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## Give The Dog A Clone

### Now we can Duplicate our Pets—But Should We?

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For many people, dogs are more than just pets—they are irreplaceable family members. While that sentiment may never change, one Northern California company is out to amend the "irreplaceable" part.

BioArts International, in Mill Valley, Calif., has attained this goal with Mira, a Siberian husky border collie mix born on Dec. 5, 2007. Born near Seoul, South Korea, Mira was named after a Korean dragon. Eastern mythology, unlike that of the West, portrays dragons as magical creatures possessing unsurpassed power and vitality.

Mira's powerful new existence is making new mythology—and money—for BioArts. By all accounts, she is a healthy puppy. But she's no ordinary dog: She is a clone of Missy, a Siberian husky border collie mix. Mira is not the first clone of an animal, but she is the first clone of a pet dog.

Dogs had been regarded as the most difficult mammal to clone. Now, the reality of reproducing family pets through what BioArts calls "a limited commercial dog cloning program" ushers in a new era of possibilities and questions. But a substantial amount of the questions raised have troubling answers—or none at all—casting a cloud over what these biotech pioneers are heralding as a new dawn.

The original cloning effort of Missy, called the "Missyplicity Project," began a decade ago, not long after the successful cloning of Dolly the sheep. Missy had been rescued from a shelter by Joan Hawthorne, her son Lou Hawthorne, and Arizona billionaire John Sperling, and in 1998, they "gene banked" their dog's DNA. Gene banking involves taking tissue samples from the living animal and storing them in liquid nitrogen. Missy died in 2002 before her cloning efforts found success, but in 2007, Lou Hawthorne, a Northern California publicist who had been hired to promote Sperling's Missy-cloning efforts, created BioArts International. As BioArts' CEO, he requested that Missy be cloned by the team at Seoul National University that had successfully cloned the world's first dog, an Afghan

hound, in 2005.

### **IF IT AIN'T BROKE, WHY BREAK IT?**

Most pet owners see their animals as exceptional, even perfect, and do not want to face the reality of infirmity and death. James Symington is a former Canadian police officer whose German shepherd is now 15 and unable to walk. The two were among the first search-and-rescue teams at Ground Zero following the 9/11 terrorist attacks. Together, he says, they located the last human survivor, under approximately 30 feet of debris. Symington recently submitted the winning essay in a BioArts contest that awarded a free cloning of his heroic dog.

Marylin D'Errico, a former dog breeder from Dix Hills, has a different reason for wanting to clone her dogs. She says that she has competed in dog shows with them, explaining, "We show our dogs, they're not just pets." The idea of cloning, she says, "was very tantalizing at first"-so tantalizing that she and a friend gene banked the DNA of their miniature pinschers in 2001, in hopes that the technology for canine cloning would soon become available. But they have decided that cloning is not for them, saying, "We won't be able to afford it...it's only for the wealthy."

The well-to-do are having no problem ponying up their hard-invested cash, helping to keep the Hawthorne biotech start-up going. A recent BioArts online auction ran through July 9, offering five slots that the general public could bid on to have their adored canine companion cloned. The first slot opened at \$100,000 and sold for \$170,000, but the next two auctions actually dropped in price. The July 8 auction slot failed to draw any bidders willing to dish out the \$160,000 starting price and was not sold, and bidding on the final slot, set to open at \$180,000, was zero.

But while many pet owners envision having a perfect replica of their best four-footed friend, what they saw is not always what they get. Calling pet cloning an illusion, in 1994 Harry Griffin, assistant director at Roslin Institute in Edinburgh, where Dolly the sheep was cloned, told the *Times Online*, "Cloning will not recreate a loved pet. A clone might be 99.95 percent genetically identical to the original but it will grow up with a personality and behavior all of its own."

Douglas Wyler, D.V.M., past president of the Long Island Veterinary Medical Association (LIVMA), agrees with Griffin's statement. "People who are looking to do this are usually doing it for extremely emotional reasons," he says. "They are deluding themselves into believing that it is the exact same animal."

Wyler brings up an example of how certain reproductive methods can have disastrous outcomes, as with golden retriever breed manipulation a number of years ago, when close inbreeding-say, between mother and son-produced retrievers with large heads. But the dogs bred to have this trait developed another trait as well: aggressive behavior.

Wyler, who has also chaired the LIVMA ethics committee, asks, "These are all doable things-but to what end?"

Many outcomes are possible with cloning, which is still experimental, and the results of procedures involved in cloning have no guarantees. The gene banking process, for example, is not painless. A veterinarian must use local or general anesthesia to take tissue samples from the pet's abdomen and mouth, stitch up those areas, and remove the abdominal stitches later. And with anaesthesia, there are always risks.

There are other hazards further down the cloning road, involving the pregnancies of surrogate mothers and causing low survival rates for puppies and kittens, according to the Humane Society of the United States (HSUS). Kathleen Conlee, HSUS director of Program Management for Animal

Research Issues, tells the *Press*, "A lot of animals are harmed in the goal [of] trying to get one cloned animal." She points to an HSUS paper stating that published reports found that "a total of 3,656 cloned embryos, more than 319 egg 'donors,' and 214 surrogate mothers have been used to produce just five cloned dogs and 11 cloned cats who were able to survive 30 days past birth."

Hawthorne disputes these claims, saying that the individuals levying the charges are "looking at data from other species, and at old data." He insists that all the dogs produced by BioArts are healthy and will remain that way, saying that in addition to the company's guarantees, "every animal that leaves our lab gets subjected to a rigorous veterinary exam."

But many animal researchers say that the practice causes high rates of abortions, neonatal losses, and subsequent problems among animals who do survive. "Many cloned animals display birth defects, including respiratory failure, immune deficiency, and inadequate renal function—all leading to premature deaths..." according to the 2003 *Science* journal article "Cloning Claim Is Science Fiction, Not Science."

## **MUTT MARKETING**

The Missy-Mira project is not the first commercial pet cloning. Missy's DNA had originally been stored with Genetic Savings & Clone (GS&C), which members of the Missyplicity Project had founded back in 2000. GS&C produced the first cloned pet cat, then another feline, "Copy Cat," ("CC"). It charged the owner of "Little Nicky," the next cloned cat, \$50,000. But the cloning of Missy eluded the company. Unable to stay in business, it closed its doors in 2006. It resurfaced as BioArts in 2007, and this time, created a duplicate Missy.

Several months later, a different company, in Korea, cloned another heroic dog, a pit bull. Bernann McKunney, a California woman, forked over \$150,000 for the cloning of her deceased dog Booger. Before he died, he had saved her life during an attack by another dog. RNL Bio reproduced her dog in February 2008.

But the legality of that RNL Bio transaction is being challenged by Hawthorne. Calling RNL "a black market cloning company," he insists that BioArts has the sole worldwide license to clone dogs, cats and endangered species. Hawthorne continues on the subject of RNL Bio: "Well, he's making a little bit of a splash. But he's not going to be able to deliver animals to clients—we're going to stop him."

While the first pet cloning clients paid \$50,000 per cat, Hawthorne and others estimate that the price could drop to \$10,000 per feline. The founder of the biotech firm, who has also worked as a filmmaker and producer of interactive media, is media savvy enough to know that his venture will encounter opposition. The BioArts website also contains a companion site, Best Friends Again, which proclaims Hawthorne's guarantee and an invitation to bid on the online auction. It reads, "BioArts International is the ONLY company with both the legal rights AND the know-how to clone dogs. We guarantee health and resemblance! Don [sic] not miss out, bidding is going on now!"

Despite the fact that cloned animals are nearly genetically identical to the original, the clone may not look just like the original animal. Remember CC, the cat copied by Hawthorne's first company, GS&C, in 2002? Her genetic donor, Rainbow, was an orange calico cat, but CC was a gray tiger tabby. As stated by the Genetic Science Learning Center at the University of Utah, "Rainbow [the original] and CC are living proof that a clone will not look exactly like the donor of its genetic material."

Hawthorne makes more than just the guarantees above, though. He tells the *Press* that BioArts has four guarantees for all its dog cloning services: "health, resemblance, financial security (that your money doesn't get touched until the clone gets delivered), and an ethics guarantee, that no animal

will be harmed in the course of cloning of your beloved animal." Insisting that animals that are contributing to the process will not be harmed, he claims that "nothing more invasive than a spay is done to any of the animals we work with, and at the conclusion of their service they're adopted out."

Hawthorne is quick to bring up his guarantees and tout his successes. But many question the scientific or ethical backgrounds of those individuals who are the core backbone of this new animal research business.

Wylter, who has veterinary practices in Rockville Centre and Whitestone, Queens, remembers an experience he had some years ago with Hawthorne's now-defunct cloning company, GS&C. The veterinarian says he had a client whose cat died of kidney failure, and after the animal died, the owner asked about cloning. Wylter called BioArts, and their representatives said that because of the deterioration of the cat's body, it couldn't lend itself to genetic harvesting. But then the client called BioArts, which reversed its position and agreed, for a price, to take a specimen from the animal, "knowing that it wouldn't be viable for cloning-which, to me, is unethical," says Wylter.

Before founding BioArts, Hawthorne handled public relations for Sperling, the Arizonan who had already amassed a fortune. Sperling made much of his money by founding the University of Phoenix, a for-profit university, in 1976. But the degree-granting school has generated controversy since its founding, with accreditation denied for some time because some saw the school as a "diploma mill."

Also, Hawthorne states that BioArts is the only company with a worldwide license to clone certain animals. But the HSUS reports that Start Licensing, Inc., the company that granted BioArts a sole license with exclusive rights to clone dogs and cats, is actually co-owned by Sperling. Start Licensing is a joint venture between U.S.-based Geron Corporation and Exeter Life Sciences, Inc., which is a holding company of John Sperling.

As for the scientific aspect of BioArts, the scientist Hawthorne chose to clone Missy had submitted fraudulent data and been relieved of duty. Woo Suk Hwang (also known as Hwang Woo-Suk), Ph.D., was one of the principal scientists who produced the first cloned dog, Snuppy the Afghan hound, in 2005, and produced Mira for BioArts in 2007. Yet Hwang's team's claim of producing the first human embryo through cloning in 2004 was found to be false. Additionally, in 2005, Hwang admitted that his lab had violated scientific ethics by using human egg donations from several of his researchers. And in 2006, Seoul National University found that Hwang had fabricated evidence used in his claim that he had produced stem cell lines from cloned human embryos. But his animal cloning claims have been found to be true: An independent source verified that Snuppy, Mira, and two other Missy clones born later, Chin-Gu and Sarang, are genetic clones.

Several cloning regulatory issues-and the lack of oversight-are of concern to many. The U.S. Department of Agriculture does not require U.S. researchers and companies cloning animals for pets to follow the minimum humane standards of the Animal Welfare Act. The primary scientific labs for BioArts are located in Beijing and it has key scientific partnerships in Seoul. The HSUS notes that "in South Korea, it is unclear how the pet cloning industry is regulated, if at all." And it was lax safety controls that killed hundreds of U.S. dogs and cats last year, when pet food manufactured in China was found to contain lethal toxins and chemicals.

## **CLONE OF CONTENTION**

The strides made in the field of biotechnology over the past 10 years may be remarkable, but they have also raised questions and issues, as the ethics of cloning attempts to keep up with innovation.

The cloning of animals-namely farm animals-in this country is legal and approved by the U.S. Food and Drug Administration (FDA), but the practice has met opposition. A 2001 poll conducted by ABC News found that six out of 10 Americans sampled said that cloning animals should be illegal in the United States, and a 2002 Gallup survey found that some two-thirds of Americans sampled felt that it is morally wrong to clone animals.

Cloning itself is a controversial topic, but the issue hasn't really hit home for many in this country-until now. In January 2008, the FDA approved the safety of meat and milk from cloned animals and their offspring to consumers. Its report concluded that "meat and milk from cow, pig, and goat clones and the offspring of any animal clones are as safe as food we eat every day." Products from cloned farm animals are not yet sold in stores, however.

But the controversy truly hits home with the possibility of bringing a cloned pet into the home. The proposition may please many but is sure to rattle the cages of two-footed animal guardians as well as furry four-footed companions. The American Anti-Vivisection Society's position on cloning is clear and simple, though: "Just because we can, doesn't mean we should."

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