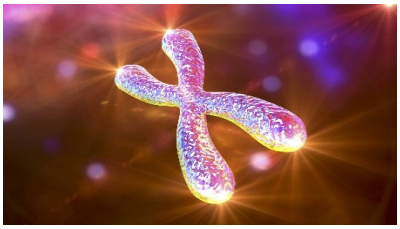
MSc project: meta-analysis on parental age effects on telomere length



Telomeres are non-coding, repeating DNA sequences at the ends of linear chromosomes. Because telomeres shorten as the individual ages, they are generally regarded as a biomarker of senescence. By studying what factors affect telomere length, we can learn what makes some individuals senesce faster or slower than other individuals. Parental age at conception is one of the factors that can affect telomere lengths. In humans, older fathers and mothers generally have offspring with longer telomeres. However, the maternal age at conception (MAC) effect often disappears when controlling for paternal age at conception (PAC), and in other animals, studies have found different results. For a better understanding of parental age effects on offspring telomere lengths, a meta-analysis is needed.

In this project, you will conduct a meta-analysis of MAC and PAC effects on offspring telomere length in vertebrates. A positive PAC effect may be due to selective disappearance, thus you will also investigate within- and between-parental age effects. Results of this study will provide a better understanding of PAC and MAC effects on offspring telomere lengths. This knowledge will contribute to research on what shapes the senescence trajectory of an individual.

Methods:
You will conduct a meta-analysis on parental age effects on offspring telomere length in non-human vertebrates. This will include:

- Using R with online databases to perform a systematic review
- Extracting effect sizes from the literature
- Conducting statistical analyses in R
- Writing up the results to a journal manuscript level

The ideal candidate will be familiar with coding in R and be interested in the evolution of ageing. Training and supervision will be provided.

During this project, you will gain: (1) skills related to systematic literature review and meta-analysis following PRISMA guidelines, (2) skills in advanced statistics in R, (3) knowledge in the fields of telomere biology and evolutionary theories of senescence, (4) valuable skills in scientific writing, and (5) a high likelihood of getting your research published in a scientific journal.

Further reading:
Lansing effect: Monaghan et al 2020 https://doi.org/10.1016/j.tree.2020.07.005 & Ivimey-Cook et al 2022 https://doi.org/10.1093/evolut/qpac045
PAC/MAC on telomere length: Sparks et al 2019 https://onlinelibrary.wiley.com/doi/10.1111/mec.15804
Telomere meta-analysis: Chik et al 2022 https://onlinelibrary.wiley.com/doi/10.1111/jeb.14071

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Expertise group: Behavioural and Physiological Ecology

Type of project: ☐ Bioinformatics ☐ Fieldwork ☐ Laboratory ☐ Theoretical ☒ Data analysis
MSc program: ☒ Biology ☒ Ecology and Evolution ☐ Marine Biology
☐ Biomedical Sciences ☐ Behavioural and Cognitive Neurosciences
ECTS: ☒ 30 ☒ 40 **Language:** ☐ Dutch ☒ English

Start date: 2023-2024 **Location:** RUG