

MSc project: Immuno-senescence in the Seychelles warbler

Declines in immune function with advancing age increases susceptibility to infection and disease. We have a limited understanding of how immune parameters senesce in wild animal populations. White blood cells, known as leukocytes, defend individuals against infectious disease. There are different types of leukocytes, and previous research has shown a relative age-related decrease in adaptive immune cells (e.g. lymphocytes, Fig 1a) and increase in innate immune cells (e.g. heterophils, Fig.1b).

You will use data from a long-term population of cooperatively breeding Seychelles warblers on Cousin Island, Seychelles. Seychelles warblers show considerable senescence in reproduction, survival and telomere dynamics, but little is known about senescence in their immune system. You will have access to this exceptional long-term dataset and blood smears (including pilot data), gaining skills in cooperative breeding and senescence theory, microscopy and statistics. You will conduct differential white blood cell counts with the battlement microscopy technique, using blood smears that have already been collected.

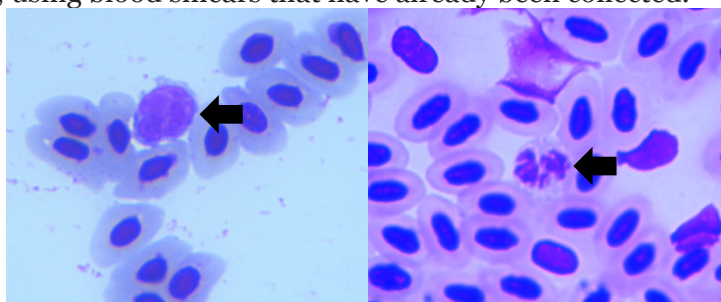


Fig.1 a) lymphocyte (small amount of cytoplasm) and b) heterophil (multi-lobed nucleus) from Seychelles warbler blood smears

Methods:

You will conduct laboratory work to quantify immunosenescence in the Seychelles warbler. This will include:

- Microscopy work to identify and count white blood cells
- Data wrangling and statistical modelling 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) laboratory skills, (2) skills in advanced statistics in R, (3) knowledge in the field of the evolution of senescence, (4) valuable skills in scientific writing, and (5) a high likelihood of getting your research published in a scientific journal.

Further reading:

Senescence in Seychelles warblers: Hammers et al 2015 <https://doi.org/10.1016/j.exger.2015.08.019>

Immunosenescence: Peters et al., 2019 <https://doi.org/10.1111/ele.13343>, Lieshout et al 2020

<https://doi.org/10.1098/rsbl.2020.0234>, Schwanz et al 2011 <https://doi.org/10.1242/jeb.046813>

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Type of project:	<input checked="" type="checkbox"/> Bioinformatics	<input type="checkbox"/> Fieldwork	<input checked="" type="checkbox"/> Laboratory	<input type="checkbox"/> Theoretical	<input checked="" type="checkbox"/> Data analysis
MSc program:	<input checked="" type="checkbox"/> Biology	<input checked="" type="checkbox"/> Ecology and Evolution	<input type="checkbox"/> Marine Biology		
	<input type="checkbox"/> Biomedical Sciences	<input type="checkbox"/> Behavioural and Cognitive Neurosciences			
ECTS:	<input checked="" type="checkbox"/> 30	<input checked="" type="checkbox"/> 40	Language:	<input checked="" type="checkbox"/> Dutch	<input checked="" type="checkbox"/> English
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