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Health

# Stress can biologically age you, but the effect isn't permanent

Alice Klein

WE BECOME biologically older when our bodies are under stress, but younger again when we recover, according to a study that analysed people's DNA when they had emergency hip surgery, had severe covid-19 or were pregnant.

"This recovery suggests we have the machinery to be able to rewind the clock back at least a little bit," says James White at Duke University in North Carolina, who co-led the study with Vadim Gladyshev at Harvard University.

We normally measure age by the number of birthdays – so-called chronological age. But people can be biologically older or younger than their chronological age depending on factors such as whether they smoke. We can measure this with "epigenetic clocks" that analyse patterns of markers on DNA called methyl groups that correlate with age.

White, Gladyshev and their colleagues used these clocks to assess the impact of three types of stressful event on biological age. They analysed DNA from blood samples that were collected at multiple points in time from participants in previous studies.

In the first analysis, the team found that the biological age of nine people with an average age of 81 rapidly rose after emergency surgery to repair a broken hip, but returned to pre-surgery levels over the following week.

Next, the team measured the biological age of 29 people with an average age of 60 while they were hospitalised with covid-19 and after they were discharged. The biological age of female participants fell after discharge, but that of male participants didn't, possibly because men take longer on average to fully recover from the disease, says White.

Finally, the team compiled data from four studies that included more than 200 women who were pregnant, which is known to put stress on the body. Their biological age increased over the course of the pregnancy, but, by six weeks after delivery, it had returned to below the levels seen in early pregnancy. No transgender men or non-binary people were included in this part of the study.

**You are only as old as you feel, but stress doesn't help**

ALEX SEGRE/ALAMY

The researchers also used epigenetic clocks to measure the biological age of mice before, during and after pregnancy and found the same pattern (*Cell Metabolism*, doi.org/gr5z88).

The idea that biological ageing speeds up during stressful events but reverses afterwards is consistent with a previous study that found that people's grey hairs sometimes regain their original colour after they recover from psychologically stressful events.

However, Luigi Fontana at the University of Sydney in Australia says that even though there may be short-term fluctuations in biological age, the trend is still to become older. "Your grey hair may regain some colour, but it isn't going to revert to the hair you had as a 10-year-old," he says.

Nevertheless, now we know that biological ageing can at least reverse slightly, it raises the possibility of being able to develop therapeutics to drive this reversal further, says White. ▮

Technology

## Wood transistor could let us embed electronics in trees

**AN ELECTRICAL switch made from conductive wood could become a building block for future electronics.**

**"There is an emerging research field called electronic plants, where scientists look at different ways to send signals inside plants or to incorporate functionality such as sensors in plants, even in living plants," says Isak Engquist at Linköping University in Sweden.**

**Engquist and his colleagues have developed a wooden version of a transistor – a component that can boost electric currents or act as a switch for electric signals.**

**At 3 centimetres long, it is much larger than silicon transistors, which can squeeze in their billions onto a fingernail-sized computer chip. It is also slower, taking seconds to switch on and off, while silicon ones can do it billions of times in a second.**

**But the wood transistors could be sustainable and biocompatible for applications in agriculture or forestry, such as monitoring plants' resistance to environmental stress and climate change.**


VAN CHINH TRAN

An electronic transistor made from balsa wood

**To create the wood transistor, Engquist and his colleagues used heat and chemicals to remove the compound lignin from bits of balsa wood. That freed up space in the network of tubes, called lumina, that transport water within wood.**

**They then immersed the wood in a liquid containing a conductive polymer, allowing the polymer to soak into the wood and coat the lumina. This made it capable of interacting with electrolytes – chemicals that conduct electricity when dissolved in water – as the foundation for constructing a wood transistor (*PNAS*, doi.org/j7d7).**

**The researchers measured the wood transistor's operations during multiple switching test runs.**

**The work represents an exciting possibility for utilising wood as a scaffold to incorporate electrical materials into devices, says Tian Li at Purdue University in Indiana.** ▮

Jeremy Hsu