

Exenatide is a case in point, King says: “Who would have thought that a 37-residue peptide drug with bad stability would become a billion-dollar drug?”

Moreover, some venom peptides may be stable enough to be taken orally. Many have multiple disulfide bonds, bridges between the sulfur atoms in the amino acid cysteine, that make the peptide stable enough to resist degradation by the enzymes in gastrointestinal juices, King says. A toxin derived from

cone snails that’s under investigation to treat neuropathic pain was recently shown to work when taken orally.

NUS’s Manjunatha, meanwhile, has discovered an analgesic peptide developed from king cobra venom that he says is 20 to 200 times more potent than morphine—and active orally. Placed under the tongue, the 11 amino acid peptide is absorbed by the mucosal membrane, he says.

Manjunatha, who has patents on dozens of

other snake peptides, was born and brought up in a small village in India surrounded by forests. “A lot of people lost their limbs or died” from snakebites, he says. When he started out as a researcher, he wanted to understand what makes toxins so dangerous: “Why are human proteins helpful and snake venom proteins so harmful?” Now, Manjunatha says he realizes an even more interesting question is which of those lethal snake peptides can help humankind most. —KAI KUPFERSCHMIDT



The Freak Show

Snake scientist Freek Vonk can’t choose between research and starring in wildlife documentaries. And so far, he doesn’t have to

LEIDEN, THE NETHERLANDS—On an October afternoon, a throng of children is waiting expectantly at the entrance of the Naturalis Biodiversity Center, a museum and research center just outside the city center. At 2 p.m. sharp, a green Land Rover pulls up, a door swings open, and a tall, blond young man jumps out. He’s wearing jungle boots, khaki shorts, and a denim shirt—as if he were on safari in Africa instead of in an academic town. A platinum blonde-haired woman emerges from the passenger seat, and soon the couple is mobbed by kids screaming for autographs.

The man is Dutch biologist and snake scientist Freek Vonk, and he has just arrived at his workplace, along with his girlfriend, talk show host Eva Jinek. He’s in safari gear because he is opening a new exhibition at the center. *Freak’s Favorites* showcases 45 animal species that fascinate Vonk;

Naturalis has invited kids and their parents to come celebrate.

At 30, Vonk has already built a respectable career studying snakes—animals he has been obsessed with for half his life. He has a couple of *Nature* papers to his name, and he is the first author on a study of the king cobra genome, published this week in the *Proceedings of the National Academy of Sciences (PNAS)* (see story on p. 1160). But here in the Netherlands, Vonk is known primarily as a TV celebrity. His wildlife shows air every day, and Naturalis has made Vonk its public face.

Just how Vonk—whose first name is pronounced “Frake”—manages to combine research and showmanship is baffling to some. He credits his attention deficit hyperactivity disorder, which made it hard to get through high school but now prevents him from ever doing nothing. “It’s always

go, go, go. It’s nonstop with Freek,” confirms Nicholas Casewell of Bangor University in the United Kingdom, a co-author of the new paper. In 2014, Vonk plans to further study the evolution of cobra venom, but he will also be filming abroad for 4 months.

Vonk’s shows are about animals, ecology, evolution—but they’re also adventures, presented with an un-Dutch touch of machismo. He wrestles with crocodiles, yanks snakes from their hiding places, and bares his torso for a bath in the Amazon after a day in the jungle. Many say he seems to be emulating one of his childhood heroes, Steve Irwin, an Australian conservationist known for his exciting wildlife documentaries. (Irwin died in 2006 after a stingray pierced his chest.)

It’s a style not everybody likes. “You don’t have to jump on crocodiles or show what a daredevil you are,” says experimental

zoologist Johan van Leeuwen of Wageningen University in the Netherlands. Vonk is “a very good biologist,” Van Leeuwen adds, “but if he’s trying to become like Irwin, he’s on the wrong path.”

But Vonk says his “hands-on approach” shows nature’s exciting side and can promote conservation and raise interest in living things. During the opening ceremony at Naturalis, he puts a living snake around a boy’s neck but also urges his young audience to consider a career in biology. The kids are impressed. “Freek loves animals. He isn’t afraid of anything,” a young fan says. “And he was bitten by a shark!”

Bitten by a passion

Two weeks later, on the terrace of a trendy cafe in Amsterdam, Vonk sets down his Heineken to show three impressive scars on his right hand. His crew was filming blacktip sharks off the South African coast earlier this year when one of the animals mistook his moving hand for a fish, he says. “Fortunately I resisted the impulse to pull back. He let go pretty quickly.”

Over dinner, Vonk explains how his two disparate careers got started when, at age 15, he was enthralled by a snake belonging to a friend’s brother. “They’re so different than any other animal,” he says, “that long limbless body, that little tongue that’s always moving back and forth. ... There’s this cloud of mysticism surrounding them.”

“If the snake is in, I’m out,” his mother declared when he told his parents he wanted a snake, too. She soon gave up her opposition, however, figuring it would be best to let her son follow his passions. After high school, Vonk studied biology at Leiden University—mostly as a way to learn more about snakes. For his bachelor’s degree, he wanted to do a research project at the lab of developmental and evolutionary biologist Michael Richardson. “I told him that we don’t really do reptiles,” Richardson recalls, “but that we’d be happy to make some room in a corner of the lab.”

Vonk started comparing histological sections from the venom glands of various lizards, as part of a broader study on venom evolution in lizards and snakes by Bryan Fry of the University of Melbourne. Their paper, with Vonk as fourth author, was published by *Nature* in 2006. His master’s work, also in Richardson’s lab, led to another *Nature* paper, with Vonk as the first author, on the evolution of fangs. A striking picture of a Lataste’s viper landed it on the cover.

Both papers triggered a wave of local media attention, and journalists discovered that the enthusiastic young researcher had charisma and a knack for storytelling. A



Cover boy. Vonk posed with one of his own pythons for an interview in a Dutch newspaper.

popular prime-time talk show contracted him to bring an animal—usually a scary one—into the studio on a regular basis and talk about it. The formula made some biologists wince but proved hugely popular. In 2009, Vonk was approached by a TV producer who wanted to take him to Africa to produce a series aimed at kids. *Freek in the Wild*, as the show is now called, became a huge success. This month, he will start filming a new prime-time series targeting adults, *Freek in Australia*.

With the fame came a stream of interview requests. The fact that Jinek, his girlfriend, is a well-known TV personality has added to Vonk’s appeal. “Now the gossip press is after me as well,” he says.

Mr. Science

Four weeks after its tumultuous opening, *Freek’s Favorites* has sent visits to Naturalis soaring, says its director, Edwin van Huis. Van Huis hired Vonk last year, weeks after he finished his Ph.D., offering him a half-time job. Vonk also has a starring role in a new crowd-funding campaign to buy a *Tyrannosaurus rex* skeleton dug up by Dutch researchers in Montana this year. If Naturalis can raise the €5 million to €7 million it needs to buy the fossil, it will be the first *T. rex* on permanent display in Europe.

Van Huis says he hired Vonk primarily because he’s a good scientist, “but we also like the way he can reach people with his enthusiasm. Freek represents what Naturalis is all about.” Vonk’s high-octane style may seem to clash with the museum’s almost 200-year tradition, but Van Huis says he hopes it will attract a broader and younger audience. “I’m an old fart myself, I grew up with David

Attenborough,” says Van Huis, referring to the iconic British documentary maker. “But young people don’t like that style anymore.”

Managers at Dutch reptile shelters raised another worry about Vonk’s work in a newspaper story 2 weeks ago: They said his shows may entice people to get reptiles they don’t know how to take care of, which then get dropped at their facilities. Vonk, stung by the story, says he has always conveyed the opposite message: “Don’t take a snake lightheartedly. It’s not for everyone.”

Vonk wants to combine his two careers as long as he can: “If I don’t have to choose, why would I?” In the long run, he’s hoping for an international audience. Talks with Discovery and National Geographic a few years ago didn’t pan out; one problem is that his English isn’t good enough. He hopes to improve it by living in the United States for a year. “I need to start thinking in American,” he says.

Risky business

Vonk won’t show off the collection of snakes he still keeps in his apartment in The Hague. “I don’t want to talk about snakes in captivity,” he says, and he’s worried about being seen as a hobbyist. He’s moving out soon and is now giving away most of his animals. He’ll keep his king cobras, however, the species he loves best and whose genome is analyzed in this week’s *PNAS* paper. “I figured we might as well choose an icon to sequence”: the largest venomous snake and an endangered species. “They’re very intelligent,” he adds. “When they’re looking at you, you can see that they’re thinking, anticipating.”

They’re also very dangerous. A friend of Vonk’s, British snake breeder Luke Yeomans, died in 2011 after being bitten by a king cobra in his snake sanctuary. Yeomans’s widow donated six of his cobras to Vonk—although not the one that killed his friend.

The tragedy drove home the risks of his own work, Vonk says. He has had his share of mishaps, including two bites by venomous snakes. There was that shark, of course, and a few other close encounters. The one that most impressed him was with a Cape cobra, one of Africa’s most dangerous snakes. Lying on the ground, a small camera mounted on his head, Vonk was taunting the snake to film how it responded, when suddenly it lunged at him, so close to his face that he could feel a breeze as its fangs raked the air. “If it had bitten me, I would have had a real problem,” he says.

He now asks his producer to say “Cape cobra” whenever he’s taking too much risk just to get a good shot. “It means: Watch out, Freek,” he says. “You’re going too far.”

—MARTIN ENSERINK

CREDITS (TOP TO BOTTOM): GLOBALPI/ISTOCKPHOTO; COURTESY OF VOLKSKRANT/CORNELIE TOLLENS