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Brief Summary

In modern land vertebrates, red bone marrow serves as the centre of blood production (the haematopoietic niche), and yellow bone marrow (a type of adipose tissue) plays a role in bone ossification as well as long term energy storage. Some marine organisms and amphibians, however, produce blood in other organs such as the liver and kidneys. Blood production also shifts between different organs during foetal development before bone marrow is developed in infancy. It stands to reason that there were selective pressures that drove certain species to evolve bone marrow structures during the diversification of vertebrate life on land – a characteristic that is conserved across almost all land vertebrates to this day.

Molecular fossils (biomarkers) have been used to elucidate the nature of long extinct organisms and the environments in which they lived. In this study, I aim to use a combination of modern and ancient bone samples to develop a biomolecular profile of red and yellow bone marrow and apply it to the fossil record. Using various organic and inorganic geochemical techniques, it may be possible to track the evolution of bone marrow and the haematopoietic niche through deep time.

Education: Curtin University – Bachelor of Science (Honours) (Chemistry) & Bachelor of Arts (Japanese)

Research interests: Biomarkers, exceptional fossil preservation, bone marrow, palaeoenvironments, dinosaurs, evolution

Thesis title: *The application of biomarkers in tracking the evolution of bone marrow and haematopoiesis before and after the diversification of land vertebrates.*

Supervisors: Prof. Kliti Grice, Dr Stephen Poropat & A/Prof. William Rickard

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