

# Telomere length positively correlates with pace-of-life in a sex- and cohort-specific way and elongates with age in a wild mammal

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## Abstract

Understanding ageing and the diversity of life histories is a cornerstone in biology. Telomeres, the protecting caps of chromosomes, are thought to be involved in ageing, cancer risks and to modulate life-history strategies. They shorten with cell division and age in somatic tissues of most species, possibly limiting lifespan. The resource allocation trade-off hypothesis predicts that short telomeres have thus co-evolved with early reproduction, proactive behaviour and reduced lifespan: a fast Pace-of-Life Syndrome (POLS). Conversely, since short telomeres may also reduce the risks of cancer, the anti-cancer hypothesis advances that they should be associated with slow POLS. Conclusion on which hypothesis best supports the role of telomeres as mediators of life-history strategies is hampered by a lack of study on wild short-lived vertebrates, apart from birds. Using seven years of data on wild Eastern chipmunks *Tamias striatus*, we highlighted that telomeres elongate with age and do not limit lifespan in this species. Furthermore, short telomeres correlated with a slow POLS in a sex-specific way. Females with short telomeres had a delayed age at first breeding and a lower fecundity rate than females with long telomeres, whereas those differences were not recorded in males. Our findings support most predictions adapted from the anti-cancer hypothesis, but none of those made under the resource allocation trade-off hypothesis. Results are in line with an increasing body of evidence suggesting that other evolutionary forces than resource allocation trade-offs shape the diversity of telomere length in adult somatic cells and the relationships between telomeres and life-histories.

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