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MICE TIMES

Experiments in East Asia

In Europe, fewer monkeys are now being used for scientific research. This is not necessarily an advantage for the monkeys. There is still a need for studies and experiments, and they are now being relocated and increasingly conducted in China.

Nikos Logothetis has decided not to carry on any longer. According to reports from last year, the neuroscientist at the Max Planck Institute for Biological Cybernetics is giving up the use of monkeys in research. The external pressure and hostility towards his experiments had become too great. «It's doubtful whether this will be of any real help to the animals. The more this kind of research is repressed in highly developed countries, the more these experiments will move to countries like China – in other words, to parts of the world where the life of a primate is not protected with the same care as it is in Europe,» Patrick Illinger was quoted as saying in the Süddeutsche Zeitung concerning the events in Tübingen[1].

The figures confirm this trend. In the journal Nature, a 28% decrease is reported in the number of monkeys used for research in Europe between 2008 and 2011[2]. Franz-Josef Kaup, Head of the Primate Husbandry Unit and Animal Welfare Officer at the DPZ (German Primate Centre) in Göttingen quotes some precise figures: «In 2005, 10'449 monkeys were used for research in the European Union, while in 2011 the figure was down to only 6'095 animals.» In his estimation, the decrease is mainly due to the fact that, in Great Britain, practically no monkey studies are carried out any longer in pharmaceutical research.

«But toxicological studies still have to be conducted for the pharmaceutical industry,» says Kaup. Between 70 and 80 percent of all monkeys are used in pharmaceutical research, he adds, and the UK companies have probably now outsourced these studies to Asia. «It is undisputed that such outsourcing takes place, but it is difficult to prove where and how – it's not talked about much,» says Kaup. A European researcher who prefers to remain anonymous reports in Nature after a visit to Asia that many Europeans have established working relations with China, but don't talk about it because of the risk of damaging their reputation[3]. The number of animals at the primate centre in Göttingen and in pharmaceutical studies in Germany are relatively stable, says Kaup, but adds that a large German pharmaceutical company has recently conducted monkey studies in China.

Rhesus monkeys, German Primate Center, Kurt Fahrner

While researchers in Europe are in retreat, an excited upbeat mood prevails in China. The Yunnan Key Laboratory of Primate Research, for example, which was founded five years ago in the southwest of the country, houses 1'500 monkeys alone, many of which serve as models for medical research, e.g. in autism, Parkinson's and cardiovascular disease. In Yunnan they are already collaborating with researchers from Europe and the USA, and its director, Ji Weizhi, plans to expand the centre further and widen international contacts.

At another flourishing centre in China, the Kunming Institute of Zoology, there is a colony of 2'500 cynomolgus monkeys (Macaca fascicularis). According to the institute's plans, the building is soon to be redesigned like a hospital, with different departments for genetic studies, operations and rooms with MRI and CT equipment for diagnosis. There are further new research centres in Shenzhen, Hanzhou, Suzhou and Guangzhou.

Why China and why now? Firstly, science and especially research in monkeys are currently being heavily promoted as a national goal in China. Secondly, techniques are now available with which primates can be manipulated using gene technology much more easily than used to be the case. «There have been advances in stem cell biology and in vitro fertilization,» said science journalist Katrin Zöfel when discussing a visit to China. «And there are methods such as the new CRISPR-Cas technology, which serves as a pair of molecular scissors that can modify genes in individual cells very precisely,» she added[4].

The inhibitions that people have in Europe when it comes to experiments with monkeys do not exist in China, says Zöfel. In her view, they do not comply with animal welfare guidelines in China in the same way European standards are observed. But you have to draw a distinction here, she adds. «They don't relate to animals in China and Japan the same way we do. Monkeys tend to be regarded as things rather than living creatures,» says Zöfel, adding that international cooperation only takes place, however, when the Chinese abide by international standards in the handling of animals. Franz-Josef

Monkey compound, German Primate Center, Kurt Fahrner

Kaup takes a similar view: «While the attitude of Asians to animals is not the same as ours, the Chinese nevertheless comply with GLP (Good Laboratory Practice) and the animal welfare requirements of their clients.»

What are the consequences of China as a global player in monkey research? «China could become the only place where we can validate our therapeutic strategies – do we want that?» asks Erwan Bezard from the University of Bordeaux, who is engaged in research on the pathogenesis of Parkinson's. Researchers are afraid of becoming dependent on China in the research and testing of medicines. «It would be a sad irony if key developments have to be moved to precisely those countries that do not live up to our high standards of animal welfare,» says Roger Lemon from University College London, where he is researching into the control of skilled hand movements. Lemon's team is developing new forms of treatment for stroke patients. The China boom could lead to bottlenecks. If more and more experts were to emigrate, it would become increasingly difficult to find specialists such as surgeons or anaesthetists who are familiar with handling animals, writes Alison Abbott in Nature.

The Göttingen researcher Franz-Josef Kaup draws attention to a further problem. In China, they often work with F1 generation monkeys, i.e. the sons and daughters of captive wild animals. «Because of the genetic variability of the animals and their uncertain health status, the quality of the study results could fall,» says Kaup. The monkeys could, for example, have become infected with parasites in utero. Animal welfare in Europe, however, stipulates that F1 animals must no longer be used in research as from 2022 at the latest, says Kaup.

Applied research is dependent on experiments with monkeys for tests and studies, says Kaup, highlighting two problem areas in particular. Firstly infection research: for a better understanding of the processes in an infection with HIV, studies using rhesus monkeys infected with the simian immunodeficiency virus (SIV) and genetically engineered variants of the virus play a crucial role. And the development of medicines or vaccines for the treatment of Ebola infections, for example, is currently inconceivable without monkeys.

For decades, researchers have been engaged in studies with monkeys to gain a better understanding of brain function and diseases of the human brain. «Brain pacemakers, which are helping thousands of Parkinson's patients today, were developed in monkeys, and mechanical prosthetic arms that are controlled by the mind are also being researched in the monkey model,» says Kaup. Grégoire Courtine from the Federal Institute of Technology in Lausanne (EPFL) is also working on the development neuroprosthetic devices. Courtine has decided to divide his time between Lausanne and the primate research firm Motac in Beijing. He flies over about once a month to advance his research.

Courtine is also a champion of Swiss monkey research in Fribourg. Here he set up the Swiss Primate Competence Centre for Research in 2013 – not only as a training centre for researchers who work with monkeys, but also as a central point of contact for the dissemination of information to the general public. «If the research demands quantity, I will do it in China,» he says. On the other hand, Courtine prefers to conduct complex experiments in Fribourg.

At present, you have three options as a researcher, writes Alison Abbott in Nature. Some scientists confront the situation and increasingly draw the attention of the public to their work. «Others have given up monkey experiments completely, and a third group moves its experiments to a country outside Europe.» The neuroscientist Anna Wang Roe from Vanderbilt University in Nashville is taking the path to China. She is hoping that state-of-the-art equipment and monkey studies there will help her to make progress with her research into how the various modules of the brain are interlinked. For this reason, she is now closing the doors on her

American laboratory and becoming Director of the Zhejiang Interdisciplinary Institute of Neuroscience and Technology.

Sources:

[1]http://www.sueddeutsche.de/wissen/ende-der-primatenforschung-in-tuebingen-falscher-jubel-1.2463621
[2]http://www.nature.com/news/monkey-kingdom-1.19762
[3]http://www.spektrum.de/magazin/primatenforschung-in-europa/1281869
[4]http://www.deutschlandfunk.de/genexperimente-mit-affen-chinas-forscher-machen-was-in.676.de.html?dram:article_id=351185

It would be ideal if we could understand the complicated mechanisms of a body without stressful animal experiment. Unfortunately that is not yet possible today. But the dilemma will remain for a long time to come: basic research without experiments in animals would mean abandoning any medical progress. Mice Times aims to explain why and therefore reports on medical success stories that were only possible thanks to animal experiments.

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