

Vascularization dynamics in engineered tissues

A public lecture by Raine Visiting Professor, Professor Shulamit Levenberg, Department of Biomedical Engineering, Technion, Haifa, Israel

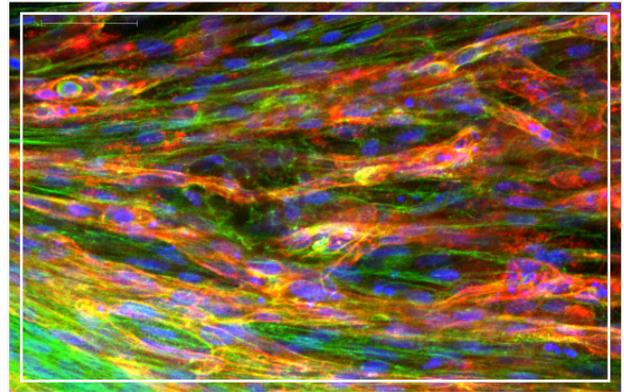
Event Details

When: Thursday 13 July 2017, 12pm
Where: McCusker Auditorium,
Harry Perkins Institute of Medical Research,
6 Verdun St, Nedlands

Cost: Free

RSVP: online via

www.ias.uwa.edu.au/lectures/levenberg



Vascularization continues to represent a major challenge in the successful implementation of regenerative strategies. Current approaches for inducing vascularization in vivo include pre-forming a vasculature ex vivo, and the use of a variety of strategies to stimulate vascularization in situ. Vessel network assembly within 3D tissues can be induced in vitro by means of co-culturing of endothelial cells, fibroblasts and cells specific to the tissue of interest. This approach supports formation of endothelial vessels and promotes endothelial and tissue-specific cell interactions. In addition, we have shown that in vitro pre-vascularization of engineered tissue can promote its survival and vascularization upon implantation and that implanted vascular networks, can anastomose with host vasculature and form functional blood vessels in vivo.

Sufficient vascularization in engineered tissues can be achieved through coordinated application of improved biomaterial systems with proper cell types. We have shown that vessel network maturity levels and morphology are highly regulated by matrix composition and analyzed the vasculogenic dynamics within the constructs. In addition, we have recently shown that adipose-derived endothelial cells and mesenchymal stem cells enhance vascular network formation on 3D constructs in vitro and can contribute to in vivo vascularization of tissue-engineered flaps. We also explored the effect of mechanical forces on vessels organization and demonstrated that morphogenesis of 3D vascular networks is regulated by tensile forces. Revealing the cues controlling vascular network properties and morphology

can enhance in-vitro tissue vascularization and improve graft integration prospects.

About Professor Levenberg

Professor Levenberg conducts interdisciplinary research on stem cells and vascular tissue engineering. She did her PhD at the Weizmann Institute on cell adhesion and her post doctorate research at MIT on stem cells tissue engineering with Professor Robert Langer, a world leader in biomaterials, drug delivery and tissue engineering. In 2004 she joined the Technion Faculty of Biomedical Engineering. During 2011-2012 she spent her sabbatical year as a visiting professor at the Wyss Institute at Harvard University. In her research she studies the mechanical control of tissue assembly in vitro and in vivo with a focus on vessel network formation and anastomosis in engineered tissues. She is also developing micro bioreactors and nanoliter droplet devices for stem cell growth and manipulations and for early diagnostic applications. Levenberg is currently the elected Dean of the Biomedical Engineering Department at the Technion and a member of the Israel National Bioethics Committee.

The Institute of Advanced Studies

Throughout the year the UWA Institute of Advanced Studies hosts visits from distinguished scholars, public intellectuals and artists. These visits form part of an annual program of public lectures, masterclasses, symposia and workshops. Visit our website for more information www.ias.uwa.edu.au.