

Elastagen: commercial translation of a biomaterial from lab to trade sale

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Statement of Purpose: The presentation will focus on a combined strategy of pioneering research into human tropoelastin (the protein building-block that gives tissue its elasticity) and a robust intellectual portfolio. We discovered how to assemble tropoelastin into synthetic elastin biomaterials that accelerate and improve the repair of scars and wounds. This work over two decades has led to a dominant position, and the patented biomaterials inventions recently led to one of the largest commercial transactions in Australian healthcare history. To achieve these outcomes, the Weiss Lab has run an innovation-focused research program that encompasses fundamental research, discovering tropoelastin's properties and functions including its wound-healing ability; applied research, inventing a unique method for building pure recombinant tropoelastin into clinically applicable biomaterials; and commercialization, and founding a spin-off company to develop these inventions and take them to market.

Methods and Results: The Weiss Lab's designed a tailored synthetic gene that achieved larger yields of pure recombinant tropoelastin, by converting the human coding DNA into a highly expressing bacterial gene. From initial production that yielded several milligrams of pure recombinant tropoelastin, far outstripping the competition, synthesis is now orders of magnitude beyond this scale in a cost-effective process. The Weiss Lab developed assembled synthetic elastin constructs that promote wound repair and reduce the time for wound closure. This discovery led to the development of new materials that enhance the repair of living tissue. Collaborative studies on highly elastic, adhesive and fast-acting hydrogel sealants (methacryloyl-substituted tropoelastin; Science Translational Med 2017; Biomaterials 2017) show a robust seal over a wound in less than a minute, without the need for sutures. In 2008 Weiss founded the spin-off biotechnology company Elastagen Pty Ltd from the University of Sydney to commercialize tropoelastin. Elastagen raised funding, including awards from AusIndustry, the Department of State & Regional Development, and awards from the State Health Minister's Medical Devices Fund. The company successfully attracted capital from leading Australian and international life science venture capital groups. Elastagen's operations expanded from its Australian base to include production in Europe and clinical trials in the UK. His inventions continued to power the company's dominant patent position covering the manufacture, formulation and applications of tropoelastin; he currently has 43 patents awarded in 17 patent families around the world. The company completed in-depth primary market research in the US which demonstrated the potential for tropoelastin products to address unmet, high-value market demand across multiple applications. Elastagen also scaled production from lab to Good Manufacturing Practice (GMP), and successfully

completed multiple clinical trials for injectables that enhance skin repair, including local damage and scars.

Conclusions: This strong position attracted a range of commercial suitors. In early 2018, Elastagen was sold to the large biopharmaceutical company Allergan, in one of the largest healthcare sales of this type in Australian history. As a direct result of Allergan's purchase of the company, Elastagen's product for non-surgical skin repair is now proceeding to product approval, sales and marketing.

References:

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