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Ageing of water pythons

Thursday 24 May 2012 1pm

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Gould Seminar Room (Room 235) Gould building, 116 Daley Road, ANU



Senescence is a paradox. Because of its obvious negative impact on organismal form, function and fitness, it should be opposed by natural selection and its existence therefore presents an unresolved enigma. One of the main processes restricting longevity is caused by the age-related deterioration of the immune systems - immunosenescence - resulting in increased morbidity and mortality from infections. However, assessment of both proximate and ultimate effects of ageing, and its effect on immune function, has rarely been conducted in free-ranging organisms. The main reason why this has been a neglected area of research is most likely due to the fact that the majority of wild animals simply do not survive long enough to grow old, and therefore, natural selection has a limited opportunity to exert a direct influence over the ageing process. Therefore, in order to study the evolutionary effects of ageing in natural populations we need a model organism that has the potential to grow to old age, can be monitored through the

ageing process, and where ageing of the immune system (immunosenescence) constituting a major component determining individual variation in adult life-span.

Our long-term study of water pythons (*Liasis fuscus*) has revealed a dramatic variation in individual adult longevity (ranging from <5 to >20 years), and that mortality in the wild is rarely a result of ecological/environmental factors such as predation, but rather of age-dependent variation in ability to combat infections. Immune challenges of different aged pythons revealed that age-related changes in python immune function may follow different and opposing pathways. I will discuss our findings in context of the general principles of immunosenescence, with special emphasis on the role of less known antigens in maintaining immunocompetence during the ageing process.

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