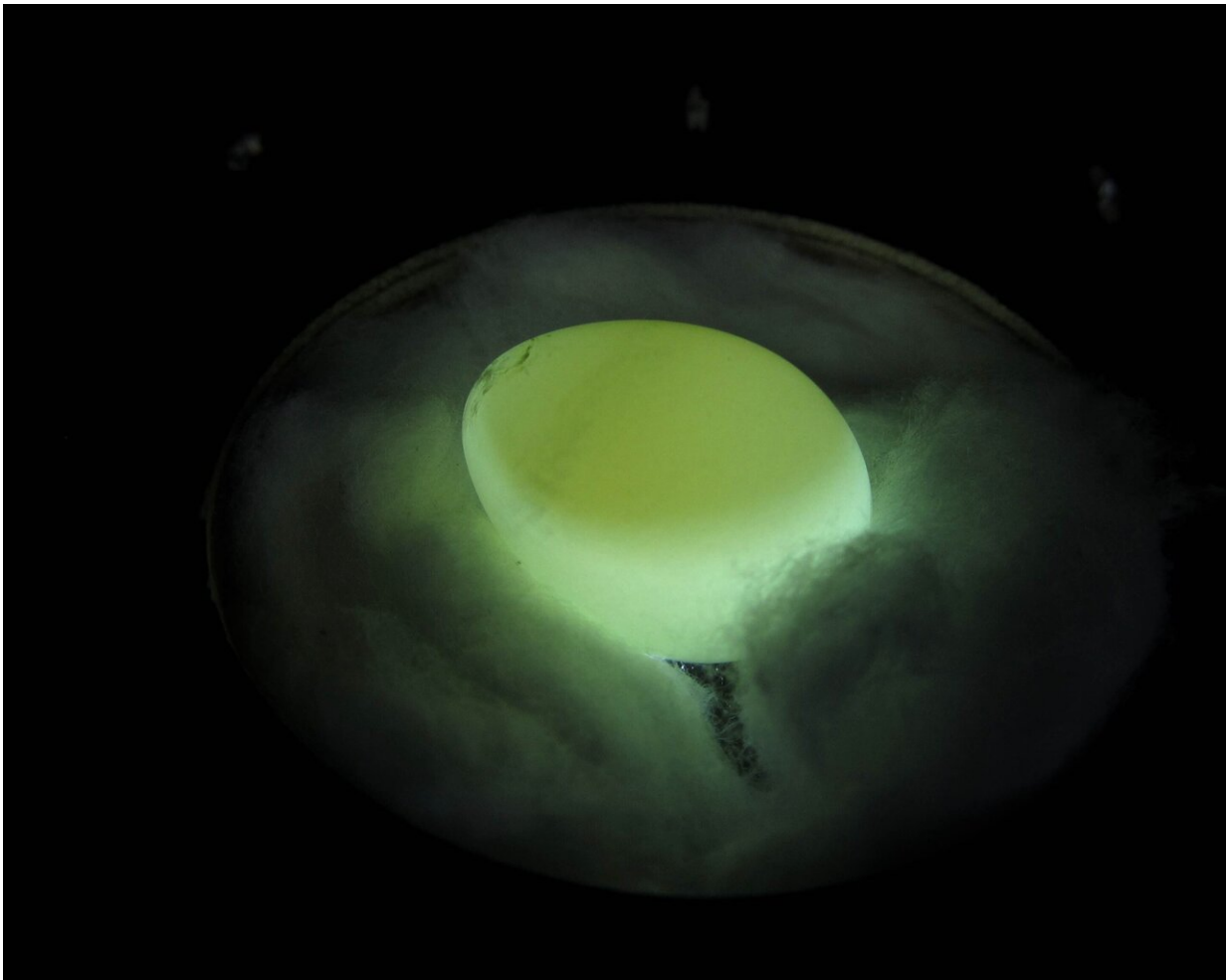


# Born to be young? Prenatal thyroid hormones influence 'biological age' at birth

November 11 2020

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Flycatcher egg being illuminated in order to inject thyroid hormones specifically into the egg yolk. Credit: Tom Sarraude

The environment provided by the mother during embryo development has major consequences on later-life health and lifespan. This can arise through effects on cellular aging which is often estimated with the length of telomeres. Telomeres are the protective end caps of chromosomes and their length is a marker of biological age.

While telomeres normally shorten with age, short telomeres at a given age predict higher disease and mortality risks. Prenatal exposure to maternal stress hormones as well as instability during embryo development have previously been found to result in short telomeres, i.e. accelerated cellular aging.

A new study funded by the Academy of Finland and the Turku Collegium for Science and Medicine manipulated [prenatal exposure](#) to maternal [thyroid hormones](#) using egg injection in an avian model.

"The [telomere](#) biology of humans is closer to the telomere biology of birds than those of traditional laboratory models. In both humans and birds, telomere length is measured in a minimally-invasive way from small blood samples," says Collegium Researcher Antoine Stier from the University of Turku (Finland), the main author of the research article.

While authors of the study had reasons to expect shorter telomeres in chicks born from eggs injected with thyroid hormones, they were quite surprised to find that those chicks actually exhibited longer telomeres right after birth.



Two days old flycatcher chicks being handled to be individually marked through nail clipping, weighed and blood sampled. Credit: Antoine Stier

"Based on the natural decline of telomere length observed with age in the same collared flycatcher population, we estimated that chicks hatching from thyroid hormones injected eggs were approximately four years younger at birth than chicks hatched from control eggs," adds Collegium Researcher Suvi Ruuskanen.

Although the [molecular mechanisms](#) underlying such effects remain to be discovered, the new findings suggest that prenatal thyroid hormones might have a role in setting the 'biological age' at birth.

"Considering the interest and controversies surrounding gene therapy trials in humans to elongate telomeres as an anti-aging therapy, this discovery opens potential avenues to better understand the influence of telomere elongation in animal models," Stier says.

The study was conducted on a long-term monitored population of wild collared flycatcher breeding in Gotland island, and relied on extensive collaborations with the University of Uppsala (Sweden), Lyon, Glasgow and Aberdeen.

**More information:** Antoine Stier et al. Born to be young? Prenatal thyroid hormones increase early-life telomere length in wild collared flycatchers, *Biology Letters* (2020). [DOI: 10.1098/rsbl.2020.0364](https://doi.org/10.1098/rsbl.2020.0364)

Provided by University of Turku

Citation: Born to be young? Prenatal thyroid hormones influence 'biological age' at birth (2020, November 11) retrieved 26 June 2024 from <https://phys.org/news/2020-11-born-young-prenatal-thyroid-hormones.html>

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