The Singapore Bioimaging Consortium (SBIC)
presents a seminar
on

"Using Imaging to Probe Biochemical and Biomechanical inter-relationships in Cancer"

Speaker: **A/Prof Michael Samuel**
Head, Tumour Microenvironment Laboratory
The University of South Australia
Host : **Dr Shigeki Sugii**
Date : **Friday, 15 December 2017**
Time : **11.00am – 12noon**
Venue : **SBIC Seminar Room**
11 Biopolis Way
Level 2, Helios Building, Singapore 138667
(Please enter via Level 1)

Abstract

The extra-cellular matrix (ECM) is a source of biochemical and biomechanical influences that direct cell proliferation and fate. The molecular mechanisms underlying the interplay between these influences and tissue homeostasis nevertheless remain relatively ill-defined. The ROCK signalling pathway lies at the interface between mechanical and biochemical signalling. They have previously demonstrated that ROCK signalling promotes epidermal proliferation and cutaneous tumour progression by increasing ECM production, elevating ECM stiffness and enhancing integrin-mediated mechanotransduction signalling in tumours. They have new insight into the mechanisms by which cancers in which ROCK is hyperactivated recruit and educate fibroblasts. ROCK-educated fibroblasts are more effective at producing and remodelling the ECM and cause accelerated tumour progression. Furthermore, mimicking the cancer micro-environment of enhanced compressive stress rapidly activates the Rho-ROCK pathway in cancer cells and in tissues. As this pathway in turn regulates the key mechanical properties of the microenvironment, we propose that ROCK promotes cancer progression via a mechanoreciprocal feed-forward mechanism and that inhibiting the effectors of ROCK that regulate fibroblast phenotypes and thereby the ECM may be a novel therapeutic approach to target cancers.

About the Speaker

Dr Michael Samuel is a Cancer Biologist and heads the Tumour Microenvironment Laboratory at the Centre for Cancer Biology, SA Pathology and the University of South Australia. His research program focuses on elucidating the inter-play between biochemical and biomechanical signals travelling between tumours and their microenvironments, promoting tumour progression and metastasis. To underpin this

work, Dr Samuel has established novel murine models of mechanotransduction, which coupled with advanced imaging approaches including atomic force, second harmonic generation and ex vivo 3D live cell microscopy, are used in his laboratory to dissect out the relationship between signalling and tumour-promoting, tissue-level mechanical changes. This work has yielded new insights into how cancers remodel their microenvironments and how this process may be therapeutically targeted.

Admission is free and all are welcome ---