

# Mammals cannot be cloned

## infinitely, mice study discovers

*The finding rules out all sorts of scenarios involving clones that have been dreamt up in science fiction.*

AFP | Paris, France

There is a limit on how many times a mammal can be cloned before suffering "mutational meltdown", Japanese scientists have discovered, after making 1,200 clones over two decades that started off with a single mouse.

The 58th generation of mice did not survive, establishing for the first time that mammals cannot be cloned an infinite number of times, the scientists said in a study published on Tuesday.

It had been hoped that this method, which involves making clones of other clones, could have a range of



the first empirical demonstration" that this meltdown occurs in mammals, it added.

The finding could also rule out all sorts of scenarios involving clones that have been dreamt up in science fiction.

For example, Wakayama joked that this finding meant it would have been impossible to create so many clone troopers in the Star Wars prequel "Attack of the Clones".

It could also affect any plans to preserve Earth's genetic resources in a vault in the hope of re-cloning a new population following some catastrophe in the future, the study pointed out.

Wakayama is also working on new ways to collect cells from animals without harming them, as part of efforts to bring endangered species back from the brink.

His team has already successfully made clones from cells found in urine -- and are currently working to do the same with faeces.

They also had larger placentas -- and some were missing a copy of their X chromosome.

"It was once believed that clones were identical to the original," Wakayama said, but this was clearly not the case.

Wakayama admitted his team has "no idea" how to overcome this problem, suggesting that perhaps the answer was to develop a better cloning method.

### The importance of sex

Importantly, when the later clones -- even in the 57th generation -- mated with male mice, they had healthy offspring with fewer mutations.

This discovery demonstrates "that sexual reproduction is indispensable for the long-term survival of mammalian species," the study said.

It also supports a theory called Muller's ratchet, which "predicts that in asexual lineages, deleterious mutations inevitably accumulate, ultimately producing mutational meltdown and extinction," the study said.

The research "provides

uses in the future, including saving endangered species or mass-producing animals for their meat.

"We had believed that we could create an infinite number of clones. That is why these results are so disappointing," the study's senior author Teruhiko Wakayama of the University of Yamanashi told AFP.

It was Wakayama's team that cloned the first mouse in 1997, a year after the famous Dolly the Sheep became the first-ever mammal clone.

For the new research, the scientists first cloned the original female mouse in 2005.

Once a mouse reached three months old, they were cloned again, resulting in three or four new generations every year.

Over the next 20 years, they carried out more than 30,000 cloning attempts that creat-

ed over 1,200 mice.

The process involves removing the DNA-containing nucleus of a cell from a donor animal and implanting it into an unfertilised egg from which the nucleus has been removed.

### 'Critical turning point'

In the first few years, the method's success rate steadily rose -- reaching over 15% at one point -- and the mice appeared to all be identical.

This gave the scientists hope that they could make clones indefinitely.

However there was a "critical turning point" around the 25th generation, according to the study published in the journal Na-

ture Commu- ni- cations.

After that point, harmful genetic mutations built up over the generations, and each new set of mice was less likely to survive.

By the 57th generation, only 0.6 percent survived. Despite their accumulating mutations, these mice were still healthy.

However all the mice in the 58th generation died shortly after birth.

"There were no visible abnormalities in the pups, and the cause of death is unknown," Wakayama said.

The scientists sequenced the genomes of some of the clones, finding that they had three times more mutations than mice born via sexual reproduction.



**The first animal ever cloned from an adult cell was Dolly the sheep in 1996, proving that specialised adult cells can be reprogrammed to create an entirely new organism.**

## NASA to build \$20 bn moon base, pause orbital lunar station plans

AFP | Washington, United States

NASA's chief on Tuesday said the US space agency will invest \$20 billion to develop a base on the Moon, while suspending its plans to create the lunar orbital space station known as Gateway.

"The agency intends to pause Gateway in its current form and shift focus to infrastructure that enables sustained surface operations," Jared Isaacman said in a statement given during a day-long event at NASA headquarters in Washington.

"Despite challenges with some existing hardware, the agency will repurpose applicable equipment and leverage international partner commitments to support these objectives," he said.

The European Space Agency among other international organizations were partners on the planned Gateway project.

It's the latest shake-up at



NASA in the wake of changes to the Artemis program, which aims to send Americans back to the Moon and establish a long-term presence there, paving the way for eventual missions to Mars.

The Gateway orbital lunar station was meant to serve both

as a point of transfer for astronauts headed to the Moon as well as a platform for research.

The suspension of the initiative isn't entirely surprising: some had criticized it as wasteful or a distraction from other lunar ambitions.

Isaacman said NASA now

plans to spend \$20 billion over the next seven years to construct the lunar base over dozens of missions, "working together with commercial and international partners towards a deliberate and achievable plan."

"There will be an evolutionary path to building humanity's first permanent surface outpost beyond Earth, and we will take the world along with us."

Artemis 2 on deck

Isaacman, who took the helm of NASA late last year, abruptly announced less than a month ago that it was reshuffling its Artemis program that has suffered multiple delays in recent years, as it aims to ensure Americans can return to the Moon's surface by 2028.

That goal remains unchanged, but the US space agency is shifting its flight lineup to include a test mission before an eventual lunar landing to improve launch "muscle memory," Isaacman said.

## Hezbollah calls on Lebanon to 'immediately reverse' expulsion

AFP | Beirut, Lebanon

Hezbollah yesterday called the decision by Lebanon's foreign ministry to expel the newly appointed Iranian ambassador a "sin", and demanded the authorities "immediately reverse" the move.

"Hezbollah calls on the President of the Republic and the Prime Minister to demand

that the Minister of Foreign Affairs... immediately reverse this decision because of its dangerous repercussions," the Iran-backed group said in a statement, calling the move a "national and strategic sin".

The foreign ministry had earlier given the Iranian diplomat until Sunday to leave the country.

## Two suspected of spying for Russia arrested in Germany, Spain

AFP | Berlin, Germany

A man and woman accused of spying for Moscow on a drone supplier in Germany have been arrested, officials said yesterday, the latest case of alleged Russian espionage amid the Ukraine war.

Berlin, one of Kyiv's key military backers, has faced a flood of suspected espionage, sabotage and disinformation plots directed by Russia since

the full-scale invasion began in 2022.

In the latest case, the man, a Ukrainian national partially identified as Sergey N., was arrested in Alicante, Spain on February 17 by local police under a European arrest warrant, German federal prosecutors said.

The woman, a Romanian national identified as Alla S., was arrested on Monday in Germany, they said.