

Cloning monkeys for research puts humans on a slippery ethical slope

February 1 2019, by David Hunter



Can't sleep: these cloned macaque monkeys are missing a gene involved in regulating the sleep/wake cycle. Credit: Chinese Academy of Sciences via AAP

Scientists have many tools at their disposal to study, manipulate and copy genes.

Now it [appears](#) researchers at the [Institute of Neuroscience](#) in Shanghai, China, have [combined techniques](#) to produce a world first: gene edited, cloned [macaque monkeys](#) (*Macaca fascicularis*).

Qiang Sun, a senior researcher in the project and Director of ION's Nonhuman Primate Research Facility [explains](#): "We believe that this approach of cloning gene-edited monkeys could be used to generate a variety of monkey models for gene-based diseases, including many brain diseases, as well as immune and metabolic disorders and cancer."

It sounds like a good idea at face value – curing [human disease](#) is something most of us consider a priority. But there are some complex ethical issues at play here.

First, there's the ongoing question of how we should decide which [animals](#) should be used for research.

Second, cloning itself introduces some unique problems around commodification of research animals.

Taking genetics out of the equation

The science in these two [reported studies](#) involved cutting out a gene involved in regulating the sleep/wake cycle. Then, an edited embryo was cloned (copied) to produce five live-born monkeys. The five monkeys are essentially genetically identical, and all missing that one gene.

The gene removal created [multiple effects](#) in edited monkeys, such as reduced sleep time, increased movement during the night, changed blood hormone levels, increased anxiety and depression, and some

schizophrenia-like behaviours.

A [statement](#) from the Institute of Neuroscience says this research is an important first step towards the production of "customised gene-edited macaque monkeys with uniform genetic background" for biomedical research.

The underlying motivation of this sort of approach is that the more genetically identical research subjects are, the better any science conducted using them as subjects can be. When comparing two possible outcomes of an experiment – comparing the effect of a new drug versus a non-active placebo for treating anxiety, for example – it allows researchers to remove the complicating effects of natural gene variation from the study outcomes.

Not humans

Animal testing and research involves people doing things to animals that we would not permit them to do to human subjects.

The World Medical Association's [Declaration of Helsinki](#) indicates that in human subject research, the interests of the research subject should be considered paramount. No amount of possible societal benefit should trump the consideration we give for the consent and welfare of [human subjects](#).

This obviously prevents all sorts of research from taking place – because even though results may be beneficial to humanity overall, some experiments would be harmful to the research subject.

The solution to this problem has been to shift this research to animals – given that many believe that animals have a lower [moral standing](#) than humans.

Human proxies

So animals are used as a proxy to try to assess what would happen to a human subject exposed to the same environment or condition.

Ideally the animal needs to be close to humans in the relevant health aspects that are being tested. Otherwise the results are likely to not tell us anything useful from the human perspective.

However, the closer to humans the subject is in a biological sense, the more likely the animal to also have a high moral status – perhaps even the same moral status as humans do.

This is because moral status is typically thought to be based on the capabilities something has, rather than its genetics. A number of different characteristics have been suggested as the root of [moral status](#), such as sentience, consciousness, personhood, rationality and higher order reasoning. The closer an animal is to us, the more likely it also shares these traits with us.

So the better a model of human biology an animal is, the more controversial and ethically problematic it will be to use them in research, especially research that is harmful or destructive in nature.

High moral status

Primates are closer to us than other species in terms of their capacities. Even if we don't hold that all primates hold the same moral status as humans, it seems clear that if any animal does have moral status, primates would be highly placed on the list. Legislation and practices around research have grown to reflect this.

Some countries – such as the Netherlands, New Zealand, the United Kingdom, Sweden, Germany and Austria – have legislation that recognises high moral status animals (great apes such as orangutans and chimpanzees, for example) from being used as research subjects. This has occurred because of work by organisations like the [Great Ape Project](#) and the [Nonhuman Rights Project](#).

Despite this many non-human primates are still used in research, [around 75,000 in the US in 2017](#) for example – most of whom are bred in captivity for this purpose.

The macaques edited and cloned in these new papers are an example of a primate that is still used a research model to explore human health.

Cloning is different from breeding

Cloning introduces additional ethical issues for non-human primate research.

There are two ways that cloning is different than captive breeding in terms of [ethics](#).

First, the process of cloning itself introduces harms. For each [live birth](#) there are often several unsuccessful attempts to create, implant and bring to term a clone.

A [report](#) suggests that to create the five cloned macaques in this world-first case, the team started with 325 cloned gene-edited embryos, which they implanted into 65 surrogate monkeys, a process that cost about US\$500,000. I suspect these costs will be reduced as the technique used is refined.

The second issue has to do with commodification, the practice of taking

something and making it "property".

A 'thing' rather than a being

Commodification is important psychologically because it helps with the othering that allows us to abuse and misuse. If something is an object rather than a subject, a "thing" rather than a "being", it becomes easier to discount its welfare.

Commodities have no standing of their own; they are things we use and discard at will.

Of course research animals are already property. The vast majority are captive bred, and many of those animals are commercially created for use in research.

Cloning for research purposes might nonetheless increase the commodification of these animals by commercialising their production even further. When techniques are used to create animals with specific harmful characteristics to improve their usefulness as test subjects, this inherently increases the view of these animals as merely disposable objects.

Given that we recognise primates often have a high moral standing, it is likely that commodification will lead to the inappropriate treatment of these creatures.

Controversial cases – such as this relatively recent piece of research testing the [effects of diesel fume exposure](#) on monkeys and humans – provide a troubling window into what can occur when creatures are treated merely as a means to a scientific end rather than as beings in their own right.

On a slippery slope

Commodifying creatures that are close to us in moral standing may well itself lead to a slippery slope. A word commonly used regarding commodification in the human context is "dehumanising".

Once we are used to treating those creatures as a commodity, something merely to be used, destroyed and discarded if needed for scientific quality, it may be easier to treat fellow humans in that way too.

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