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LIVING FOREVER

Is the death of death just a matter of time?






Surgery to Scale

STORY *Rebecca Skloot*

Orthopaedics, obstetrics, X-rays, CT-scans
— believe it or not, the world of high-tech
medicine has invaded the fish tank.

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Dr Helen Roberts was about to make the first incision in what should have been standard surgery – a quick in-and-out procedure – when she froze. “Bonnie,” she said, turning to her anaesthetist, Bonita Wulf. “Is she breathing? I don’t see her breathing.” Roberts’s eyes darted around the room. “Grab the Doppler,” she told her other assistant. “I want to hear her heart. Bonnie, how’s she doing?”

Bonnie pushed up her purple glasses, leaned over the surgery table and lowered her face centimetres from the patient to watch for any signs of breath: nothing. “She’s too deep,” Roberts said, “go ahead and give her 30cc of fresh water.” Bonnie poured two glugs of pond water from an old plastic jug into the anaesthesia machine. Seconds later, a whisper of a heart rate came through the Doppler, then it was silent. Again Bonnie reached for the jug. “Wait,” Roberts said. “We have fin movement. She’s waking up – 30cc of anaesthetic.” Roberts shook her head. “She was holding her breath. Fish are a lot smarter than people give them credit for.”

That’s right – fish. Helen Roberts and Bonita Wulf were doing surgery on a goldfish. Not the fancy kind that people buy for thousands of dollars and keep in decorative ponds (though they do surgery on those too), but on a county-fair goldfish named Golden One, which Roberts adopted when its previous owners brought it into her clinic outside Buffalo, New York, saying they didn’t have time to take care of it. A fish that could belong to anybody. Just like Lucky, the half-kilo koi with a one-kilogram tumour; Sunshine, who was impaled on a branch during a bit of rough sex; Betta, with a fluid-filled abdomen; the perpetually upside-down Belly Bob, or Raven, who was stuck floating nose down and tail to the sky. All those fish went under the knife.

Ten years ago, the chances of finding a ‘fish vet’ were slim. But true to its history, veterinary medicine is steadily evolving to meet the demands of pet owners. In the early 20th century, vets treated livestock mostly, not cats and dogs – you usually shot those. But by the mid-1950s, the world was in love with Lassie, and people started thinking, “I shouldn’t have to shoot my dog”. By the 1970s, dogs and cats could get human-quality medical care – but treating birds? That was insane. Instead, bird advice came from pet stores (and birds died of a ‘draft’, a diagnosis akin to ‘the vapours’). Yet by the 1980s, avian medicine had its own academic programs in the United States, as well as a professional society, a monthly magazine and a large clientele. Today, many industrialised countries – including Australia – have surgery for parakeets, organ transplantation for

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dogs and cats, even chemotherapy for guinea pigs. But people who want to take fish to the vet? Obviously crazy, right? Well, maybe not.

"I have no doubt fish medicine will become mainstream, much like bird medicine did in the '80s," said Dr David Scarfe, assistant director of scientific activities at the American Veterinary Medical Association (AVMA) in Illinois. "It's actually happening far more rapidly than I'd imagined." According to the AVMA, almost 2,000 vets in the U.S. practise fish medicine. That number is steadily growing, and the market seems solid: 13.9 million homes have fish, spending several billions of dollars annually on fish supplies – tanks, water conditioners, food – not including veterinary care or the fish themselves, which can total as much as US\$100,000 each (A\$132,000), or more.

Fish diagnostics range from basic exams, blood work and X-rays to ultrasounds and computed-tomography (CT) scans. Veterinary services for fish include tube feeding, enemas, fixing broken bones with plates and screws, removing impacted eggs, treating scoliosis and even plastic surgery – anything from glass-eye implantation to 'pattern improvement' (scale transplantation, tattooing and removal).

But some of the most common and vexing fish ailments are buoyancy disorders. These all involve the swim bladder, an organ in the digestive tract, which, if it malfunctions interferes with piscine air regulation, leaving sufferers 'improperly buoyant', to the point of floating or sinking in odd positions – usually upside down. Surgically inserting a tiny stone in the fish's abdomen to weigh it down is the best option, but since that costs US\$150–1,500 (A\$200–2,000), depending on where and how it's done, many vets first recommend 'green-pea treatment': "Feeding affected goldfish a single green pea (canned or cooked and lightly crushed) once daily might cure the problem," Dr Greg Lewbart wrote in a paper titled "Green Peas for Buoyancy Disorders" in *Exotic DVM Veterinary Magazine*. Lewbart is a professor of aquatic medicine at the College of Veterinary Medicine at North Carolina State University in Raleigh, but even he isn't sure how pea treatment works.

"When I tell people I'm writing about fish medicine, their reaction is almost always: 'Why not flush the sick fish and get a new one?'"

Actually, for several reasons. First, there are the money makers. "I've worked on several fish worth between US\$30,000 and US\$50,000," Lewbart once told me. These are the fancy koi that earn their living on the fish-show circuit, garnering big prizes before retiring to a life of profitable reproduction. "I examined one in Japan whose owner had turned down an offer of US\$200,000," Lewbart says. That's what he calls a Big Fish. "People will spend thousands to fix them." But not all koi are show koi; many are what Lewbart calls UPFs: ugly pond fish.

Which brings us to the human-fish bond, and people who gasp if you mention flushing fish, because they swear their fish have personalities so big they win hearts. I heard the stories of Zeus, who weighed 900 grams but dominated its owner's cat by yanking the confused feline into the tank head first; Sushi, the "gregoriously affectionate" koi with recurring bacterial infections; and Zoomer, the "koi with a vendetta", who shot out of the water at her owner, and broke his nose – something Ladyfish never would have done. She'd just cuddle with her owner in the pond and wiggle when he kissed her. Ladyfish's back was broken by a near-miss lightning strike and her owner spent thousands trying to save her. He paid for X-rays, CT scans, chiropractic adjustments and spinal surgery, then spent weeks in the pond assisting her physiotherapy. Nothing worked, and tears still well up when he talks about it.

The human-fish-bond people can't fathom the Big Fish people. "They don't even name their fish," Bonita Wulf says, sounding shocked. The organisers of the Singapore International Fish Show recently announced a fish-adoption initiative, declaring that "fish have their lives, and they have feelings, too," so if fish don't win shows, it's "more humane to bring the fish up for adoption," rather than flush them down the toilet. Others train fish to fetch and dunk basketballs. "Some fish personality might be a feeding response," says Dr Julius Tepper of the Long Island Fish Hospital in New York.

Sushi's owner doesn't buy that. "You have to meet Sushi to understand," she told me. So I went with Roberts to Marsha Chapman's house thinking, "Okay Sushi, show me this personality of yours".

"Sushi's in here," Chapman said, leading me to the 1.8 metre-long, 570-litre tank in her

family room. Chapman is a warm and motherly special-education teacher in her 50s who looks you in the eye and sounds as if she's talking to a room of primary-school children. "Hi baby," she cooed. "How's Mama's girl?" Sushi darted to the surface of the tank and started splashing frantically. "That's right, show us how you wag your tail." And Sushi did (though a wagging fish tail looks just like a swimming fish tail to me). "She's just like a dog that way," Chapman said. "If I could hug her, I would."

Aside from Sushi's size (60cm), her looks are unimpressive. Mostly white, a few orange spots, short non-flowing fins, trademark carp whiskers. Some might call her a UPF, though not around Chapman, who reached in the tank and patted Sushi's head. "Look who's here, Sweetie," she said.

Sushi ignored me. But she did the 'basketball dance' for Chapman, swimming in place, face against the glass, jerking back and forth and up and down. And Chapman did it right back. She put her red lipstick-covered lips a couple of centimetres from the tank opposite Sushi's. She clenched her fists, bent her elbows and knees, stuck out her butt and wiggled her body violently while making loud kissing noises. The more Chapman danced, the more Sushi danced. Then Roberts walked in the room and Sushi hid. "Dr Roberts thinks she might be a boy, but Sushi is a girl's name." Chapman tapped the tank. "Don't be afraid, Dr Roberts always makes you better."

Roberts is a petite "warm, fuzzy fish vet" whose no-nonsense appearance – no makeup, a thick black plastic sports watch – almost clashes with the turquoise contacts that make her eyes beautifully inhuman. She surrounds herself with pewter fish and glass fish; papier-mâché, metal, wood and stone fish; and of course, her pet fish: Splotch, Carrot, Harrison, Ford, Golden One, and about 32 others, including B.O. (Big Orange), her favourite. "Come on, Sush," Roberts said. "I'm your friend."

I stared into Sushi's tank for hours. Chapman put the *Twin Peaks* theme song on repeat, and I thought, "Fun fish". She was active and sparkly, she swam back and forth, her muscles moving with the music in slow

melodic waves. It was mesmerising. But to me she was more like a lava lamp than a pet. Then again, to her I was more like a piece of furniture than a human. I didn't feel Sushi's personality, I felt Roberts's and Chapman's. When Sushi swam by, their eyes widened, they smiled, touched the glass, said hello. When she turned, they said things like "Isn't he amazing?" and "She's so funny."

They know people might say they're crazy. "I don't care what people think," Chapman said. "I use my relationship with Sushi as a springboard for teaching special-education students about affection for unconventional people like themselves." She stared into the tank, her voice suddenly serious. "It enlarges the world when you see how much possibility there is for loving others who aren't usually given a chance."

The Golden One finally stopped holding her breath, which meant Roberts could actually spay her. Well, at least that was the plan. "I'm pretty sure she's a female," Roberts said, "but it's always hard to tell with fish. If she turns out to be a boy, we'll just neuter her." Roberts was born in England, and raised in Italy and the southern U.S. state of Georgia; her accent is soft, slightly rural and completely unidentifiable. "Goldfish are the rabbits of the fish world," she said when I asked why she was spaying her fish. "I don't want to face the ethical decision of what to do with all those babies."

Aside from the human-quality surgical instruments and monitors, the set-up was 100 per cent hardware store: one tub of pond water and anaesthetic, clear tubing attached to a submersible pump with duct tape. The Golden One lay on a grate above the tub, foam pad keeping her upright, a tube pumping anaesthetic water from the tub into her mouth, through her gills and back again. Like a recirculating fountain.

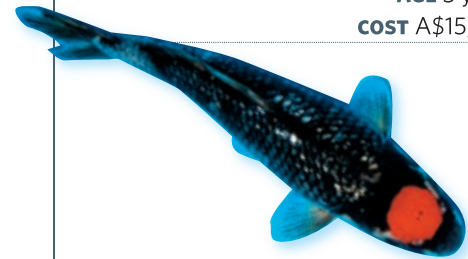
It's the same set-up used in the first account of pet fish surgery I could find, which was performed in 1993 and written about two years later by Greg Lewbart. Lewbart, a top fish vet, has short brown hair, greying sideburns and a soft blanket of freckles – like someone misted him with tan paint. "I don't tell my clients," he

Best in Show



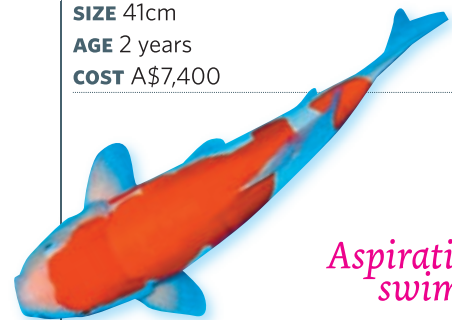
Top of the Line

SPECIES *Cyprinus carpio*
SIZE 10cm
AGE 3 years
COST A\$15,500



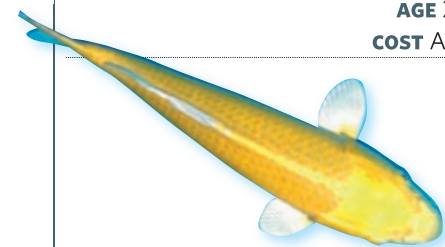
Upper-Middle Class

SPECIES *Cyprinus carpio*
SIZE 41cm
AGE 2 years
COST A\$7,400



Aspirational swimmer

SPECIES *Cyprinus carpio*
SIZE 48cm
AGE 2 years
COST A\$3,100



Outer suburbanite

SPECIES *Cyprinus carpio*
SIZE 37cm
AGE 2 years
COST A\$650



Ugly Pond Fish (UPF)

SPECIES *Carassius auratus*
SIZE 5cm
AGE Unknown
COST A\$3

said hesitantly, “but I got into fish as a fisherman.” He couldn’t help laughing when he said this. “It’s undeniably weird: I sometimes spend my weekends at the coast fishing.” Then he paused. “I do mostly catch and release, but not always, and either way, it’s unpleasant for the animal. Then I go into work Monday, somebody brings in a goldfish, I console them, take their fish to surgery, then put it on post-operative pain medication.”

Lewbart loves fish medicine – he flies around the world teaching and practising it; he publishes scholarly articles and books on it. But, he told me: “My real love is marine invertebrates. It’s still a little down the road before people are going to start bringing those guys – snails, worms, horseshoe crabs – to the vet.”

Fish medicine actually dates to the 19th century, but it didn’t start to catch on until the 1970s and ’80s, when scientists started publishing research articles about everything from fish hormones and nutrition to pondside operating tables. But that had nothing to do with pets. Until Lewbart published his surgery paper in the *Journal of the American Veterinary Medical Association* in 1995, references to fish medicine came from fisheries, marine biology and wildlife.

In the late 1970s, a few obscure papers mentioned the burgeoning field of pet fish; some even said vets should make the transition from aquaculture to pets. But that didn’t happen for more than a decade, until koi exploded into a multimillion-dollar industry, the Internet appeared and owners started typing “fish veterinarian” into search engines. When they found research papers by vets like Lewbart, owners started calling and emailing. “I never thought of being a fish vet,” said Julius Tepper of the Long Island Fish Hospital. “Then I got a call from a guy wondering if I treated fish or knew someone who did. Then I was like, Why didn’t I think of this earlier?”

Pet-fish medicine isn’t exactly mainstream: many owners don’t know fish vets exist; others look but can’t find them. The AVMA and several vets are working on databases for referring clients, but they’re not available yet. Until then, Lewbart will keep fielding 400 to 500 calls and



Wulf is a fish hobbyist with a very large gun collection...she talks to her fish and carries pictures of them in her purse. “I have grandkids too, but I only carry fish pictures.”

email messages a year from people with fish questions, and many owners will take matters into their own hands. Just like Bonita Wulf, who isn’t an actual fish anaesthetist; she’s a fish hobbyist with a gravelly smoker’s voice and a very large gun collection. (As Roberts tells me, you don’t joke about flushing fish with a woman like Bonnie.) Wulf talks to her fish and carries pictures of them in her purse. “I’ve got grandkids too,” she says with a grin,

“but I only carry fish pictures”. She has taken more courses in fish health and medicine than most veterinarians, and she started by Googling the word “koi”. Inevitably, this provided links to KoiVet.com and Aquamaniacs.net. These two sites attract thousands of fish hobbyists seeking moral support and do-it-yourself help during fish crises. Traditionally, fish medicine is one of the few areas where pet owners know more than veterinarians. But

GLENN HUNT

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A fish called Bruce: Fish surgeons in Australia

Fish surgery is not an American fad: it is a specialisation of veterinary medicine with a growing following – and demand – in Australia.

In 2002, the Australian College of Veterinary Scientists (ACVS) established a chapter “for the advancement of aquatic animal health”. Today the chapter has about 20 members, including Stephen Pyecroft, who was a suburban vet for more than a decade before joining the Tasmanian Aquaculture and Fisheries Institute. He says that treating fish was, at first, a kind of public-relations move: helping out the odd goldfish kept owners of the more lucrative cats and dogs happy. But it soon “became all-consuming”.

“I really enjoy the challenge of working in a pioneering area,” he said.

Pyecroft would patch up pet fish with skin lesions and perform fin surgery ... and he has even removed a fish’s thyroid tumour. He charged A\$100 for a standard operation, and as much as A\$300 for more specialised work.

He said fish owners seek veterinary assistance because: “They just get all warm and fuzzy”. He paused, “A lot of people probably won’t relate to that.”

Most Australian fish vets work in aquaculture, because that’s where the money is, but at least one attends solely to aquarium fish. Jim Greenwood is a Melbourne vet who prides himself on treating any animal that is brought to his surgery. Ferrets, rats, crocodiles, spiders, Jim takes them all. His passion however, is for fish and he spends one day a week attending to the stock at Australia’s largest importer of pet fish. He also teaches fish medicine to veterinary students at the University of Melbourne.

Greenwood has pioneered a new anaesthetic for fish operations, has unparalleled experience in tumour removal, and is intensely sympathetic to distraught goldfish owners but, like his U.S. contemporary Greg Lewbart, he still enjoys fishing on weekends. — *Sara Phillips*

Jim Greenwood – University of Melbourne lecturer in piscine medicine, avid fisherman and pet-fish industry ‘consultant’ – takes a peek at patients in the waiting room of his university practice.

things have changed: U.S. veterinary schools are starting to teach fish medicine. I recently attended a seminar at Lewbart’s aquatic-medicine department at North Carolina State University – one of few such departments in the world. He and his colleagues also run a one-week intensive fish-medicine course, as well as the world’s only aquatic-medicine residency. Their courses are always full.

On the first day of the seminar, students from around the U.S. learned to catch, anaesthetise and transport fish. They drew blood, took fin and scale samples, looked under microscopes for parasites. They saw an underwater frog with a fluid-retention problem, and a turtle filled with rocks it wasn’t supposed to eat. The seminar is about one-quarter aquatic reptiles and three-quarters fish, but the first day, there were no sick fish. And it was sunny, so Lewbart took everyone outside for ice cream and a fish-medicine lecture. As he sat in the sun wearing

black plastic sunglasses – ice cream in one hand – Lewbart talked about fish cancer and carp herpes. “Are there any questions?” he asked eventually. A student enquired: “Can a person make a living as a fish vet?”

The answer is yes and no: despite hourly rates up to US\$100 for ‘tank calls’, business would be tight for a full-time pet-fish vet today. Some successfully work in fisheries, public aquariums, zoos or the tropical-fish industry; others supplement their practices with teaching. But most must treat other species. “Dogs and cats are the ‘meat and potatoes,’” Roberts says. “Fish are the spice.” That’s likely to be true for a while. “Fish medicine is still a hobby,” Tepper says. “It costs me thousands of dollars a year.”

One of the reasons for modest incomes among fish vets is that koi are dormant in winter. So many fish vets are encouraging preventive medicine, which brings us back to

the Golden One’s surgery. Spaying her not only means Roberts won’t have to face the ethical baby-placement problem, it’s also a business move. “If I can master this,” says Roberts, “I can offer it to owners who say, ‘I really love this goldfish, I just don’t want a thousand more.’”

Roberts poked around in the fish’s abdomen. She was telling Wulf about her new video game, when she stopped mid sentence. “Look at that, Bonnie.” Roberts pulled a long yellow gelatinous strand from the Golden One’s belly. “That looks male, doesn’t it?” Bonnie nodded. “Yep, Helen, that’s male, don’t spay that one.”

“OK,” Roberts shot back, chipper as always. “We’ll neuter him.” Then she turned to me and whispered: “Fish medicine isn’t an exact science yet. But we’re working on it.” 🩺

REBECCA SKLOOT is a journalist in New York. Her first book, *The Immortal Life of Henrietta Lacks*, will be published by Crown next year.