MONASH University | ARMI AUSTRALIAN REGENERATIVE MEDICINE INSTITUTE

2016 EXTERNAL SPEAKER PROGRAM
Australian Regenerative Medicine Institute

Beating back: a search for the revolutionary origins of hearts

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Elucidating cardiac evolution has been frustrated by lack of fossils. One celebrated enigma in cardiac evolution involves the transition from a cardiac outflow tract dominated by a multi-valved conus arteriosus in basal actinopterygians, to an outflow tract commanded by the non-valved, elastic, bulbus arteriosus in higher actinopterygians. We demonstrate that cardiac preservation is possible in the extinct fish *Rhacolepis buccalis* from the Brazilian Cretaceous. Using X-ray synchrotron microtomography, we show that *Rhacolepis* fossils display hearts with a conus arteriosus containing at least five valve rows. This represents a transitional morphology between the primitive, multivalvar, conal condition and the derived, monovalvar, bulbar state of the outflow tract in modern actinopterygians. Our data rescue a long-lost cardiac phenotype (119-113 Ma) and suggest that outflow tract simplification in actinopterygians is compatible with a gradual, rather than a drastic saltation event. Overall, our results demonstrate the feasibility of studying cardiac evolution in fossils.

DATE: **Friday November 4**

TIME: **10 am**

VENUE: **Seminar Room**
Level 3
15 Innovation Walk
Monash University
Clayton Campus

Bio

Jose Xavier Neto is a Leading researcher in the Brazilian National Biosciences Laboratory. Contributions include the elucidation of patterning mechanisms of cardiac segmentation into atria and ventricles, coronary morphogenesis and congenital heart disease. These goals were pursued using signalling by retinoic acid as a research handle and are compounded by work on the origins of the retinoic acid signalling pathway. Dr. Xavier-Neto led an international multidisciplinary team that described the first fossilized heart and mapped its contribution to the understanding of heart development in vertebrates

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