animal Welfare Science, Vol. 5, No. 3, 2002, available at www.savingsandclone.com/ethics/debates3.html.

⁸⁸ Id.

⁸⁹ Id.

high incidence of congenital abnormalities.⁹⁰ Placentas are often abnormal and result in additional problems even if fetuses are normal.⁹¹ Increased neonatal deaths as well as increased embryo size are also side effects of cloning.⁹² However, oversized embryos may not have a negative impact on litter bearing animals, such as cats and dogs who already have large uteri which can accommodate several embryos.⁹³ Extremely high embryonic and fetal attrition also frequently occurs during gestation.⁹⁴ It is believed that fetuses may be mal-nurtured because of epigenetically abnormal placentas.⁹⁵ Despite all of the possible risks, GSC and many other still intend to continue their research in this field. GSC claims that they have a new assessment technology which can test whether a cloned embryo is normal before transferring it to a surrogate mother.⁹⁶

B. Cloning Ads to the Pet Overpopulation Problem.

Another major concern associated with the cloning of people's pets is that it adds to the pet overpopulation problem and increases the number of unwanted animals destined to live out their final days unloved and unwanted waiting to be euthanized at a county shelter or humane society.⁹⁷ In fact, the Humane Society of the United States has taken a firm stance against pet cloning.⁹⁸ The HSUS director asks "Why create animals through such extreme and experimental means when there are so many animals desperate

⁹⁰ Jose B. Cibelli, Keith H. Campbell, George E. Seidel, Michael D. West, and Robert P. Lanza, "The Health Profile of Cloned Animals," Nature Biotechnology, Jan. 2002, Vol. 20, 2002 Nature Publishing Group, available at <http://biotech.nature.com>.

⁹¹ Id.

⁹² Id.

⁹³ Genetic Savings and Clone, Ethics & Discussion- Ethical Debates. Lou Hawthorne, "Hawthorne's Rebuttal," Journal of Applied Welfare Science, Vol. 5, No. 3, 2002.

⁹⁴ See Note 78, *supra*.

⁹⁵ Id.

⁹⁶ See Note 70, *supra*.

⁹⁷ See Note 49, *supra*.

⁹⁸ "Cat Cloning Is Wrong-Headed States The Humane Society of the United States," The Humane Society of the United States, available at www.hsus.org/ace/13214.

for homes?”⁹⁹ Over nine million cats and dogs are euthanized each year in the United States.¹⁰⁰ Each and every day thousands of animals will die needlessly. The Humane Society of the United States believes that cloning animals takes away the altruistic component of being a pet owner and reduce the experience to one of selfishness.¹⁰¹ “There is something wonderful about providing hope and homes for animals in need.¹⁰² Where in the past people have turned to unwanted animals in the shelters waiting for adoption, opponents fear that gene banks may be the adoption centers of the future. Since a clone won’t be an identical match of a lost pet anyway, why not just get an already born unwanted animal that is just as similar rather than letting him die and then bringing an entirely new animal into the world?

Genetic Savings and Clone argues that they are not adding to the pet overpopulation problem in the least bit.¹⁰³ In order to dispel this myth Genetic Savings and Clone backs spay/neuter clinics where they obtain most of their eggs for research.¹⁰⁴ Lou Hawthorne of Genetic Savings and Clone believes that they in fact reduce the pet overpopulation by funding the clinics and suggests that the real problem lies with breeders.¹⁰⁵

C. **Sometimes You Have to Let Go: American Society’s Unwillingness to Accept Death.**

Death is a part of life. Or is it? No more will children have to face the fact that their beloved pet has crossed the rainbow bridge. Instead mommy and daddy can go to

⁹⁹ Id.

¹⁰⁰ American Humane: Newsroom: Facts Sheets: Euthanasia, *available at* www.americanhumane.org.

¹⁰¹ See Note 86, *supra*.

¹⁰² Id.

¹⁰³ See Note 49, *supra*.

¹⁰⁴ Id.

¹⁰⁵ Id.

the clone store and get an all new pet, young, cuddly and cute. For children who always want a kitten, their parents can even supply the same (or pretty close) kitten on a yearly basis (assuming they have enough money to do so).

Throughout American history, Americans have rejected the notion of death.¹⁰⁶ People run from death, escape death, cheat death, delay death and sometimes simply deny that death has occurred. Phrases such as “passed away” are used to cushion the harsh reality of death.¹⁰⁷ From the fountain of youth to Dr. Frankenstein to comic book superheroes who just can’t be killed, the fixation with avoiding death has been an ongoing theme in American culture and society. Cloning your cat and dog is simply another way of avoiding the unavoidable and refusing to accept the fact that we are all mortal and will one day cease to exist on this earth.

V. FROM ANIMALS TO HUMANS: THE INEVITABLE CONCLUSION

A. A General Trend for Scientific Techniques Used on Animals to Graduate to Human Use Once Deemed Reasonably Safe.

In vitro fertilization, artificial insemination, and euthanasia all started out being used on animals.¹⁰⁸ Opponents fought hard to keep them out of human medicinal practices, calling them “ungodly” and unnatural, but the progression from use on animals to willing humans could not be stopped.¹⁰⁹ Infertile couples clambered for the in vitro fertilization technology as well as the artificial insemination possibilities. Artificial insemination has proved to be a useful tool for infertile couples, single women wanting to

¹⁰⁶ See Note 33, *supra*.

¹⁰⁷ “The Psychology of Death,” Wyoming Funeral Directors Association, and FuneralNet, 2000, *available at* www.wyfda.org/basics_4.html.

¹⁰⁸ See Note 33, *supra*; Genetic Savings and Clone, FAQ’s- Ethical FAQ, *available at* www.savingsandclone.com/faqs/ethical.html.

¹⁰⁹ *Id.*

have children, homosexual couples and many other individuals.

Euthanasia is still not acceptably used on humans in most corners of the world, but it is quietly and slowly gaining ground as more and more people discover that it may be the only answer to unbearable suffering. It is currently in widespread practice in the Netherlands and numerous other countries have considered physician assisted suicide legislation.¹¹⁰ The legalization of euthanasia for the Dutch appears to be the result of an effort to regulate the practice which already accepted by Dutch courts.¹¹¹ In the United States, the State of Oregon has passed a “Death with Dignity Act” legalizing assisted suicide and helping 171 individuals benefit from human euthanasia.¹¹²

Like in vitro fertilization, artificial insemination and euthanasia, cloning has sparked the fears of a nation. However, after years of animal research and animal clones walking the streets, cloning will lose its mysterious foreboding and what seemed impossible and immoral in the past will become inevitable. What is good enough for the dog will be good enough for his owner.

Although opponents to cloning cite reasons related to human dignity, cloning bears a more similar relationship to in vitro fertilization and artificial insemination than to euthanasia. Like the former two practices, cloning will create life, not take it away (at least not intentionally). Once the technique is perfected on animals, it will likely meet far less resistance in American society than physician assisted suicide. Furthermore, with the lack of current federal legislation, one state standing on its own, like Oregon with euthanasia, could pave the way for the first human clone to come into the world.

¹¹⁰ “World Articles,” *available at* www.euthanasia.com.

¹¹¹ “Legalizing Euthanasia in Holland and the “Slippery Slope,” National Right to Life Press Release, November 28, 2000, *available at* www.euthanasia.com/nethlegal.html.

B. Cuddly Kittens and Playful Pups Ease Fears About Human Cloning and Force the Public to ask How Bad Can it Really be?

Perhaps some of you that are reading this might have seen the Arnold Swarzenegger movie called the “Sixth Day.” The futuristic action movie portrayed societies worst fears about cloning, but grossly misrepresented the actual possibilities involved. We know that clones don’t just spring up fully grown and completely identical to the cell donor. However, one thing in the movie that rang true was its portrayal of pet cloning services. Parents too afraid or too busy to explain the “death” of a beloved companion to their children simply had to make a trip to the mall and replace him. Adult owners whose pets suffered an untimely death were also drawn in to clone an identical pet. Gradually society began to accept clones as part of everyday life, not evil or unfamiliar or unnatural in any way.

In the real world, things may not be quite so clear cut, but if Genetic Savings and Clones’s and Lazonby’s reports are correct, people are lining up to obtain pet cloning services and when the service becomes affordable to all, gene banks are bound to replace animal shelters, humane societies, and pet stores as the number one place people go to adopt or should I say “create” their pets.

C. Animals as Stepping Stones: Once Cloning Technology is Perfected on Animals it Will be Safe Enough to Use on Humans.

Like the testing of a new drug or treatment for cancer, reproductive cloning will be perfected through the use of animals. Each generation of clones brings researchers

¹¹² Physician Assisted Suicide, Death with Dignity, Annual Report 2003, Oregon Department of Human Services, *available at* www.ohd.hr.state.or.us/chs/pas/ar-tbl-1.cfm.

closer to the ultimate goal of completely understanding the process and sufficiently safeguarding it for the use on human beings. But just what is “safe enough?” Since each species is quite different there will always be an initial trial in which the drug or treatment is not completely safe. Humans will be asked to voluntarily subject themselves to the new breakthrough. Some will volunteer because they need the money, others will volunteer because all hope is lost and it may be their last chance at survival. In any event, volunteers will always be found to test a new technology. With cloning, researchers can obtain the consent of the cell donor and the surrogate, but it is impossible to obtain the consent of the baby who may be born without a functioning heart or the baby who will grow into a man only to find that he has severe and fatal health problems at the ripe old age of thirty. It is these research subjects who can never consent because they never asked to be brought into the world through such drastic means. Arguably, no child truly asks to be brought into the world and parents make decisions every day to have a baby who may suffer a serious birth defect or worse. Is cloning really any different?

VI. U.S. LAWS RESTRICTING HUMAN CLONING

A. Executive Orders and Failed Legislation.

Former President Clinton issued an executive order prohibiting the use of federal funds for human cloning in February of 1997, one month after the announcement of Dolly’s birth.¹¹³ To date, the moratorium is still in effect.¹¹⁴ However, there are no federal regulations concerning the use of private funds for human cloning purposes.¹¹⁵

¹¹³ NBAC, U.S. Cloning Policy, available at www.cs.virginia.edu/~jones/tmp352/projects98/group10/NBAC.htm.

¹¹⁴ Id.

¹¹⁵ Id.

Two years prior to the federal funding ban, Clinton created the National Bioethics Advisory Commission to regulate research involving human subjects.¹¹⁶ The NBAC reviewed scientific developments in conjunction with ethical concerns including but not limited to safety, individuality, family integrity, objectifying children, and religion when coming to the conclusions laid out in the NBAC report and recommendations on human cloning.¹¹⁷ Their overall conclusion was that cloning is morally unacceptable at this time and that the current scientific technique is not safe to use on humans.¹¹⁸ The Commission recommended federal legislation prohibiting human cloning, but encouraged cloning research on animals.¹¹⁹ It further encouraged international efforts to enforce cloning regulations and education of the public.¹²⁰

Upon receiving the report, President Clinton proposed legislation, the “Cloning Prohibition Act of 1997” that would ban human cloning, both public and private.¹²¹ When Chicago scientist Richard Seed announced his plans to open a human cloning clinic for childless couples, interest in cloning legislation increased.¹²² In 1998, Democrats and Republicans introduced competing bills to prohibit human cloning.¹²³ While the Republicans bill sought to prohibit both reproductive and therapeutic cloning, the Democratic bill would ban reproductive human cloning only.¹²⁴ Thus the Democratic bill gained the support of the biotechnology industry and the biomedical research

¹¹⁶ Id.

¹¹⁷ “Cloning Human Beings,” Report of the National Bioethics Advisory Commission, June 1997, *available at* http://65.205.1.226/cloning/cloning_report.html.

¹¹⁸ See Note 97, *supra*.

¹¹⁹ Id.

¹²⁰ Id.

¹²¹ Id.

¹²² Id.

¹²³ Center for Genetics and Society, [Policies: U.S. Federal and State Policies: Federal Policies on Cloning](http://www.genetics-and-society.org/policies/us/cloning.html), *available at* www.genetics-and-society.org/policies/us/cloning.html.

¹²⁴ Id.

community while the Republican bill garnered support from anti-abortion groups and religious conservatives.¹²⁵ Since the urgency of passing the legislation seemed remote the bill's fate rested on the voter's views on abortion rather than human cloning.¹²⁶ Few believed that human cloning was actually possible in the near future.¹²⁷

By 2001, cloning human beings was a much more realistic possibility. Research on animals had seen significant leaps since the cloning of Dolly and more scientists began to step forward and proclaim their intentions to clone human beings. On July 31, 2001, the Weldon bill, banning both reproductive and therapeutic cloning, passed in the House of Representatives with an overwhelming majority.¹²⁸ Shortly thereafter, a companion bill backed by President Bush was introduced in the Senate along with a competing bill which would ban reproductive cloning only.¹²⁹ The competing bill, the Hatch-Feinstein bill was strongly criticized by the opposition, stating that it doesn't ban human cloning at all.¹³⁰ Since the bill only makes it a crime to allow human embryos to survive past 2 week of age, pro-lifers fear that it will lead to the unnecessary destruction of human embryos. There was no clear majority in favor of either bill.¹³¹ In 2002, the Senate ultimately decided to table the legislation and put off a vote.¹³²

Shortly before the senate hearing on human cloning, President Bush put together a

¹²⁵ Id.

¹²⁶ Id.

¹²⁷ Id.

¹²⁸ Id.

¹²⁹ Id.; The White House: President Bush Calls on Senate to Back Human Cloning Ban- Remarks by the President on Human Cloning Legislation, The East Room, *available at* www.whitehouse.gov/news/releases/2002/04/20020410-4.html.

¹³⁰ National Right to Life Committee- Hatch-Feinstein Bill Gives Green Light to Human Embryo Farms, Press Release, Americans to Ban Cloning, February 5, 2003, *available at* www.cloninginformation.org/prps/nrlc_03-02-05.htm; "Hatch-Feinstein Bill Gives Green Light to Human Embryo Farms," National Right to Life, February 5, 2003, *available at* www.nrlc.org/killing_Embryos.

¹³¹ See Note 107, *supra*.

¹³² Id.

Bioethics Council of his own.¹³³ Critics believed the membership was heavily stacked with conservatives likely to support findings in line with Bush's blanket anti-cloning position.¹³⁴ Ultimately, the report released by Bush's committee came to a divided conclusion on embryonic cloning.¹³⁵ While all seventeen members agreed that reproductive cloning should be banned, seven of them encouraged regulated embryonic cloning research which could lead to cures for various diseases.¹³⁶ This report may serve as a starting point in the current cloning debate, but will likely not be the last of its kind.

B. Federal Food and Drug Administration Claims Authority to Regulate Human Cloning.

The FDA claimed jurisdiction over human cloning in 1998 when they announced that they had the authority to regulate it under the Food, Drug and Cosmetic Act.¹³⁷ Accordingly, any attempt to clone a human without FDA approval would be a violation of federal law.¹³⁸ However, the law allows the FDA only a limited control of human cloning.¹³⁹ Only safety and efficacy are allowed to be taken into consideration under the applicable law.¹⁴⁰ Social, political and moral issues exceed the FDA's authority.¹⁴¹ Nevertheless, the FDA takes the position that they will shut down any operations attempting human cloning without their permission and will not hesitate to bring the

¹³³ Rick Weiss, Bush Unveils Bioethics Council: Human Cloning, Tests on Cloned Embryos Will Top Agenda of Panel's 1st Meeting, Washington Post, Thursday January 17, 2002. p.A21, available at www.washingtonpost.com/ac2/wp-dyn/A57155-2002Jan16?language=printer.

¹³⁴ Id.

¹³⁵ Dan Vergano, Bush Panel Releases Report on Cloning, USA TODAY, July 11, 2002, available at www.usatoday.com/news/washington/2002/07/12/bioethics.htm; "Human Cloning and Human Dignity: An Ethical Inquiry," The President's Council on Bioethics, Washington D.C., July 2002, available at www.bioethics.gov.

¹³⁶ Id.

¹³⁷ See Note 97, *supra*.

¹³⁸ Id.

¹³⁹ Id.

¹⁴⁰ Id.

¹⁴¹ Id.

wrongdoers to justice in a court of law.¹⁴²

C. State Laws Regulating or Restricting Human Cloning Research.

Where federal law has failed to effectively ban human cloning, State law has succeeded. Nine states currently have laws placing restrictions on human cloning.¹⁴³ California was the first to ban reproductive cloning in 1997.¹⁴⁴ Seven other states, including Arkansas, Iowa, Michigan, Rhode Island, New Jersey, North Dakota, and Virginia have since enacted currently valid prohibitions on reproductive cloning.¹⁴⁵ Additionally, Missouri prohibits the use of public funds for human cloning research and Louisiana also enacted legislation prohibiting reproductive cloning, which expired in July 2003.¹⁴⁶ Four of the states who currently regulate cloning further extend their prohibitions to therapeutic cloning.¹⁴⁷ These four states are Arkansas, Iowa, Michigan, and North Dakota.¹⁴⁸ It is unclear what the extent of the ban is under Virginian law.¹⁴⁹

States that ban cloning subject violators to a range of punishments including fines up to \$250,000.¹⁵⁰ Some states implement civil penalties, while others are prepared to institute criminal charges from misdemeanors to felonies.¹⁵¹

However, many critics are concerned that state cloning legislation has numerous loopholes which could lead to an ineffective ban on both reproductive and therapeutic

¹⁴² Id.

¹⁴³ National Conference of State Legislatures: State Human Cloning Laws- Updated: January 6, 2004, available at www.ncsl.org/programs/health/genetics/rt-shcl.htm.

¹⁴⁴ Id.

¹⁴⁵ Id.

¹⁴⁶ Id.

¹⁴⁷ Id.

¹⁴⁸ Id.

¹⁴⁹ Id.

¹⁵⁰ Id.

¹⁵¹ Id.

human cloning.¹⁵² For example, the Delaware cloning legislation will rise and fall depending on meaning given to dozens of ambiguous words and phrases.¹⁵³ Others worry that state cloning bans will be too broad, banning not only cloning but abortion as well by protecting human embryos from the moment of conception.¹⁵⁴ Nevertheless, any ban is better than none at all.

VII. INTERNATIONAL CLONING REGULATIONS

While many nations have already instituted their own cloning legislation, they recognize the need for international cloning guidelines and regulations. However, the international community has faced the same dilemma as the U.S. government. There is widespread disagreement as to whether a blanket ban on all cloning, reproductive and therapeutic, should be instituted as opposed to a ban on reproductive cloning alone. Strong feelings on both sides of the debate have stalled international action on the issue. More than sixty of the world's leading scientific academies urged the UN to ban reproductive cloning, but to allow continued research involving therapeutic cloning.¹⁵⁵ The United Nations established an ad hoc committee to discuss an International Convention against the Reproductive Cloning of Human Beings.¹⁵⁶ However, after the submission of competing proposals, each backed by numerous nations, a vote has been

¹⁵² Diane Irving, "Delaware State Cloning "Ban": Loopholes form Blueprints for Human Genetic Engineering, Lifeissues.net, April 14, 2004, *available at* www.lifeissues.net/writers/irvi/irvi_30delawarecloningban1.html.

¹⁵³ *Id.*

¹⁵⁴ Kristin Philipkoski, "Cloning Bill Bans Abortion Too?" Free Republic.com, May 30, 2002, *available at* www.freerepublic.com/focus/new.

¹⁵⁵ UK Mission to the United Nations: Statement by Adam Thomson, Deputy Permanent Representative to the United Kingdom Mission to the United Nations: General Assembly: Agenda Item 158: International Convention Against the Reproductive Cloning of Human Beings, Statement, 9 December 2003, *available at* www.ukun.org/articles_show.asp?SarticleType=17&Article_ID=718.

¹⁵⁶ Ad Hoc Committee on an International Convention Against the Reproductive Cloning of Human Beings, *available at* www.un.org/law/cloning/.

postponed and the debate will be re-opened in 2005.¹⁵⁷

Nevertheless, several applicable conventions already exist which effectively ban human cloning in the participating States.¹⁵⁸ The Universal Declaration on the Human Genome and Human Rights prohibits practices contrary to human dignity, "such as reproductive cloning of human beings" and the Convention for the Protection of Human Rights and Dignity of the Human Being prohibits interventions seeking to create a human being genetically identical to another human being.¹⁵⁹ The European Union's Charter of Fundamental Rights also prohibits reproductive cloning of human beings.¹⁶⁰ However, these Conventions focus attention on the individual and the interests of the individual and inevitably create a conflict between the rights of an individual to choose to reproduce through cloning and the rights of an individual to not be cloned.¹⁶¹

VIII. RECOMMENDATIONS

A. Limit Commercial Appeal of Companion Animal Cloning.

For those who seek to maximize profit by taking advantage of forlorn pet owners, regulations and price caps would soon stem the marketing of cloned pets to the public. While the cost of storing DNA and cloning may prove prohibitive, there is no justification for providing a service as essential as GSC would have you believe to only the wealthiest segments of society. Research on animal cloning should not be funded by misguided pet owners who lost their companions and have nowhere else to turn. Should the government decide that cloning research involving dogs and cats is valuable to

¹⁵⁷ Id.

¹⁵⁸ Dr. Tade Matthias Spranger, "What is Wrong with Human Reproductive Cloning? A Legal Perspective," *Eubios Journal of Asian and International Bioethics*, 11 (2001), 101-2.

¹⁵⁹ Id.

¹⁶⁰ Id.

¹⁶¹ Id.

society, government funding should be made available to qualified institutions who wish to pursue this area of study. Qualified institutions would not include companies focused on profiting from the new cloning technology, but rather educational institutions and scientific institutions primarily motivated by the possibility of scientific discovery.

B. The Better Course: Regulation or Restriction.

Let's face it, cloning is going to happen whether we like it or not. And yes, that includes human cloning. The best way to deal with this emerging new technology is to put guidelines and regulations in place now before the first human clone looks out at us through the TV set when we turn on the six o'clock news. At least one US-based company, Clonaid, has vowed to create a human clone and is actively pursuing that goal with affiliates around the world.¹⁶² Clonaid was founded by a religious cult, known as the Raelian Movement. While we may not be able to prevent cloning, the United States and the International community most certainly can regulate it and ensure that procedures are performed in the safest most efficient ways possible. By instituting complete bans on cloning research, the technology is simply pushed out of view into the basement laboratories trying to keep off the radar. Under such circumstances, regulation would be near impossible and our worst fears would come true because clones would be produced unethically, unsafely and perhaps even against the original cell owner's will. In the end we have to ask ourselves, will any law truly stifle scientific advances and the insatiable curiosity of the human mind when it comes to the often pondered possibilities of human cloning.

¹⁶² South Korea Probes Human Clone Claim, BBC News World Edition, Wednesday, July 24, 2002, available at <http://news.bbc.co.uk/2/hi/asia-pacific/2148864.stm>.

C. Education is Key.

Beyond all else, education is the most powerful weapon anyone can have in the ongoing debate over cloning. By providing accurate information to the public on how cloning works, what research is being done and the results of that research, society will be prepared to decide person by person whether or not our world can or should accommodate cloning. It is important for individuals to realize what clones are and what they aren't. For example, science fiction movies have depicted clones as exact duplicates with the same memories as the original. This presumption is far from the truth. People around the world need to be educated by the scientific community about the benefits, limitations and drawbacks of current cloning technology.

IX. CONCLUSION

From Dolly to CC and beyond, cloning has carved a niche for itself in the world of scientific research that cannot easily be ignored or disposed of. While the Missyplicity Project marked the dawn of an increasing interest in companion animal cloning, Operation Copycat was indeed the first successful companion animal cloning project. With the birth of CC the cat, cloning suddenly became real and people began to envision new applications close to the hearts of many Americans. Companies like Genetics Savings and Clone realized the commercial potential early on and continue to capitalize on a technology that has not yet passed the testing stage. Wealthy pet owners (and some not so wealth pet owners) happily pay hundreds of dollars to store their pet's genes in hopes of one day owning a clone of their long lost animal. Clones have proven to be un-identical from original cell donors in more ways than one and for those looking to resurrect, cloning will be a disappointment. It has also been suggested that cloning

working animals and endangered species may have some benefits to society. However, those benefits are also questionable and not widely accepted. On the other hand, cloning will certainly advance animal health research because researchers attempting to utilize cloning technology will be required to study animal reproductive processes and learn a great deal from such studies. Along with these advancements, animal welfare concerns will most certainly come into play. Justifications for the countless animals used in the cloning experiments will be demanded and producing pets for grieving owners may not satisfy those who seek answers. Perhaps it would simply be better for these owners to let go of their pets, be happy for the good lives they lived and when it is time, give another unwanted animal a home rather than increasing the suffering of research animals and adding to the pet overpopulation problem.

As with all new technologies and scientific developments, once tested and perfected on animals, humans will be free to benefit from them as well. Consequently, with all of the energy put into cloning pets it will not be long before the technique is perfected and ready to test on humans. By cloning dogs and cats, the cloning industry has already found a way to move cloning into people's homes and into their hearts. Once clones are accepted as companion animals, little reason can be given as to why human clones should not be similarly accepted.

The United States has attempted legislation to ban human reproductive cloning, but so far has been unsuccessful. The fundamental disagreement between those who believe embryos are life that should be preserved and those who simply want to prevent reproductive cloning alone has stalled legislation and prevented any ban whatsoever from being instituted. Clearly, therapeutic cloning and reproductive cloning are very different

and should be looked at separately, but those opposed to all cloning likely fear that they cannot succeed in banning therapeutic cloning on its own if they were to go along with an initial ban involving only reproductive cloning.

The international community has been equally unsuccessful in establishing international cloning regulations due to the different positions on therapeutic cloning taken by numerous nations. Although it appears that all nations are against reproductive cloning, therapeutic cloning is both an internationally and nationally debated issue which will not likely be resolved in the near future.

With the rapid progress in the cloning industry, the United States as well as other nations involved with cloning research would be well advised to enact regulatory legislation sooner rather than later. While President's Bush and Clinton have formed council's to take a long hard look at human cloning, they have failed to consider the implications of companion animal cloning and the slippery slope which follows. Regulations above and beyond the Animal Welfare Act's weak guidelines for animal care and use would not be a moment too soon. Not only to protect the animals involved in cloning studies, but to protect society from the implications of cloning beloved companions. Despite the government's focus on human cloning, effective federal legislation has failed to pass in this area as well. The debate on human cloning has turned into a pro-choice vs. pro-life debate amongst party representatives, something which it clearly is not. Stubborn anti-therapeutic cloning advocates have prevented even the passage of a reproductive cloning ban.

On the current course, a human clone will likely precede human cloning legislation. In fact, the therapeutic cloning of a human embryo was successfully

accomplished in South Korea for the first time on February 11, 2003.¹⁶³ The technology to create a human reproductive clone is there. The birth of a human clone will open the door to considerations never before dreamed of. What rights does the clone have? Anything less than those given to any other human being would be unjust. Who are the clone's parents? And many more questions will need to be answered. Once a human clone is created, even strong legislation may not be adequate to regulate the future outcome. Clones will become a part of our world for better or for worse.

¹⁶³ Health: Scientists 'cloned human embryos,' Thursday, February 12, 2004, *available at* www.cnn.com/2004/HEALTH/02/12/science.clone/; John Fostyk, "South Korea Clones Human," The Tiger Online Edition, *available at* www.thetigernews.com/vnews/display.v/ART/2004/02/20/40353c21385eb.

Human cloning is a debatable topic because there is no guarantee that the clone will be physically normal. In spite of remarkable progress in this field it is not yet thoroughly tested and perfected. Society will greatly suffer from the existence of clones in different ways. First of all, large scale cloning will result in overpopulation, which in its turn implies utilization and consumption of different natural resources. 9. Cloning animals could eventually lead to cloning humans. There is no supporting scientific evidence to suggest that a cloned human embryo exists, although genetic alteration reports have come from China in 2019. Cloning humans is more complicated than it is for other mammals because of the location of spindle proteins on the chromosomes. Removing the nucleus removes these proteins. Only RUB 193.34/month. To clone or not to clone. STUDY. Flashcards.Â to clone a gene/a human. cloner un gÃ“ne/un humain. a clone/ a cloned animal. un clone/un animal clonÃ©. an advance in cloning. un progrÃ“s dans le clonage. Upgrade to remove adverts. Only RUB 193.34/month. cloning technology. la technologie du clonage. to extract the genetic material (from).Â You might also like 74. Genetic engineering. 34 terms. To Clone or Not To Clone In today's upcoming society technology and science are advancing quite rapidly. The technology and science fields are merging together to create demanded results and solutions. For the most part they have solved many issues in health care that have been beneficial and saved lives from death. Many believe that technological science is the answer to all problems concerning the well being of a human. But is it really doing more harm or good by taking it too far? Human cloning has stirred up heated debate the last couple years due to strong beliefs on both sides of the arg