

Tropoelastin promotes elastic tissue regeneration and restoration

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Abstract

Elastic tissue does not typically regenerate in adults, so there is demand for ways to restore these tissues following damage. The stages through which tropoelastin self-assembles into elastin and, in turn, elastic fibers, are hierarchical and the topic of extensive, ongoing research. It is this capacity for self-assembly that is of interest for a class of materials that promote the formation of new elastic tissue.

Processes and a hybrid biomaterial, developed in association with Dr. Suzanne Mithieux in my lab, are intended to deliver tunable levels of histologically detectable patient elastin into full-thickness wound sites. This approach addresses a persistent unmet need because repairing wounds lack this elastic substratum. Previously, dogma asserted that elastin synthesis is attenuated in early childhood, but we found that we can overcome this restriction by adding exogenous tropoelastin, regardless of the age of the dermal fibroblast donor. We found how to further enhance synthesis with older cells by using conditioned media. This approach delivers elastin as a layer on the leading dermal repair template for contact with the deep dermis in order to deliver prefabricated elastic fibers to the physiologically appropriate site during surgery to repair scar tissue at sites of healing full thickness wounds.

Biography

Professor Anthony Weiss PhD AM FRSC FTSE FRSN FRACI FAIMBE FAICD FBSE FTERM is the McCaughey Chair in Biochemistry at the University of Sydney. His research focuses on the assembly of human elastic tissue, damage and its repair. His awards include the Order of Australia, Clunies Ross National Science and Technology Award, Eureka Prize for Innovation in Medical Research, Premier's Prize for Science & Engineering Leadership in Innovation, Roslyn Flora Goulston Prize, NIH Fogarty International Fellow, David Syme Research Medal, Amersham Pharmacia Biotechnology Medal, NSW Commercialization Expo Prize, Australian Innovation Challenge Award, Fondation des Treilles Scholar, Pauling Prize Medal, Barry Preston Award, ASBTE Research Excellence Award, FAOBMB Entrepreneurship Award and RACI Applied Research Medal. Professor Weiss founded the biotechnology clinical stage company Elastagen Pty Ltd which was sold to Allergan in one of the largest transactions ever completed in the Australian life science sector. He is an inventor with 105 awarded international patents in 17 patent families. He is on eleven editorial boards comprising leading journals in the field and is global President-Elect of TERMIS.

