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By Cassandra Willyard

Wild-type work

Manuel Patarroyo holding an owl monkey.

courtesy of Mauricio Ángel

On an overcast day this spring, a blue-canopied motorboat slowly navigates the 110-kilometer stretch of the Amazon that divides Colombia and Peru. At the fore stands Manuel Elkin Patarroyo. The aft contains his research subjects—30 individually bagged owl monkeys, each no bigger than a small housecat.

The captain guides the boat toward the bank. Patarroyo, head of the Bogota-based Fundación Instituto de Inmunología de Colombia, disembarks, and begins offloading the animals. Owl monkeys are reportedly difficult to capture, but releasing them takes no time at all. “They are excited to go home,” Patarroyo says, beaming. Investigators the world over occasionally use wild primates for medical research, but Patarroyo says he is the only one who returns them.

Back on the boat, Patarroyo and his shipmates toast the monkeys’ successful liberation with plastic glasses of rum. But not everyone in Colombia is happy about Patarroyo’s catch and release methodology. In 2007, the national magazine *Cambio* published an investigative article that accused Patarroyo of encouraging illegal trafficking and causing ecological damage, sparking public outrage.

Owl monkeys (so called because of their nocturnal habits and large, round eyes) are one of the few primates susceptible to human malaria. In the United States and Europe, these animals can be expensive and hard to find even in primate breeding centers. But Patarroyo has nearly unfettered access: In the early 1980s, he built a laboratory in Leticia, a small town in the heart of the Amazon rainforest. The Colombian government gave him permission to use wild monkeys from the surrounding jungle. He pays

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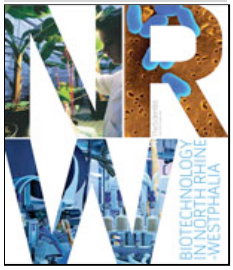

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nearly three decades. Most vaccines rely on pieces of dead or live pathogen to rouse an immune response. But Patarroyo synthesizes molecules that mimic proteins found in the malaria parasite instead. To test each molecule, he injects it into a group of five to 10 monkeys, then gives each a shot of 200,000 malaria parasites (roughly 200 times the number of parasites transmitted via a single mosquito bite). “If they get [malaria], the molecule doesn’t work,” he says.

Not everyone is happy with Manuel Patarroyo’s catch and release program.

In the late 1980s, Patarroyo stumbled across a combination of four molecules that seemed to provide protection against the parasite (*Nature* 328:629-32, 1987), but failed in larger clinical trials. “At that point, the field turned away from Patarroyo’s approach,” says an expert in malaria vaccine research who declined to be named. “He became marginalized.”

Patarroyo has hardly faded away, however—according to ISI, he has published more than 250 papers, which have gathered more than 5,000 citations, mostly within the last 10 years. Today, Patarroyo is following more or less the same approach, but this time he’s aiming for a vaccine composed of at least 60 molecules. The more molecules, the better he thinks the protection will be.

The researcher is wary of talking on the record about the number of primates that have passed through his lab. In March, his lab contained about 650 animals. The Colombian government has issued permits for at least 4,200 animals in total since 1994, and Patarroyo admits to “several thousand.” But Angela Maldonado, a conservationist at Oxford Brookes University in England who has been interviewing the collectors, says that the number captured recently could be as high as 4,000 a year.

It’s not yet clear what, if any, impact Patarroyo’s unconventional methods are having on local populations. (Owl monkeys aren’t endangered or even threatened.) Although the monkeys receive a dose of artequin to rid them of malaria before they are released, some Colombian scientists have expressed concern that they may be spreading diseases. Maldonado is worried that the liberated monkeys might be dying off. Eduardo Fernandez-Duque, a behavioral ecologist at the University of Pennsylvania who studies owl monkeys in Argentina, says that the animals are highly territorial. “If I were to release an owl monkey from the lab into a forest filled with owl monkeys,” he says, “I would be very concerned that other monkeys may just beat the animal to death.”

Camilo Pirajoín, the vet who oversees Patarroyo’s lab in Leticia, says that doesn’t happen. But his evidence is largely anecdotal. The monkeys that participate in Patarroyo’s experiments receive small tattoos. “We know that those animals can live in the jungle,” Pirajoín says, “because the collectors have recaptured them.”

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