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Mouse and human germline cells appear to reset their biological age

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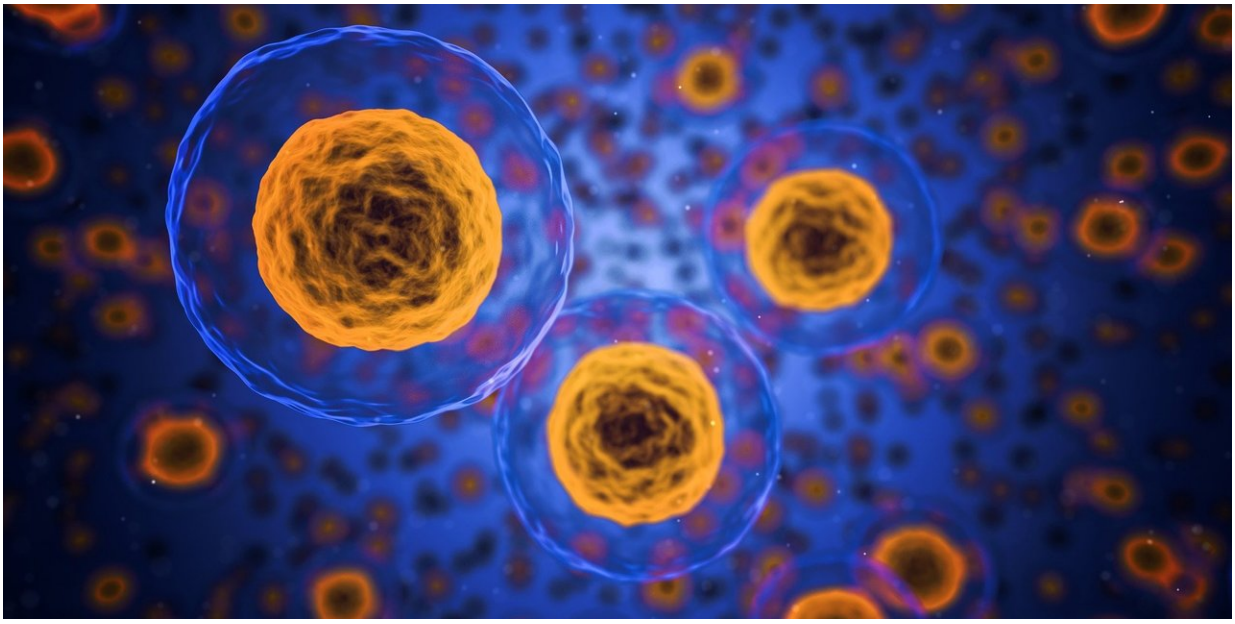

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A team of researchers at Brigham and Women's Hospital and Harvard Medical School have found evidence of mouse and human germline cells resetting their biological age. In their paper published in the journal *Science Advances*, the group describes their study of the aging process in germline cells and what they found by doing so.

As animals grow older, all of the cells in their body replicate themselves

repeatedly. As the process continues, errors in replicating and other external factors (such as exposure to pollutants) lead to gradual decay in cell quality, which is all part of the natural aging process. In this new effort, the researchers have found evidence showing that germline cells have a mechanism for resetting this process, allowing offspring to reset their aging clocks.

Germline cells pass on genetic material from parent to offspring during the reproductive process. For many years, scientists have wondered why these cells do not inherit the age of their parents. And for many years, they assumed that the cells were ageless, but recent work has shown that they do, in fact, age. So that raised the question of how offspring are able to begin their lives with fresh cells.

To find out, the researchers used molecular clocks to track the aging process of mouse embryos. These clocks have been developed to measure epigenetic changes in cells. The researchers used them to continuously compare the biological age of embryos (how old they appear to be based on reactions to epigenetic changes) with their chronological age. They found that the age of the mouse embryos remained constant through initial cell division after an egg was fertilized. But then, approximately a week later, after the embryo had attached itself to the uterus, the biological age of the embryos dropped. This finding suggested that some mechanism had reset the biological age of the embryo back to zero.

The team then turned their attention to human embryos. They were not able to track aging in human embryos due to ethics rules that forbid such research, but they did find evidence that suggested human embryos reset their clocks, as well. They plan to continue seeking the mechanism behind the reset process.

More information: Csaba Kerepesi et al, Epigenetic clocks reveal a

rejuvenation event during embryogenesis followed by aging, *Science Advances* (2021). DOI: 10.1126/sciadv.abg6082