

<b>Research Theme: Neurobiology and Parasitology</b>
<b>Research Project Title: Non-consumptive effects of predation</b>
<b>Principal Investigator/Supervisor: Ajai Vyas</b>
<b>Co-supervisor/ Collaborator(s) (if any): NA</b>
<p><b>Project Description</b></p> <p><b>a) Background:</b></p> <p>In John Gardner's wonderful fiction 'Grendel', a wise protagonist sums up the nature of life with two terse axioms. "Everything fades; and, alternatives exclude". These axioms poignantly capture the essence of animal life histories (i.e. schedule and duration of key events in an organism's lifespan like reproduction and death). For each morsel of food regurgitated by parents for the brood, there is one less morsel available to the parents for their survival. For each decision to create bright plumage there is risk that predators also will be attracted by this sexual advertisement. In short, current fitness cannot be maximized without forgoing future fitness and survival. Alternatives of "me-now" and "me-later" exclude each other. Animals typically negotiate these trade-offs using conditional behaviors, or 'if-then-else' clauses. How animals execute these conditional programs? Reproduction requires presence of opportunities (e.g. presence of sexually receptive females). It also requires metabolic wherewithal, so that cost and competition during partaking of these opportunities can be sustained. How do animals integrate these factors? How do biological substrates mediate the shift of behavior from survival to reproduction or vice versa (i.e. trade-off between "me-now" and "me-later")? Broadly, we aim to answer these questions in our research. We do this in the broader context of ecological interactions between predators, prey and parasites.</p> <p><b>b) Proposed work:</b></p> <p>Current questions include:</p> <ol style="list-style-type: none"> <li>1. Does increased predation rate in the field change reproductive investment by the prey?</li> <li>2. What are the neuroendocrine substrates that calibrate defense against predators and reproductive investment across changing ecological conditions?</li> <li>3. How does a parasite balance inherent trade-offs between trophic and sexual transmission?</li> <li>4. Does cognitive impulsivity co-elute with reproductive investment in laboratory and field rodents?</li> <li>5. Can cognitive aging be prevented using gonadal hormones?</li> </ol>
<p><b>Supervisor contact:</b></p> <p><b>If you have questions regarding this project, please email the Principal Investigator: <a href="mailto:avyas@ntu.edu.sg">avyas@ntu.edu.sg</a>;</b></p>
<p><b>SBS contact and how to apply:</b></p> <p>Associate Chair-Biological Sciences (Graduate Studies) : <a href="mailto:AC-SBS-GS@ntu.edu.sg">AC-SBS-GS@ntu.edu.sg</a></p> <p>Please apply at the following: <a href="http://admissions.ntu.edu.sg/graduate/R-Programs/RWhenYouApply/">http://admissions.ntu.edu.sg/graduate/R-Programs/RWhenYouApply/</a></p>