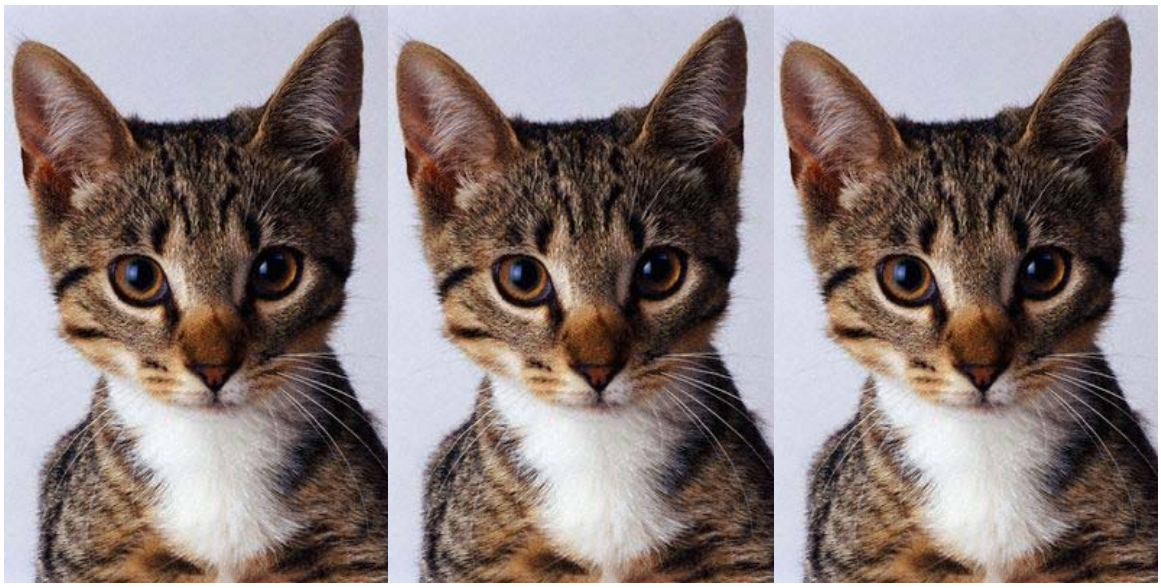


Pet Cloning:

Separating Facts from Fluff

American Anti-Vivisection Society
801 Old York Rd., #204, Jenkintown, PA 19046

Released: February 16, 2005

Table of Contents

Executive Summary

This report, produced by the American Anti-Vivisection Society (AAVS), which has been monitoring the treatment of animals in laboratories since 1883, is the result of over two years of investigation and contains published statements and evidence from mainstream scientific literature explaining the dangers and concerns regarding pet cloning. While media reports often present pet cloning news as quirky and/or heartwarming, animal advocates, bioethicists, scientists, and the public have significant concerns about a variety of issues related to pet cloning.

Historically, pet cloning began as a cat and dog cloning project backed by an Arizona billionaire who wanted to clone his dog. It now has become a budding industry in cloned pets. The first cloned cat was born in late 2001, and although no dog has ever been cloned, companies have sprouted up across the U.S. claiming that people can pay to 'bank' DNA from their dogs or cats and have them cloned in the future. The billionaire's firm has had more success than its competitors and claims the live births of five cloned cats in 2004, one of whom was sold to a woman in Texas for $50,000 and another who was sold in February 2005.

The AAVS report, *Pet Cloning: Separating Fact from Fluff*, highlights four primary areas of concern:

1) The (imperfect) Science of Animal Cloning
2) Animal Welfare
3) Consumer Fraud
4) Ethics

Published reviews of animal cloning studies have documented that on average only 0.5-4.0 percent of cloned animals survive gestation and birth, and of those, many suffer serious health consequences and die at a young age. The pet cloning process uses 'surrogate mothers' in whom embryos are implanted. These female animals undergo repeated invasive surgical procedures for both implantation of embryos and removal of fetuses. Along with the high incidence of miscarriage of cloned animals, the surrogate mothers' health and well-being are one of the first areas deserving attention.

Of the cloned offspring who survive, there have been no long-term studies to indicate that cloned pets will live relatively normal, healthy lives. Meanwhile, millions

of healthy cats and dogs are euthanized in shelters all across the country each year simply because homes cannot be found.

Several scientific studies by animal cloning experts published in such journals as *Science* highlight the inefficiency of animal cloning, which is still considered to be a young field of science. Leading scientists caution that cloned animals suffer significant consequences such as birth defects and premature death as a result of having been cloned. Yet, pet cloning companies are forging ahead, working outside the mainstream of the scientific community. One company is soliciting general veterinary practitioners to promote DNA banking for pet cloning to grieving clients as a way to preserve the qualities of a terminally ill or recently deceased cat or dog.

Many believe that 'clone' refers to carbon-copies of original animals. But the reality is that cloned animals are unlikely to be identical in appearance or behavior; cloned animals only are genetically identical to the original animal.

By advertising that they can 'clone' pets, these companies are misleading the public and continuing to profit from DNA banking services, even though very few cats have been cloned and no dog ever has been successfully cloned anywhere in the world.

Though there has been little public debate over the ethics of pet cloning, surveys show that the majority of people in the U.S. are opposed to cloning animals such as cats and dogs for pets. Bioethicists and scientists from many prestigious institutions have also voiced ethical concerns over the pet cloning industry's exploitation of both animals and consumers. Additionally, many people view pet cloning as an unnecessary venture that is unnatural and offers no overall benefit to society.

There is no doubting the strength of the bond between people and animals. Pet cloning companies offer false hope of never having to let go of a pet, and are causing harm to animals in the process. While it may appear that people seeking to clone a companion animal are among the greatest of animal lovers, an examination of the serious consequences to the animals involved reveals that they really would be doing more harm than good.

This report is intended to document the problems of the emerging pet cloning industry.

The History of Commercial Pet Cloning

Historically, pet cloning began in 1997, when an Arizona billionaire asked his entrepreneurial friend to help him find a team of scientists who could clone his dog Missy. He poured millions of dollars into what became both the "Missyplicity Project" and a Sausalito, California-based, for-profit company called Genetic Savings & Clone, Inc. (GSC, Inc.) and funded cat and dog cloning experiments at Texas A&M University.

Ironically, despite several attempts, no dog has been cloned successfully. According to the firm, at least 245 dogs and cats were part of the original group used in the failed cloning experiments.[1] The first successful effort to clone a cat happened at Texas A&M in December 2001 and resulted in the birth of a kitten named CC. GSC, Inc. and the veterinary scientists at Texas A&M have since parted ways over differing scientific opinions,[2] but GSC, Inc. has kept its own private laboratory in Texas dedicated solely to cloning pets. It also announced plans to open a new laboratory outside Madison, Wisconsin in February 2005.[3]

In 2004, GSC, Inc. began advertising the first-ever public sale of cloned cats. Billed as the "Nine Lives Extravaganza," GSC, Inc. publicized its plan to clone six cats at a cost of $50,000 each[4] and three cats who would be used for exhibits.[5] The company reported that five orders were taken from the public[6] and promised to fulfill them by November 2004.[7] In August 2004, GSC, Inc. announced the June births of two cats, Baba Ganoush and Tabouli,[8] and a third kitten named Peaches was later born.[9] Baba Ganoush, Peaches, and Tabouli have been exhibited at cat shows around the country.[10] In an October 2004 *New York Times* article, the company's CEO stated that the company had "[several cat] pregnancies in progress."[11] In December 2004, the company made its first sale of a cloned animal, a kitten named Little Nicky,[12] and in February 2005, another kitten (named Little Gizmo) was sold.[13] As of February 2005, GSC, Inc. has not reported the status of the orders for the other three cloned cats who originally were promised to be delivered to clients in November 2004.

In addition to actual pet cloning, the corporation also advertises itself as a DNA 'bank.' This allows people to save or 'bank' a pet's DNA so they can clone them later. The cost for this varies from $295 to $1,395 plus $100-$150 annually for storage fees.[14]

The company also announced plans to offer dog cloning in 2005, despite the fact

that no canine has ever been cloned successfully.[15] The company's CEO forecasts, "It's a multibillion-dollar business waiting to happen."[16]

GSC, Inc. is the only firm presently selling cloned companion animals. Other companies that have purported to engage in pet cloning in the U.S. are Lazaron Biotechnologies (now defunct), ForeverPet, and PerPETuate, Inc., although their activities are not as well documented. PerPETuate's emphasis is currently on 'banking' of animal tissues, and ForeverPet claims that it can clone a cat,[17] though there is no evidence that this has been accomplished by this company. ForeverPet lists the cost to clone a cat at $19,995 and DNA banking for $2,995.[18] ForeverPet is operated by Geneticas, a company that claims it soon will sell genetically modified 'hypoallergenic' cats (though none are known to exist).[19]

Understanding the Science of Cloning

This section of the report will educate readers about the animal cloning process from a scientific perspective. The majority of the experimentation on the cloning of animals is concerned with: 1) agriculture; 2) biomedical research; and 3) propagation of endangered species. All of these areas have potential commercial applications, despite the inefficiency of cloning.[20]

Cats, cattle, goats, horses, mice, mules, pigs, rabbits, rats, sheep, Siberian ibex, and white-tailed deer are examples of animals who have been cloned. Researchers are still trying to clone monkeys, chickens, and other animals.

The Process[21] [22]

Using cats as an example in the diagram in Appendix A, attempting to clone an animal begins with performing a biopsy on a live or very recently deceased animal to collect DNA. Next, the tissues are cultured (grown), and the cells are preserved until the next phase of the cloning process. To produce a cloned embryo, the cells are treated to prevent them from being assigned to a particular function (e.g. hair, neuron, skin). The nuclei (genetic material) are removed from oocytes (eggs) obtained from random cats. The eggs and cells then are fused together by electricity, resulting in cloned embryos.

Next, multiple cloned embryos are surgically implanted into female surrogate cats during an artificially-induced reproductive cycle. The cats may or may not develop pregnancies and are monitored by ultrasound. Fetuses are surgically removed via Caesarian section if they die *in utero* or when they are considered to be viable.

The Failures

The public rarely hears about animal cloning failures. However, in reviewing discussions and papers published about human cloning, it is conclusive that animals suffer a variety of consequences in cloning experiments.

Two well-known scientists in the animal cloning field are Ian Wilmut of the Roslin Institute in Scotland and Gerald Schatten of the Magee Women's Hospital/University of Pittsburgh School of Medicine. Wilmut was credited with cloning Dolly the sheep. Schatten was credited with the first ever 'successful' genetic modification of a monkey named ANDi, and he is now actively trying to clone monkeys. Both men, along with other scientists, continue to remind the public and the scientific community of the common failures of animal cloning, particularly within the context of human cloning.

A published letter co-authored by Schatten and Wilmut in the journal *Science* stated, "…[A]nimal cloning so far results in high rates of abortions and neonatal losses. Attempts to produce children…would be grossly irresponsible because the outcome would almost certainly include late abortions, stillbirths, and children with abnormalities that would prevent them from leading a normal life. Many cloned animals display birth defects, including respiratory failure, immune deficiency, and inadequate renal function—all leading to premature deaths.…"[23]

Another paper published in *Science* stated, "In all mammalian species where cloning has been successful, at best a few percent of nuclear transfer embryos develop to term, and of those, many die shortly after birth.… Even apparently healthy survivors may suffer from immune dysfunction or kidney or brain malformation, perhaps contributing to their death at later stages. Most frequently cloned animals that have survived to term are overgrown, a condition referred to as 'large offspring syndrome.'[24]

A 2002 report from the National Academy of Sciences stated, "…[I]t is quite clear that across multiple species there are far more failures in the development of cloned fetuses than there are live normal births…. The most notable defects are increased birth size, placental defects, and lung, kidney, and cardiovascular problems. Other problems have included liver, joint, and brain defects, immune dysfunction, and postnatal weight gain. Thus, a wide variety of tissues and organs can fail to develop properly in cloned animals…. Animal cloning can also result in danger to the mother of any cloned offspring."[25]

Animal Welfare Concerns

There are four significant animal welfare concerns connected to pet cloning: 1) health consequences and survival of the cloned animals; 2) absence of regulatory oversight; 3) current overpopulation of dogs and cats; and 4) dogs and cats as 'production units.' The next section of this report highlights these concerns.

Health Consequences and Survival

As discussed above, scientists routinely refer to cloning as a new and "inefficient" technology citing a low survival rate of between 0.5 - 4.0 percent for cloned embryos from animals of various species.[26] [27] Cloned animals who actually survive birth can suffer unpredictable, serious health consequences (e.g. early onset of cancer, developmental problems, sudden death).[28] [29] [30] Animal cloning technologies are still very new, and the long-term effects on cloned animals, particularly longer-lived animals such as cats, have yet to be adequately measured. Therefore, each time pet cloning companies attempt to clone an animal, it must be recognized as experimental. As of February 2005, only six cloned domestic cats are known to be alive, and no dog has ever survived cloning.

One pet cloning firm claims that a new chromatin transfer (CT) technique is an improvement to nuclear transfer (NT) and claims that it has exclusively licensed the technique for cat and dog cloning. Citing a paper on its website that discusses CT experiments and cattle cloning, the company states that CT will increase the survival of cloned pets.[31]

A review of the success of CT in the cattle cloning article reveals that two groups of cattle were used: one group of 506 cows had multiple NT cloned embryos implanted into them, and a second group of 273 cows were implanted with multiple CT cloned embryos.[32] Pregnancy rates and numbers of live calves at birth were the same for both groups. Forty-six calves (i.e., 9 percent survival of cloned embryos) were born alive through NT alone, and 27 (i.e., 10 percent survival of cloned embryos) calves were born through CT, indicating that there is no statistically significant improvement in fetal survival between the two groups. However, the authors report that at one month postpartum, 26 calves (i.e., 5.1 percent survival of cloned embryos) from the NT group and 23 calves (i.e., 8.4 percent survival of cloned embryos) from the CT group were still alive. Though it may appear that CT will facilitate, in the authors' words, "a trend toward survival enhancement,"[33] 8.4 percent is an extremely low survival rate. Thirty-two calves died at birth (15 of whom were from the CT group), and 24 calves died under the age of four weeks (four of whom were from the CT group). The fate of the calves living beyond four weeks is unknown.

Another relevant paper published in the November 2004 issue of the journal *Cloning and Stem Cells* described the results of an African wildcat cloning experiment involving 50 female cats in a Louisiana laboratory.[34] The cats were divided into two groups. One group had 25 or fewer cloned embryos implanted in each of them, and none of them established pregnancy. The cats in the other group each had 30 or more cloned embryos implanted into them, and twelve of the cats developed pregnancies. Of these, 75 percent of the fetuses developed to term, while the others were aborted or resorbed. Of those kittens born, seven were stillborn, eight died before six weeks of age, and only two survived.

Dog and Cat Overpopulation

While pet cloning firms currently are charging customers up to $50,000 for a cloned cat and as much as $2,995 to 'bank' a dog's or cat's DNA for future cloning[35], millions of homeless animals of the same species are available in U.S. animal shelters for around $100, which is used to cover costs. However, most animals in shelters are euthanized for lack of adopting homes.

One company has claimed at times that the animals used in its experiments are adopted into private homes after use. In one instance, that total was 245 dogs and cats.[36] Even if true, this is not a realistic plan if the pet cloning industry develops, because as the industry grows so does the number of former experimental animals in need of adoption.

In addition to the many animals used during the pet cloning process, cloned animals also may be born who are unhealthy or do not have the desired traits and therefore, are not 'sellable,' potentially adding to an already staggering problem and further burdening of shelters and municipal animal control agencies.

Absence of Regulatory Oversight

Research laboratories in which dogs and cats are used are legally required to abide by specific standards of animal care and use. All of these laboratories have a committee that reviews the merits of protocols for animal experimentation. These labs also are inspected annually by the U.S. Department of Agriculture (USDA), which enforces the Animal Welfare Act, and must be federally licensed (some state laws require a state license as well). Each year, these laboratories must report the numbers of cats and dogs on their premises and include the category of pain and distress they are subjected to based on the experiments in which they were used. This allows some accountability, and official documents can be requested from the USDA regarding animals used or held at any registered research facility.

Pet cloning companies are neither licensed by any state or federal agency, nor accredited by any organization requiring specific standards of animal care and use. Therefore, there is no authenticated public record of how many animals are used in pet cloning laboratories; where they come from; what, precisely, they experience; nor their fate.

Dogs and Cats as 'Production Units'

The pet cloning industry treats companion animals as producers and products. One company even sells gift certificates and offers a "money-back guarantee" should an animal become 'defective' or not bear the desired resemblance.[37] Cloning one cat or dog involves many animals used as 'production units' in the laboratory, from the female dogs

used to surgically 'harvest' eggs (oocytes) to the colonies of canine and feline 'surrogate mothers' who are surgically implanted with cloned embryos and undergo Caesarian sections to remove the fetuses.

In its December company newsletter, one firm stated that it plans to 'rent' dogs from its so-called "National Breeders Network" to use as surrogate mothers in its laboratory.[38] Dog breeders can ship dogs to the firm's lab and profit from a kind of 'womb for rent' scheme. A staff member of this corporation said, "Every breeder also ends up with some dogs who lack [desired] traits…so now breeders have a way to earn income from those dogs too and not just from their champions…. We have about 150 dogs in our Network." [39]

Consumer Fraud

According to a 2003/2004 survey by the American Pet Products Manufacturing Association, 62 percent of American households include pets.[40] Most people have strong bonds with their cats and/or dogs and, therefore, have difficulty coping with their companion animals' terminal illnesses or deaths. In fact, grief counseling for individuals who have experienced such a loss is becoming more common.[41]

Pet cloning companies exploit such tender emotions and lead the public to believe that deceased pets can be 'resurrected' through new cloning technology. According to one firm's website, "Veterinarians have also told us that gene banking can provide relief to clients facing the death of an exceptional pet. Because gene banking gives a pet owner the option to clone the animal later, it allows the client to focus on grieving the loss of the individual pet, without letting go of the exceptional genetics."[42]

This means that pet cloning companies can profit from people who, in moments of grief, are probably confused—people who will at least pay hundreds of dollars to bank their animals' DNA, even if they later decide against investing tens of thousands of dollars to clone the animal. The bottom line: pet cloning companies are profiting each year from individuals who have been promised that dog cloning will soon be possible, yet not one dog has ever survived cloning. Further, they likely are not aware of the experimental nature of cat cloning and the animal suffering it inevitably involves.

Appearance and Behavior

Most people assume that a cloned animal is virtually a 'carbon-copy.' However, animal cloning experiments have revealed otherwise. While a cloned animal is genetically identical to the original animal, there is no guarantee that the he or she will physically resemble the original animal.[43] Despite one company's announcement of improved cloning technology resulting in two Bengal kittens who appear to look alike, it has yet to be proven that cloned animals who are mixed breeds or otherwise have non-uniform hair coat patterns will look like the original animal.

In addition, there is no assurance that an animal will share any other traits (such as behavior/personality) with the original animal,[44] unless a behavior is breed-specific. Cloning scientists at Texas A&M University compared the behavior of cloned and naturally bred pigs and found that, "…the goal of using nuclear transfer to replicate animals to reproduce certain behavioral characteristics is an unrealistic expectation."[45]

In another published paper, the authors from Texas A&M state, "This finding is contrary to the expectation that cloning can be used to reduce the size of groups involved in animal experimentation and to reproduce an animal, including a pet, with a homogenous set of desired traits."[46] It has not been indicated that the chromatin transfer technique improves physical or behaviorally similarities between cloned animals and their genetic counterparts.[47] Even though at least one company claims to have a "money back guarantee" on animals, the result may be only disappointment and unwanted animals.

Health

According to published scientific studies, the odds are strongly against a cloned animal being born healthy.[48] [49] [50] Of those who survive, many suffer from unpredictable health problems which may not appear early in life.[51] For instance, Dolly the sheep suffered an early onset of arthritis and at the young age of six years old, had to be euthanized after developing lung cancer.[52]

GSC, Inc.'s CEO states that 15 to 45 percent of cloned cats who are born alive will die within 30 days.[53] While this has not been verified, it should be noted that the

company has been careful to present their cloned kittens not at the time of 'birth,' but months later, implying caution born of experience.

Because the first cloned cat was born in 2001, no one knows the potential health problems that could arise, and companion animal veterinarians are likely unprepared and untrained in the specialized care required by genetically manipulated animals.

Currently, pet cloning is an unregulated industry, and no one outside of the labs knows the success rates and other details of the cat and dog experiments. The Roslin Institute, where Dolly was cloned, has posted a statement against pet cloning on its website. It states, "...the supposed benefit of cloning a pet is an illusion and the harm to the other animals involved would be real…."[54]

Ethics

Ethical justification generally cannot be claimed for doing something simply because 'it might be possible.' Ethics poses the question, just because it *can* be done, *should* it be done?

To date, only one corporation is actively selling cloned cats and other companies that promote pet cloning (but have yet to offer it) exist only because they apparently have sufficient financial backing from individuals who want to create a pet cloning market.

Thus far, the pet cloning industry does not conduct research with the goal of improving human or veterinary medicine; it is strictly an entrepreneurial venture that involves experimenting with cats and dogs in unregulated labs to sell tissue storage and perhaps, cloned pets for up to $50,000 each.

Bioethics and Philosophy

The leading U.S. bioethics expert, Arthur Caplan, Ph.D., Director of University of Pennsylvania's Center for Bioethics, has stated, "I think pet cloning is closer to a scam than it is a service.... I think from what's been learned so far in animal cloning, it's highly likely to produce stillborn, dying, and sick animals."[55]

Other bioethicists and philosophers have also addressed this issue. Hilary Bok, Ph.D. of The Johns Hopkins University Department of Philosophy wrote an article for a 2002 issue of the *Journal of Applied Animal Welfare Science* entitled "Cloning Companion Animals is Wrong." Bok stated, "Cloning causes animals to suffer…. [Cloned animals] are much more likely than other animals to be miscarried, have birth defects, develop serious illnesses, and die prematurely…. One must ask whether enabling humans to clone their pets is important enough to justify the considerable suffering involved in learning how to do so….. If [these and other arguments] are sound, then people who want to clone their pets must be either mistaken about what cloning is or immoral."[56]

David Magnus, Associate Professor of Pediatrics, Medicine, and Philosophy at Stanford University and Director of the Stanford Center for Biomedical Ethics, stated "The idea that somebody would spend $50,000 for a cat when they can go to any shelter and rescue one is absurd. Add to that the fact that spending the $50,000 puts this new cat at medical risk of dying, and it's not only absurd, it's unethical. That a company would be trying to create a market for this is wrong."[57] "We can produce a genetically identical copy of our pet, but we delude ourselves if we think we have somehow accomplished something by this substitution," wrote Lawrence Hinman, Ph.D., Director of the Values Institute and Professor of Philosophy at the University of San Diego, in a commentary in the *Los Angeles Times*.[58]

Cloning and Religion

Many people are opposed to pet cloning because it is unnatural and does not serve to benefit humankind. In some cases, religious leaders may support certain animal experiments, but pet cloning is seen as a frivolous venture with no societal benefit that results in grave consequences for the animals involved.

The Church of Scotland's Science, Religion, and Technology Project states, "…cloning a pet ranks as an essentially cosmetic application which is not morally justified. Just because someone is rich enough to pay does not make it morally justified, and indeed suggests a trivialisation of embryo science in diverting skills and knowledge away from meeting serious ethical needs on to something that for many would represent

an excessive commodification of the animal."[59]

Public Perception: Surveys

The issue of cloning animals usually arises in the context of the dangers of human cloning. Indeed, there has been little, if any, public debate regarding this new industry and the genetic manipulation of animals. However, when engaged on the issue, the public is largely opposed to pet cloning on ethical grounds.

According to an independent national survey commissioned by the American Anti-Vivisection Society, 80 percent of people in the U.S. are opposed to cloning companion animals such as cats and dogs, and 84 percent feel that companies should not be allowed to sell genetically engineered animals as pets.[60] These results echo those of other national surveys.[61] [62]

At the 2004 annual convention of the American Veterinary Medical Association, Autumn Fiester, Ph.D., a University of Pennsylvania bioethicist, noted, "This odd neglect [of public discussion and consideration] of the ethics of animal cloning may have serious repercussions for animals and human beings alike."[63]

Key Points

- **Cloned animals suffer serious health problems and often die.** Several published scientific studies indicate that, of the animals who survive gestation and birth, many die within the first few days of life, suffer from physical deformities and other medical conditions, and/or die prematurely.
- **Pet cloning also involves the invasive use of other animals as 'surrogate mothers.'** Cats and dogs are repeatedly used in cloning experiments that involve injecting them with hormones, surgically implanting cloned embryos, and removing the cloned offspring via Caesarian section. Miscarriage is also common.
- **Cloning cats and dogs will exacerbate the already severe and costly animal overpopulation problem in the United States.** Millions of animals are euthanized each year, because there are not enough adopting homes for them. Individuals who seek an animal resembling their own companion animal can visit a local shelter or search a website such as PetFinder.org for animals who fit their desired profile.
- **The pet cloning industry is currently operating without federal regulatory oversight, in violation of the law.** Pet cloning companies are essentially conducting animal experiments, but have had no accountability to regulatory agencies charged with enforcing animal welfare laws. Therefore, there are no inspections and no authenticated public record of how many animals are used in experiments or their fate.
- **Consumers are being misled** Cloning companies are exploiting the emotions associated with pet loss. The cloned animal might not resemble the original, and the cloned animal will likely have unpredictable health conditions as a result of cloning. Although breed traits may express themselves in some cloned animals, it is almost certain that they will have different personalities from the original animals.
- **Veterinarians may not be prepared to treat ailing animals who were born through cloning.** General veterinary practitioners have no training with regard to caring for genetically-altered animals.
- **The ethical implications of cloning are controversial.** There has been little public debate regarding the genetic manipulation of animals. Many people are opposed to pet cloning because it is unnatural and does not benefit society in any way.
- **The American public is largely opposed to the cloning or genetic engineering of companion animals.** Several national polls conducted independently indicated that U.S. citizens overwhelmingly oppose pet cloning. A survey commissioned by AAVS also shows that the public largely opposes companies selling genetically modified pets.

Conclusion

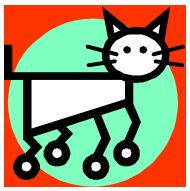
The pet cloning industry has seized an emerging yet problematic form of biotechnology. It has forged ahead for profit, outpacing the vital discourse among the scientific community, policymakers, legislators, and the public. Public interest organizations, like the American Anti-Vivisection Society, which are concerned with animals and the people who care about them, need to educate consumers and policymakers on the hazards of pet cloning. It is likely that legal action will be necessary to prevent further development of this industry, which seems to have the financial resources to continue to experiment on animals regardless of the exceedingly high failure rate of their methods and challenges of the mainstream scientific and professional ethical community.

For more information, contact the author of this report:

Crystal Miller-Spiegel
Senior Policy Analyst
American Anti-Vivisection Society
801 Old York Rd., #204
Jenkintown, PA, 19046
Phone: (215)887-0816
E-mail: cspiegel@aavs.org

Appendix A

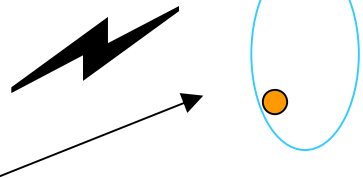
Basic Cat Cloning Process[64 65]

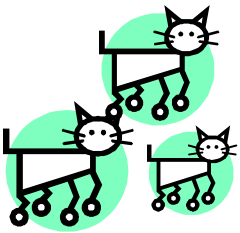


(1) DNA of animal to be cloned is collected.

(2) Tissue is grown (cultured) & cells are preserved.

(3) Cells are treated to prevent them from differentiation—being assigned to a certain function (skin, hair, neuron).

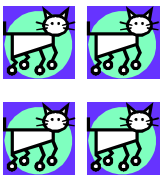




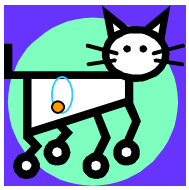
(4) Eggs (oocytes) are obtained from random cats for implantation.

(5) The genetic material from eggs to be implanted is removed. (enucleation)

(6) Cells and eggs are fused together with electricity to become cloned embryos.



(7) Female cats in the laboratory colony are injected with hormones to synchronize their fertile periods (heat or estrus). They then undergo surgery to implant cloned embryos.

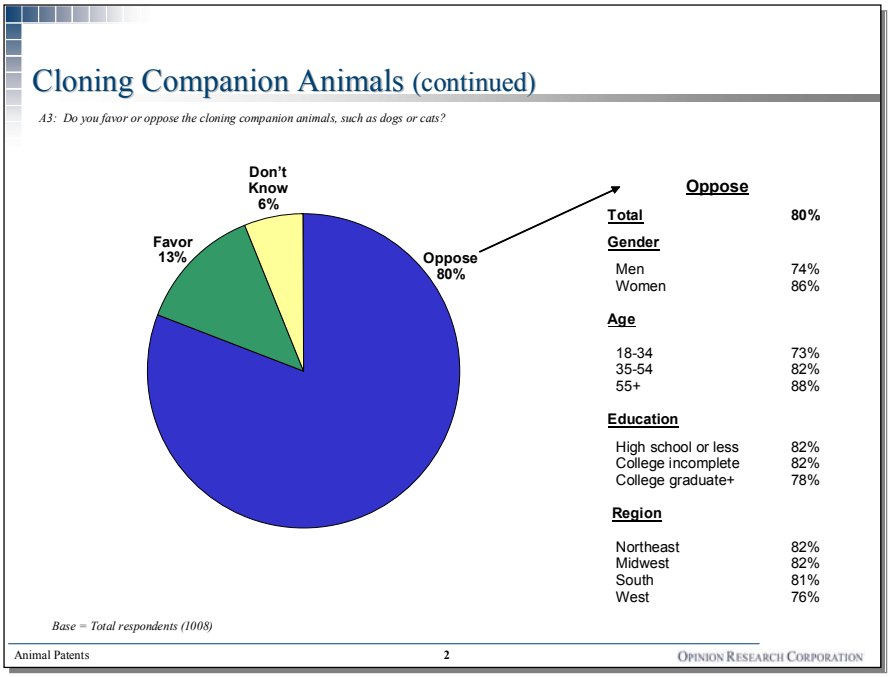


(8) Embryos are surgically implanted in the 'surrogates' and likely will not survive to term. If kittens survive gestation, they will be removed via Caesarian section.

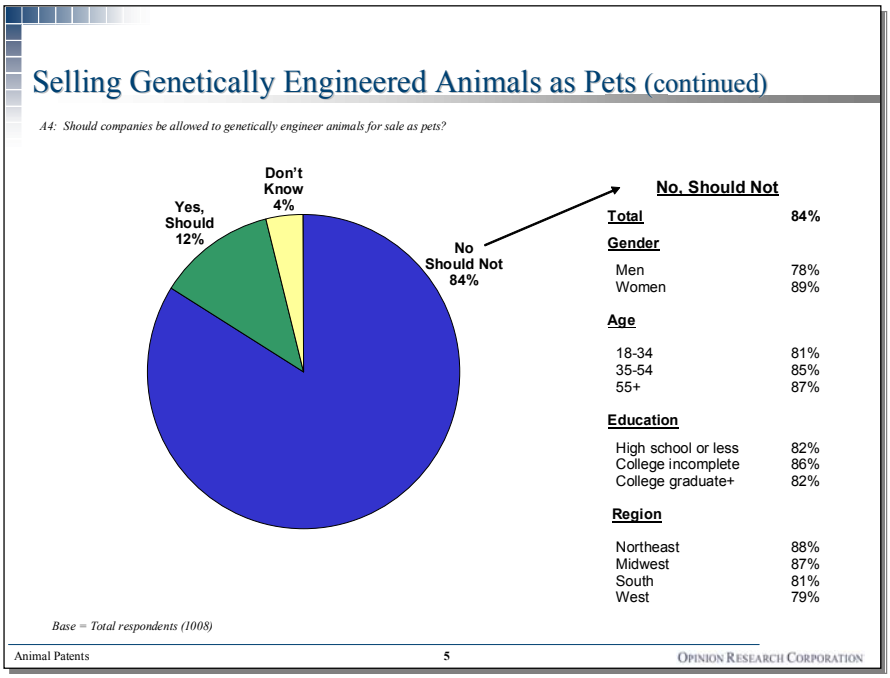
Appendix B

In February 2004, AAVS commissioned Opinion Research Corporation to conduct a national survey to assess public opinion about patents on animals and genetically altered and cloned pets. Questions and responses related to cloned and genetically altered pets are shown here. Respondents were not given an introduction about pet cloning. Visuals provided by Opinion Research Corporation. (95% confidence level +/-3%)

Q: Do you favor or oppose the cloning of companion animals, such as dogs and cats?



Q: Should companies be allowed to genetically engineer animals for sale as pets?



Appendix C

801 Old York Road, Suite 204
Jenkintown, PA 19046-1685
Tel: 215.887.0816
Fax: 215.887.2088
www.aavs.org

American Anti-Vivisection Society

N E W S R E L E A S E

For Immediate Release:
Thursday, November 18, 2004

Contact: Crystal Miller-Spiegel, Senior Policy Analyst
cspiegel@aavs.org
(215) 887-0816 (ext 351)

Animal Advocates Oppose Pet Cloning

American Anti-Vivisection Society Launches Public Education Campaign

(USNEWSWIRE) Jenkintown, PA— The American Anti-Vivisection Society (AAVS) is proud to announce the launch of a public education campaign and new website**, www.NoPetCloning.org**, dedicated to informing the public about the budding market in cloned companion animals such as cats and dogs and its harm to these animals.

“It might seem hard to believe, but private companies are trying to capitalize on the public’s ever-growing bond with animals by offering to clone companion animals,” said Crystal Miller-Spiegel, AAVS Senior Policy Analyst. “However, several factors cause us grave concern, primarily the suffering endured by the animals in the cloning laboratories and how this industry will impact our nation’s critical cat and dog overpopulation problem.”

Citing references to scientific literature and other resources, the website includes information about animal welfare, consumer fraud, ethics, and science, media resources, expert opinions, and much more. Visitors can also view a page of companion animals and remarkable ‘clones’ or look-alikes who await adoption. “Results from animal studies published in science journals indicate that cloned animals suffer in many ways. Our goal is to demonstrate that there is no need to risk harming cats and dogs in pet cloning experiments when there are plenty of cats and dogs who need loving families,” said Miller-Spiegel.

Earlier this year, AAVS commissioned a survey to assess the public’s perspective on pet cloning. The results showed that 80 percent of people in the U.S. are opposed to cloning companion animals such as cats and dogs, and 84 percent feel that companies should not be allowed to sell genetically engineered animals as pets. The companies currently offering pet cloning and genetic banking services are focused solely on selling pets, not improving human or veterinary medicine.

AAVS is a non-profit animal advocacy and educational organization dedicated to ending experiments on animals in research, testing, and education. Founded in Philadelphia in 1883, AAVS is the oldest organization in the United States dedicated to eliminating experiments on animals. AAVS pursues its objectives through legal and effective advocacy, education, and the support of the development of non-animal alternative methods.

###

References

[1] Genetic Savings & Clone, Inc. 2004. About Us: Our Team. http://www.savingsandclone.com/about_us/team.html. [Accessed 1/27/05].
[2] LeBas, J. 1/29/03. Cloning Firm Says A&M Made 'Mistake' With Cat. *The Bryan-College Station Eagle*.
[3] Moe, D. 12/29/04. Hold the clone: It's Waunakee. *The Capital Times*. http://www.madison.com/tct/opinion/column/moe//index.php?ntid=22734&ntpid=2.
[4] Genetic Savings & Clone, Inc. 2004. Our Services: Nine Lives Extravaganza. http://www.savingsandclone.com/services/9lives.html. [Accessed 1/27/05].
[5] Genetic Savings & Clone, Inc. 2004. Our Services: Overview. http://www.savingsandclone.com/services/index.html. [Accessed 1/27/05].
[6] Genetic Savings & Clone, Inc. 2004. About Us: CEOverview. http://www.savingsandclone.com/about_us/index.html. [Accessed 1/27/05].
[7] Genetic Savings & Clone, Inc. 2004. Our Services: Overview. http://www.savingsandclone.com/services/index.html.[Accessed 1/27/05].
[8] Genetic Savings & Clone, Inc. 8/5/04. GSC Introduces First Cloned Cats Born by New Technique Chromatin Transfer Produces Two Healthy Kittens. [press release]
[9] Farrell, M.B. 11/24/04. Cloning Kitty. *Christian Science Monitor*.
[10] *Ibid.*
[11] Barron, J. 10/8/04. New Breed of Cat: Clones to Make Debut at Annual Show. *New York Times*.
[12] Elias, P. 12/23/04. First Cloned Cat Sold in U.S.: Generates Ethics Debate. *Associated Press*.
[13] Genetic Savings & Clone, Inc. 2/12/05. GSC Cuts Price, Announces New Chief Scientist. *PRNewswire*.
[14] Genetic Savings & Clone, Inc. 2004. Our Services: Pet Bank. http://www.savingsandclone.com/services/petbank.html. [Accessed 1/27/05].
[15] Elias, P. 12/23/04. First Cloned Cat Sold in U.S.: Generates Ethics Debate. Associated Press.
[16] CBS. 9/8/04. This Company Will Clone Your Cat [transcript]. *CBS Evening News*. http://www.cbsnews.com/stories/2004/09/08/eveningnews/main641999.shtml.
[17] ForeverPet. 2004. Cat Cloning is Now Available. http://www.foreverpet.com/inquirysf.html. [Accessed 1/31/05].
[18] ForeverPet. 2004. Cat Cloning is Now Available. http://www.foreverpet.com/inquirysf.html. [Accessed 1/31/05].
[19] Oransky, I. 1/31/05. Doubts About Allergy-Free Cats. *The Scientist.* 19(2):13.
[20] Long, C.R., Walker, S.C., Tang, R.T., Westhusin, M.E. 2003. New commercial opportunities for advanced reproductive technologies in horses, wildlife, and companion animals. *Theriogenology*. 59(1):139-49.
[21] Shin, T., Kraemer, D., Pryor, J., Liu. L., Rugila, J., Howe, L., Buck, S., Murphy, K., Lyons, L., Westhusin, M. 2002. A cat cloned by nuclear transplantation. *Nature*, 415:859.
[22] Genetic Savings & Clone, Inc. 2004. Our Services: Cat Cloning Process. http://www.savingsandclone.com/services/cloning_process.html. [Accessed 9/8/04].
[23] Schatten, G., Prather, R., and Wilmut, I. 2003. Cloning Claim Is Science Fiction, Not Science. *Science.* 299:344.
[24] Rideout, W.M., Eggan, K., and Jaenisch, R. 2001. Nuclear Cloning and Epigenetic Reprogramming of the Genome. *Science.* 293: 1093-1098.
[25] U.S. Committee on Science, Engineering, and Public Policy, Policy and Global Affairs Division, Board on Life Sciences, Division on Earth and Life Studies, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council. 2002. *Scientific and Medical Aspects of Human Reproductive Cloning.* National Academy Press. http://books.nap.edu/books/0309076374/html/41.html#pagetop.
[26] Paterson, L., DeSousa, P., Ritchie, W., King, T., and Wilmut, I. 2003. Application of reproductive biotechnology in animals: implications and potentials. Applications of reproductive cloning. *Animal Reproduction Science.* 79(3-4):137-143.
[27] Tamada, H. and Kikyo, N. 2004. Nuclear reprogramming in mammalian somatic cell nuclear cloning. *Cytogenetic and Genome Research.* 105:285-291.
[28] Rideout, W.M., Eggan, K., and Jaenisch, R. 2001. Nuclear Cloning and Epigenetic Reprogramming of the Genome. *Science.* 293: 1093-1098.

[29] Schatten, G., Prather, R., and Wilmut, I. 2003. Cloning Claim Is Science Fiction, Not Science. *Science*. 299:344.
[30] Wilmut I, Beaujean N, de Sousa PA, Dinnyes A, King TJ, Paterson LA, Wells DN, Young LE. 2002. Somatic Cell Nuclear Transfer. *Nature*. 419(6907):583-6.
[31] Genetic Savings & Clone, Inc. 2004. GSC Acquires License for Promising New Cloning Method. [press release] http://www.savingsandclone.com/news/press_releases_09.html. [accessed 1/27/04].
[32] Sullivan, E.J., Kasinathan, S., Kasinathan, P., Robl, J., and Collas, P. 2004. Cloned calves from chromatin remodeled *in vitro*. *Biology of Reproduction*. 70:146-153.
[33] *Ibid.*
[34] Gómez, M.C., Pope, C.E., Giraldo, A., Lyons, L.A., Harris, R.F., King, A.L., Cole, A., Godke, R.A., and Dresser, B.L. 2004. Birth of African Wildcat Cloned Kittens Born from Domestic Cats. *Cloning and Stem Cells*. 6:247-268.
[35] ForeverPet. 2004. Cat Cloning is Now Available. http://www.foreverpet.com/inquirysf.html. [Accessed 1/31/05].
[36] Genetic Savings & Clone, Inc. 2004. About Us: Our Team. http://www.savingsandclone.com/about_us/team.html. [Accessed 1/27/05].
[37] CBS. 9/8/04. This Company Will Clone Your Cat [transcript]. *CBS Evening News*. http://www.cbsnews.com/stories/2004/09/08/eveningnews/main641999.shtml.
[38] Genetic Savings & Clone, Inc. 2004. GSC Faces: Canine Surrogate Manager Jessica Harrison. The *Dish Newsletter*. http://www.savingsandclone.com/news/newsletter/12-04.html. [Accessed 1/27/05].
[39] *Ibid.*
[40] American Pet Products Manufacturing Association. 2004. Fact Sheet: Industry Statistics & Trends. http://www.appma.org/press_industrytrends.asp. [Accessed 1/31/05].
[41] McCutcheon, K., and Fleming, A.J. 2002. Grief Resulting from Euthanasia and Natural Death of Companion Animals. *The Journal of Death and Dying*. 44(2):169-188.
[42] Genetic Savings & Clone, Inc. 2004. Veterinarian Information: Overview. http://savingsandclone.com/vet/index.html. [Accessed 1/27/05].
[43] Archer, G.S., Dindot, S., Friend, T.H., Walker, S., Zaunbrecher, G., Lawhorn, B., and Piedrahita, J.A. 2003. Hierarchical Phenotypic and Epigenetic Variation in Cloned Swine. *Biology of Reproduction*. 69: 430–436.
[44] Archer, G.S., Friend, T.H., Piedrahita, J., Nevill, C.H., and Walker, S. (2003). Behavioral variation among cloned pigs [Erratum]. *Applied Animal Behaviour Science*. 82(2):151-161.
[45] *Ibid.*
[46] Archer, G.S., Dindot, S., Friend, T.H., Walker, S., Zaunbrecher, G., Lawhorn, B., and Piedrahita, J.A. 2003. Hierarchical Phenotypic and Epigenetic Variation in Cloned Swine. *Biology of Reproduction*. 69: 430–436.
[47] Sullivan, E.J., Kasinathan, S., Kasinathan, P., Robl, J., and Collas, P. 2004. Cloned calves from chromatin remodeled *in vitro*. *Biology of Reproduction*. 70:146-153.
[48] Paterson, L., DeSousa, P., Ritchie, W., King, T., and Wilmut, I. 2003. Application of reproductive biotechnology in animals: implications and potentials. Applications of reproductive cloning. *Animal Reproduction Science*. 79(3-4):137-143.
[49] Tamada, H. and Kikyo, N. 2004. Nuclear reprogramming in mammalian somatic cell nuclear cloning. *Cytogenetic and Genome Research*. 105:285-291.
[50] Sullivan, E.J., Kasinathan, S., Kasinathan, P., Robl, J., and Collas, P. 2004. Cloned calves from chromatin remodeled *in vitro*. *Biology of Reproduction*. 70:146-153.
[51] Rideout, W.M., Eggan, K., and Jaenisch, R. 2001. Nuclear Cloning and Epigenetic Reprogramming of the Genome. *Science*. 293: 1093-1098.
[52] Knight, W. 2/14/03. Dolly the Sheep Dies Young. *New Scientist.com News Service*. http://www.newscientist.com/article.ns?id=dn3393
[53] Elias, P. 12/23/04. First Cloned Cat Sold in U.S.: Generates Ethics Debate. *Associated Press*.
[54] Roslin Institute. 8/12/02. Cloning of Pets. http://www.roslin.ac.uk/news/articles/155.html. [Accessed 1/27/05].
[55] Brenner, K. 2/23/03. Critics Say Pet Owners Exploited. *Marin Independent Journal*.
[56] Bok, H. 2002. Cloning Companion Animals is Wrong. *Journal of Applied Animal Welfare Science*. 5(3): 233-238.
[57] Fimrite, P. 12/23/04. Cat has 10 Lives, Thanks to $50,000 Cloning. *San Francisco Chronicle*.

[58] Hinman, L.M.. 8/28/04. Rover is Not Replaceable—Forget Cloning. *Los Angeles Times*.
[59] Church of Scotland. 2002. Animal Welfare and Pet Cloning Ethics. *Society, Religion, and Technology Project*. http://www.srtp.org.uk/clonin84.htm.
[60] Opinion Research Corporation. 2004. Summary of Survey Findings Prepared for American Anti-Vivisection Society. http://www.nopetcloning.org/docs/AAVSSURVEYPETCLONING.pdf.
[61] Gallup Organization. 2002. Cloning Survey. http://www.genetics-and-society.org/analysis/opinion/detailed.html#2002gallup.
[62] Fox News. 2002. Poll: Send in the Clones? http://www.foxnews.com/story/0,2933,45676,00.html.
[63] Fiester, A. 2004. Ethical Issues in Pet Cloning. *AVMA 2004 Convention Notes (7/24/04)*. 2004 American Veterinary Medical Association Annual Convention.
[64] Shin, T., Kraemer, D., Pryor, J., Liu. L., Rugila, J., Howe, L., Buck, S., Murphy, K., Lyons, L., Westhusin, M. 2002. A cat cloned by nuclear transplantation. Nature, 415:859.
[65] Genetic Savings & Clone, Inc. 2004. Our Services: Cat Cloning Process. http://www.savingsandclone.com/services/cloning_process.html. [Accessed 9/8/04].