

Monkey business - a brutal Amazonian trade in Owl Monkeys



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Peter Bunyard on the battle against malaria, a fallen hero of the Colombian medical establishment and the mysterious fate of thousands of unique primates.

Leticia, nestling beside the Amazon river, is Colombia's southernmost border town. It has a reputation for being a laid-back, peaceful sort of place, where you can walk casually from one end to the other, and even into Brazil – that is if you can tolerate the heat and high humidity. Increasingly it is becoming a tourist centre for Colombians as well as people from overseas, some of whom arrive by river from Brazil or Peru.

One attraction is the Amacayacu National Park, some 70km upstream, which covers half a million hectares of rainforest. There you can stay and rub shoulders with local indigenous communities, in particular the ubiquitous Tikuna and Yagua. There, if you are patient and prepared to walk away from the river and into the forest, you may see wildlife, including monkeys, the three-toed sloth and a host of birds, all supposedly protected from hunting and the illegal trade in fauna and flora.

In Leticia, in recent years, they have built a new hotel, somewhat luxurious for all its Amazon setting, with an excellent view of the vast, mile-wide river making its inexorable way, several thousand miles downstream, to its sprawling 300-mile-wide mouth in Eastern Brazil. Few, if any, of the Decameron Hotel guests are aware that next door, tucked away within a carefully maintained, exotic tropical garden, is a set of laboratories, with cage upon cage containing a single specimen of the genus *Aotus*, a smallish, decidedly beautiful primate which, on account of its nocturnal habits and its large, brown eyes, is known in the English-speaking world as the owl monkey.

Why are these unusual creatures kept in cages? Unfortunately for the owl monkey, the genetics of its blood and immune system make it the near-perfect model in searching for a vaccine that could

prevent humans suffering from infectious diseases such as malaria and tuberculosis. As a result, it has been in demand in laboratories throughout the world, not least in Europe and the United States.

Captive breeding programmes have had limited success and are costly to maintain; for that reason the siting of a laboratory close to the rainforest – so animals can be ‘harvested’, supposedly in pace with natural reproduction – would seem to make sense. And since the Amazon’s indigenous peoples are masters at hunting and tracking primates, it is they who supply the Leticia laboratory, the Amazon wing of FIDIC (the Immunological Foundation of Colombia), with its subjects.

The scourge of malaria

Shouldn’t we be grateful for a God-given creature that can help us find a way to combat such a deadly and debilitating disease as malaria? Each year in Africa more than a million children below the age of five die of this disease – one every 30 seconds. As many as 500 million people are infected worldwide, and the deaths may run into several millions; moreover malaria is spreading as global warming takes hold. According to the World Health Organization (WHO), in countries where malaria is endemic the expenditure on treatment may cost as much as 40 per cent of annual public health expenditure. Who would deny the effort, at whatever cost, to look for a means to prevent it?

The problem is that there has never been a successful malaria vaccine. Indeed, the failure to find a cure is an ongoing embarrassment to medical science. Anti-malarial drugs are generally toxic (as the recent withdrawal of Lapdap has shown) and if taken for extended periods of time can damage the liver. Drugs such as Larium (mefloquine) even have dangerous psychological effects. Certainly not an option for young vulnerable children.

Nor is the situation helped by modern travel and the taking of prophylactic doses of antimalarials for the thousands of tourists visiting mosquito-prone areas. Plasmodium, the malaria parasite, quickly evolves resistance and, in a matter of years, one drug has to replace another that has lost its efficacy.

Of course testing of new drugs invariably involves animal experimentation. Few in Colombia have questioned the use of primates in medical research, any more than they do in the US or Europe. But over the past few years, people in Colombia, including primatologists and animals rights activists, have begun to look more closely at the ‘monkey business’ of using wild animals – indeed, any animals – for research, however philanthropic the aims.

Colombia is a country where malaria, including the virulent *Plasmodium falciparum*, is prevalent, especially in the Pacific coast Chocó region, and the idea of a synthetic vaccine that would help not only

Colombians, but also people in other parts of the planet, certainly took the fancy of an ambitious Colombian medical investigator, Manuel Elkin Patarroyo. He has spent more than 25 years looking for a vaccine that would confer protection against malaria on those at risk from the disease. The advantage he has had over investigators in Europe and the US is that his test organism is native to, and thus readily available in, his part of the world.

Some 20 years ago, after extensive tests on the owl monkey, Patarroyo synthesised his vaccine, SPf66. After trials in Colombia and Tanzania, he claimed it conferred protection from malaria on 40 per cent of the population – a rate of non-infection that was not so different from what might be found in an unvaccinated population, his critics observed.

Despite that, in 1994, in Spain, Patarroyo was awarded the Prince of Asturias Award for Technical and Scientific Research, on which occasion he proclaimed, 'I have marked the territory and my vaccine is a landmark in the history of parasitology', unblushingly observing that had he not been a Colombian but a scientist from the US or Europe he would by then have received the Nobel Prize. He went on to silence the critics who believed he was in the business of creating a vaccine for his own gain by handing all rights for the use of his SPf66 vaccine over to the WHO.

The WHO put Patarroyo's vaccine to the test in Gambia and Thailand but obtained disappointing results. Its creator responded that the vaccine used – manufactured in the USA – was not the same as he had developed. It was found to contain a higher proportion of the active principal ingredient, but the Colombian Institute of Tropical Medicine got results that were no better using vaccines from Patarroyo's own lab, the Institute of Immunology at the San Juan de Dios Hospital in Bogotá, to carry out epidemiological tests in Vigía del Fuerte in the Chocó.

How many monkeys?

In justifying his use of the owl monkey in the Leticia lab, Patarroyo states not only that the animals do not suffer, but also he gives them five-star hotel treatment. He says none of the monkeys has died in captivity; moreover that their stay is a relatively short one and after they have served their purpose that they are rehabilitated and set free in the forest.

The actual registry of what happens to the animals in the lab gives the lie to Patarroyo's claim that no animals have died in captivity. Between January and June in 2005, as many as 76 owl monkeys died: 26 from malaria, 15 from pneumonia, nine from malnutrition and four from diarrhoea. Photographs have also come to light showing animals in a deplorable state, with some dead in their cages and others, having lost all their fur, barely able to stand.

As a result of the picture emerging from the Leticia lab, María Constanza Moreno, the legal representative of the federation of groups defending Colombia's natural environment (Federación de Entidades Defensores de Animales y Medio Ambiente de Colombia), has charged Patarroyo with violating Colombia's laws regarding the exploitation of natural resources; with unlicensed experimentation on animals; with failing to ensure the wellbeing of captive animals; with indiscriminate hunting of research specimens; with forest destruction and, finally, with failing to set up, or at least promote, a committee that deals with the ethical use of experimental animals.

In supporting her demand for a court hearing, Moreno refers to a video tape taken in 2003, which shows Peruvian and Brazilian Indians selling monkeys under the cover of night to staff in Patarroyo's Leticia lab. The Indians know full well what they are doing is contrary to the laws of Brazil, Peru and Colombia. They know too, if caught, to deny any connection to Patarroyo. In fact, he has told them he

will take no responsibility and they must stand on their own. That's why he pays them well, £12 per live animal – not bad money in that part of the world.

Over 25 years of the Leticia lab's existence, thousands of animals have been handed over to Patarroyo, with no clear idea of where they come from nor what happens to them once he has dispensed with them. In October last year, according to Cambio (22 November 2007), the Colombian Newsweek, a group of 15 Tikuna Indians spent five hours on the river to deliver 120 owl monkeys, all of which had been captured on the Peruvian side of the Amazon.

Meanwhile, Patarroyo has requested authorisation for 1,600 more monkeys so he can continue his research during 2008. The authority concerned, CorpoAmazonía, the council for Colombia's Amazonas department, gave its approval despite knowing of abuses against animals and the laws of Colombia and its neighbours, not least of which deems it illegal to trade in wild animals. In fact, Colombia has signed up to all the relevant international laws, and the 1964 Declaration of Helsinki clearly states 'sufficient attention must be paid in any scientific investigation to those factors that could prejudice the natural environment. In addition, the wellbeing of any animals used in experiments must be assured.'

Contrary to all that, according to Marcela Ramírez, director of the network for protecting the environment and wildlife, the environmental authorities of Colombia have looked the other way so as not to impede Patarroyo in his ambition to be among the first to produce a viable vaccine for malaria.

'The lack of any institutional regulation of Patarroyo's activities is truly shame-making,' she says. 'He has managed to sell an image of his importance as a medical scientist dedicated to finding an effective malarial vaccine, which finds its way right to the presidential palace.'

Though rather late in the day, the scientific community has begun to react to these fundamental irregularities in the activities of the Leticia lab, and on 1 December 2007, the Colombian Association of Primatology stated its concern that nothing was known of the fate of thousands of monkeys that Patarroyo had used over 25 years of research.

'We have received no data from CorpoAmazonía, the department responsible for the fate of the primates,' said the Association. 'Moreover, Patarroyo does not have any licence from either Brazil or Peru for fomenting the trade in animals from their countries. That is illegal in Colombia and no less internationally. It is regrettable that CorpoAmazonía appears to have been a willing accomplice in such illegal activities. That surely cannot help the situation with regard to Colombia's standing in terms of its international responsibilities.'

'We are also concerned that Patarroyo and his group of scientists have freed animals that have been inoculated with Plasmodium. Contact between those animals and local wild populations could lead to the spread of disease. The human population could also be at risk. We have no information on the "freed" animals, how many and where, and CorpoAmazonía refuses to enlighten us.'

The primatologists are also worried that the extraction rate is far higher than the population of Aotus can sustain. 'The owl monkey is relatively widely dispersed in its natural environment, living

monogamously and therefore in small family groups. It takes at least three years for an animal to reach sexual maturity and that is just not enough to enable the population to recover.'

A successful vaccine?

Patarroyo has failed, it would seem, to produce a viable vaccine against malaria, despite the untold suffering of the thousands of owl monkeys involved in his trials. Other research establishments appear to be making some headway approaching the problem of malaria from less traditional angles.

Most vaccines work by stimulating the body to produce antibodies against disease. This approach does not work against the malaria parasite once it has invaded liver cells, where it continues to divide with relative impunity and provide a source of infection. The Malaria Vaccine Trials Group in Oxford, based at the university, has focused on generating vaccines that rely on boosting a strong T-cell lymphocyte immune response against the very same liver cells harbouring the parasite. Human trials are ongoing in areas in Africa where malaria is endemic.

Medical research can and should turn away from using primates such as the owl monkey and find what they need from in vitro studies of human cells and from human volunteers.

Whether or not Patarroyo ends up in court to face the serious charges against him is still to be decided, but the publicity surrounding the case against a man considered a Colombian superstar may at least lead authorities such as CorpoAmazonía to think again before blithely giving their consent, in the name of progress, to more cruel and unnecessary tests on animals.

Animal testing – why not?

Several published studies show that animal testing can only correctly predict human reactions to drugs in 5-25 per cent of cases. Several drugs deemed safe and effective based on animal testing have later proven ineffective, harmful or lethal to humans. For example:

- Arthritis drug Vioxx appeared safe in animal tests but was withdrawn from the market in 2004 after it caused 140,000 heart attacks and strokes in the US alone.
- Hormone Replacement Therapy lowers the risk of heart disease and stroke in monkeys but significantly increases the risk of these conditions in humans. Further, The Lancet estimated in 2003 that over a decade it had caused 20,000 cases of breast cancer in Britain.

There are numerous other similar examples relating to drugs for these and other diseases and complaints, such as cholesterol, diabetes and various heart conditions – even cancer. There are several reasons for this:

- Every species of animal has a unique genetic make-up, so introduced substances produce different reactions from one species to another.

- Animal models cannot demonstrate side-effects, such as headaches, allergic reactions, depression, some blood disorders, skin lesions and many central nervous system effects.
- The range of species used and the variety of conditions under which tests are conducted mean that results can be used to 'prove' almost anything.

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