



## SEMINARS IN CHEMICAL AND BIOMOLECULAR ENGINEERING



Friday, Oct 5th, 2018 | 10:00AM

Boelter Hall 3400

Presented by:

**Anthony S. Weiss**

Chair and Professor

Department of Biochemistry & Molecular

Charles Perkins Centre & University of Sydney

### “Elastic materials and enhanced wound repair”

The robust repair of large wounds and tissue defects relies on blood flow. This vascularization is the major challenge faced by tissue engineering on the path to forming thick, implantable tissue constructs. Without this vasculature, oxygen and nutrients cannot reach the cells located far from host blood vessels. To make viable constructs, tissue engineering takes advantage of the mechanical properties of synthetic materials, while combining them with extracellular matrix proteins to create a natural environment for the tissue-specific cells. Tropoelastin, the precursor of the elastin, is the extracellular matrix protein responsible for elasticity in diverse tissues, including robust blood vessels. Tropoelastin contributes a physical role in elasticity but also substantially to the biology of repairing tissue. The emerging model from a range of our in vivo studies is that tropoelastin encodes direct biological effects and has the versatility to promote tissue repair. We have discovered that tropoelastin substantially improves healing by halving the time to repair full-thickness wounds in mice and pigs; tropoelastin elicits this response with early stage neo-angiogenesis, recruitment of endogenous cells with enhanced repair in two weeks consistently in these small and large animals. This potency is marked by the concerted appearance of blood vessels, neodermis and phased cellular contributions that work together to accelerate tissue repair.

Professor Tony Weiss is the Endowed McCaughey Chair in Biochemistry, Professor of Biochemistry & Molecular Biotechnology, Leader of the Tissue Engineering & Regenerative Medicine Node at the Charles Perkins Centre, and Professor at the Bosch Institute at the University of Sydney. He has received multiple international prizes, and was recently awarded the Order of Australia, Eureka Prize for Innovation in Medical Research, Vice Chancellor's Award for Excellence, Innovator of Influence Award, and Applied Research Medal. He is inventor on a family of awarded patents covering the use of human tropoelastin, which gives tissue its elasticity and enhances the repair of scars and wounds. His discoveries have substantially contributed to our knowledge of the biochemistry, biology and medical applications of these unique human elastic molecules. He is on the Governing Board of the Tissue Engineering and Regenerative Medicine International Society, Chair of Tissue Engineering and Regenerative Medicine International Society for Asia Pacific, and recent national President of the Matrix Biology Society. He founded Elastagen Pty Ltd, which was recently sold to Allergan, Inc.