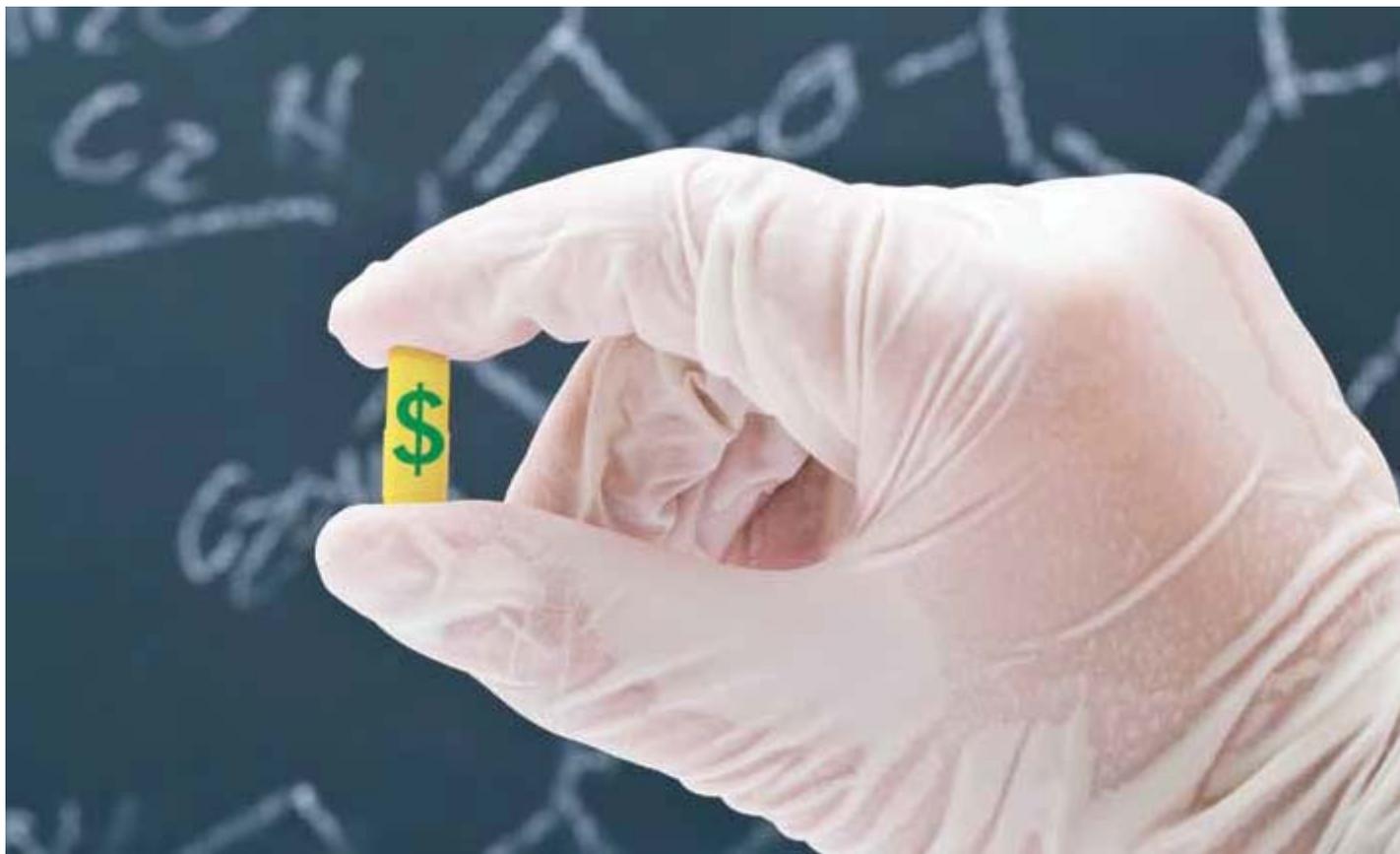


## Million-Dollar Ideas

Michelson Prize and Grants program spurs research into nonsurgical spay/neuter



The tools of the spay/neuter trade might be changing. The Michelson Prize and Grants program is putting up millions of dollars to inspire researchers to devise a nonsurgical alternative to conventional surgery.

**Of course it can't buy you love**, and it may be the root of all evil, but on this we can agree: Money can get things done.

It might, in fact, spur a solution to pet overpopulation and unnecessary euthanasia.

That's the hope of the Found Animals Foundation, a Los Angeles-based nonprofit founded by Gary Michelson, a billionaire spinal surgeon who made his fortune patenting medical devices. Incorporated in 2005 after Michelson saw the animal issues caused by Hurricane Katrina and was moved to help, Found Animals offers a variety of programs, from adoption to pet identification, aimed at minimizing or ending shelter euthanasia. (The "found" in the organization's name, says executive director Aimee Gilbreath, reflects both the promise of its microchip program

and Michelson's affection for the song "Amazing Grace," which includes the line, "I once was lost, but now am found.")

In late 2008, the foundation announced an eye-popping brass ring: the Michelson Prize and Grants in Reproductive Biology. The prize promised \$25 million to the first entity to develop a low-cost, single-dose, nonsurgical method of permanently sterilizing cats and dogs. The project made another \$50 million available in grants for related research. "The prize is out there to motivate people to go after the Holy Grail, and the grant program is there to make sure they



have the resources to pursue that lofty goal," Gilbreath says. She's confident the prize will be awarded within five years, but notes it will take at least another two years beyond that to get a product on the market.

In the edited interview that follows, Gilbreath, a former biotechnology researcher and business consultant who became the foundation's first employee, and Shirley Johnston, an expert on animal reproduction who oversees the prize and grants program, discuss the project's progress with *Animal Sheltering* associate editor James Hettinger.

### Tracking the Immune System

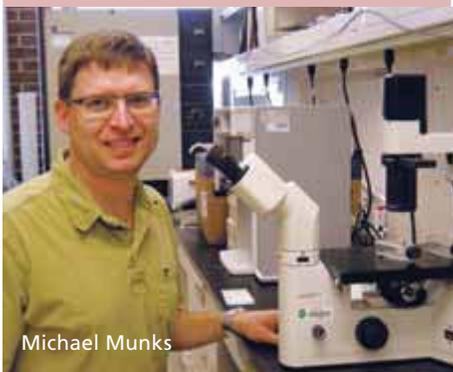
Michael Munks didn't hear about the Michelson Prize and Grants through a science journal or a grants website. He got the word from a decidedly less academic source.

"Crazily enough, I first heard about this when I was watching *Saturday Night Live*." On a "Weekend Update" segment in October 2008, "they were mentioning that Gary Michelson was offering this \$75 million prize and grants for nonsurgical sterilization of cats and dogs," he recalls. "So then they were making a joke about how the cats and dogs had put together \$100 million to hire a hit man to take out Gary Michelson."

But for Munks, an immunologist and research fellow who studies viruses and the immune system's response to them at National Jewish Health in Denver, the thought of applying the concept of immunocontraception to cats and dogs was no joke. He put together a proposal and in late 2009 got a four-year Michelson grant for more than \$700,000.

The idea of immunocontraception, Munks explains, is to trick the immune system into deactivating part of the reproductive system. If you can create an immune response that inactivates the eggs or the hormones that regulate reproduction, you can essentially "use the animal's immune system to sterilize itself," he says.

Munks is proposing a herpesvirus to create a nonsurgical sterilant for cats and dogs—an approach he says other researchers found effective in mice.



Michael Munks



Shirley Johnston acknowledges that developing a nonsurgical way to permanently disable the reproductive systems of cats and dogs is a difficult task, but she's impressed with the quality of the proposals received by the Michelson Prize and Grants program.

#### **Animal Sheltering: Give us a thumbnail description of the Michelson Prize and Grants program.**

**Aimee Gilbreath:** When [Gary Michelson] got interested in how to keep so many pets from being euthanized in shelters, he started looking at weak points in the system, and realized that affordability and accessibility of spay and neuter was an issue. He started thinking that technology has got to have a solution to this that is nonsurgical, affordable, and easy to deploy in a field setting. That was the genesis of the Michelson Prize and Grants program.

**Shirley Johnston:** In the history of the world, there has never been such [an] amount of money available to study dog and cat reproduction. Our program is trying to get the word out to not only scientists who have worked in the field of dog and cat reproduction in the past, but also people that work on basic cellular mechanisms, people that work in human reproduction, to try and find innovative ways that we can discover a single-dose, nonsurgical sterilant. To date we've approved



Executive director Aimee Gilbreath says the Found Animals Foundation—reflecting the wishes of its founder, Gary Michelson—seeks innovative solutions to the problem of shelter euthanasia.

about 15 proposals. And we've got funding in place around the United States, and also in Argentina and Australia—researchers there that have successfully applied for our grants.

#### **What form are you envisioning? Would this be a shot? A pill?**

**Gilbreath:** We actually try really hard to be agnostic about what approach might ultimately carry the day. We are open to any nonsurgical method, whether that would be an injectable, a pill, some sort of medical device, some sort of very small implant. We really don't have a preconceived notion of how this problem gets solved.

#### **Do you think this will ultimately be cheaper than conventional surgery?**

**Gilbreath:** That is our hope, and one of the requirements for winning the prize is that it has a reasonable manufacturing cost.

#### **How affordable do you think this would be?**

**Johnston:** We hope that it will be in the neighborhood of \$5 to \$10 [per dose] when

manufactured on a large scale. We are prepared to award the prize for something up to about \$30.

**Are you picturing a day when this non-surgical method would actually replace conventional surgeries?**

**Gilbreath:** It's not necessarily our intention to replace surgical spay/neuter. It's our intention to extend the reach to places and to people where surgical techniques don't work well now. You could envision a product coming out of this—just for example—that was great for feral cats, but maybe not great for owned cats. It could be that owned cats will continue to get surgical spay and neuter, but there'll be a great option for feral cat caretakers.

**What do you see as the obstacles to this non-surgical solution? Is it a scientific problem, or a matter of the funding not being there to do the research?**

**Seeking a 'Magic Bullet'**

His lab might focus on tiny fruit flies, but William Ja is thinking big.

Normally, he uses fruit flies to study human aging, nutrition, and disease. And now Ja has diversified to join the researchers seeking a nonsurgical sterilant for dogs and cats through the Michelson project, which awarded him a two-year grant of more than \$200,000.

Ja, an assistant professor at Scripps Research Institute in Jupiter, Fla., recalls thinking the prize money was "amazing" when he spotted a Michelson program ad in a scientific journal in late 2008. He and some colleagues jokingly kicked around some ideas over dinner. It was the kind of talk that often ends at the table, but Ja decided to investigate further.

Borrowing from cancer research, he eventually pitched the Michelson funders the idea of developing a "magic bullet" (technically a toxin-ligand conjugate) that would target crucial reproductive cells



in the gonads of cats and dogs, causing sterilization.

Ja acknowledges that developing a single drug that permanently takes out male and female reproduction in two different species is a daunting task, but he is confident that someone will devise at least a partial solution to the Michelson program's challenge. "I think it should be doable, given the examples of sterility that occur in nature," he says. "... And certainly this giant load of cash will help the field greatly."

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### Tracking the Immune System

At Crinetics Pharmaceuticals, Scott Struthers focuses on developing drugs to combat human problems like endocrine diseases and cancers.



Scott Struthers

At the Found Animals Foundation, the Michelson Prize and Grants program is seeking a nonsurgical way to sterilize dogs and cats.

The connection wasn't immediately clear.

But the Michelson project "stuck someplace in the back of my head" after Struthers heard about it, and eventually he realized there could be a link to his firm's work. Crinetics, a small startup firm founded in 2010 in San Diego, was working on an anti-ovarian cancer drug that might have a side effect of rendering women sterile. While the side effect wasn't an intended component for its human applications, Struthers, the firm's president and chief scientific officer, wondered if the drug might cause sterility in dogs and cats.

The Michelson program awarded Crinetics a two-year research grant of more than \$540,000. In a time when funding is tight, Struthers credits the Found Animals Foundation with catching the eyes of researchers "who are normally just thinking about humans, and making them think about what they can do for our pets."

While he's not on the front lines, Struthers says he's learning how important a nonsurgical sterilant could be in the battle against pet overpopulation. No matter how efficiently its practitioners work, spaying and neutering is still a surgical procedure, he notes. "You can only go so fast."

**Gilbreath:** I think it's probably a combination. Nonsurgical products for humans are out there, and they've been out there for 40 years. If you can do it for humans, I have no doubt that it is technologically possible to do it for pets. I have to think that a lot of it has been technology, and funding to really motivate people to apply cutting-edge technology to that issue.

**Johnston:** It's not easy to completely disable the reproductive systems. In nature, the reproductive systems have a lot of ability to rebound, for survival of the species.

Secondly, we have mandated a thoroughly high standard in looking at both the male and female dog and cat. Dogs and cats are real different, and males and females are real different, and so to give a single injection of something that will safely and permanently knock out their [reproductive capability] is really a big challenge.

The money is as important, perhaps, as the other two. I've worked in dog and cat reproduction for nearly 40 years now, and people have done good research historically, all over the world, in trying to find safe contraceptive agents. But in my career at universities you would scramble to get a \$10,000 to \$50,000 grant, and now we are making available a quarter of a million dollars a year for three to four years. We're really getting some traction in that regard; we've really had some quite brilliant proposals come in that we think may be able to solve this challenge.

#### What would happen if nobody wins the \$25 million prize?

**Gilbreath:** The grant program would continue, and it could be that we have products that come out of grant-funded research that do not meet all of the criteria for the prize, but that would have an impact on the issue. We could very well choose to commercialize some products, for example, if [they] only worked in cats. That could still be a very useful product.

#### What's your impression of how the project is going so far?

**Gilbreath:** We're seeing exactly what we had hoped for, which is people that were working on technology that could be relevant, but had no idea that this problem existed, actually having that moment of inspiration, and saying, "Oh, this compound that I'm developing for ovarian cancer treatment kills reproductive cells, so I bet that maybe with some tweaks, you could use it to sterilize animals, because I know that a side effect [of] ovarian cancer treatment is sterility."

#### Are you optimistic that you're going to find what you're looking for?

**Johnston:** I'm really optimistic. I was [initially] negative about this whole process. I turned down a position on the board originally, because I thought it was like [saying to] somebody, "Oh, we'll give you \$25 million to turn lead into gold." But I have since come to recognize that in the last 10 to 15 years, science has advanced on so many fronts that now I really do believe we're going to award this prize. **AS**



**"It's not necessarily our intention to replace surgical spay/neuter. It's our intention to extend the reach to places and to people where surgical techniques don't work well now."**

—AIMEE GILBREATH