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URVentures

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TECHNOLOGY REVIEW

Your Guide to What's Happening at
UR Ventures and the University of Rochester

The UR Ventures Technology Review is your monthly look at innovation and technology commercialization at the University of Rochester. In this issue, you will learn about a method to heal and regenerate cartilage, a startup taking vision correction to new levels, and the most influential patent of recent years. Meliora!

Clerio Vision Revolutionizing Vision Correction

Just as LASIK revolutionized vision correction in the 1990s, a new technology arising from research conducted by Wayne Knox, Professor of Optics and Physics, Krystel Huxlin, Professor of Opthalmology, and Jonathan Ellis, Associate Professor of Mechanical Engineering is working to change the paradigm of vision correction. Known as "LIRIC" (Laser Induced Refractive Index Change), this ground-breaking method also uses a laser to correct the optical properties of the eye, but there the similarities to LASIK end.

The older technology uses two lasers and includes cutting the cornea to create a flap and then pulling that flap back to expose the inner cornea. A laser is then applied to ablate and reshape the corneal tissue in such a way as to acheive the desired focus. The corneal flap is repositioned and the healing process begins. Complications are rare, but as with any surgery, they are a real concern. Fear of complications and of having one's eye cut are big reasons why less than 2% of people who are eligible for LASIK ever get the procedure done.

The LIRIC method uses a laser at a much lower power and does not cut or remove any tissue. Instead, it is a non-invasive procedure that alters the refractive index of the corneal tissue to correct vision. Since the procedure doesn't thin the cornea like LASIK, it may be repeated many times over the course of a patient's lifetime as the eye grows and changes.

This remarkable technology has been licensed to Clerio Vision, Inc. a local startup poised to bring this new treatment to market. Clerio was started by

CLERIO VISION

a team of entrepreneurs with proven track records – Mikael Totterman (VirtualScopics, iCardiac), Alex Zapesochny (Lenel, iCardiac), Scott Catlin (AMO, Abbott Medical Optics – and now with UR Ventures), and Sasha Latypova (VirtualScopics, iCardiac). The company successfully concluded an oversubscribed Series A round of fundraising with participation from three venture capital firms, and is considering a Series B round to further accelerate product and clinical development. They have proven efficacy in animal models and hydro-gels (contact lenses), and plan to conduct human studies early in 2016.

Doing The Impossible: Healing Cartilage

"Articular cartilage is avascular & is prevented from mounting a vascular response when there is isolated cartilage injury. The absence of vessels within the cartilage imposes limitations on healing potential. Indeed, some traumatic defects in cartilage apparently never heal."

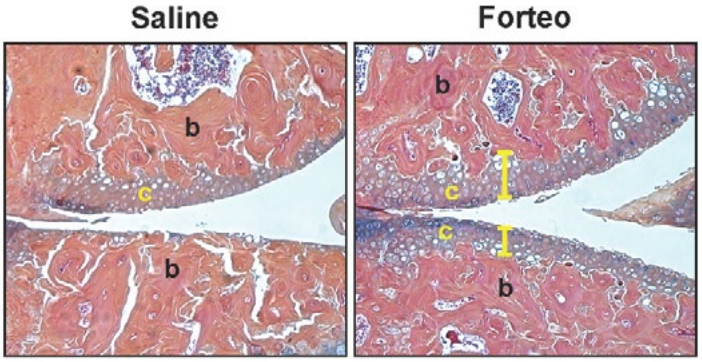
Paraphrasing Wheeless' Textbook of Orthopaedics

What this means in plain English is that the lack of blood vessels in cartilaginous tissues makes repairs quite difficult, causing severe injuries to never heal fully. Current methods of treatment consist of pain management and total joint replacement.

A team of researchers at the University of Rochester, led by Randy Rosier, M.D., Ph.D. and Michael Zuscik, Ph.D. have developed a promising, and potentially disease modifying, method to halt deterioration and promote regeneration of cartilage lost or damaged in an injury or through osteoarthritis.

The treatment is based on a parathyroid hormone (PTH) or a parathyroid hormone-related protein (PTHrP) receptor agonist. The introduction of PTH/PTHrP stimulates proteoglycan synthesis, as well as attracting and activating mesenchymal stem cells to enhance tissue repair.

Early studies in animal models have been very promising. Injuries, such as meniscus tears, and damage mimicking the effects of osteoarthritis have been successfully mitigated, and in some cases, reversed. Clinical testing in human patients has begun.



There is also evidence demonstrating that these methods are effective in treating other types of musculoskeletal soft tissue, such as tendons, ligaments, and inter-vertebral discs.

UR Ventures is actively seeking a partner to develop this technology to obtain FDA approval. For more information, contact Weimin Kaufman.

Giants Walk Among Us

"If I have seen further than others, it is by standing upon the shoulders of giants."

Isaac Newton

We all know that science doesn't happen in a vacuum. Today's advances can only be achieved by understanding and leveraging yesterday's accomplishments. Quantifying and tracking that leverage can be a little tricky, but fortunately, citations in scientific journals and patent applications offer serious insight into truly influential research.

Thompson Reuters IP & Science recently compiled a list of the World's Most Innovative Universities (more on that in a future issue). One of the measures of innovation was the number of times the subject of a patent application has been cited as a reference on subsequent patent applications. Large numbers of such references are suggestive of the groundbreaking nature of the referenced patent. After examining tens of thousands of patent applications from around the world filed in 2008 - 2012, Reuters concluded that the most cited patent in the world belongs to the University of Rochester.

U.S. Patent #8,642,660, "Method for Altering the Lifespan of Eukaryotic Organisms," covers a discovery by David Goldfarb, Professor of Biology at the University of Rochester. According to Reuters, this patent was cited as prior art in 108 subsequent global patent filings during the period of interest.

The patent reveals the chemical structures of scores of small drug-like molecules that affect yeast lifespan. The discovery of these molecules was possible using a novel assay that allowed the lifespan effects of tens of thousands of compounds to be quantified in a single rapid, inexpensive screen. Such a library of bioactive compounds was hoped to contain some that would prevent, slow, or reverse age-associated diseases, including diabetes, cardiovascular diseases, cancers, and obesity.

When asked about what makes this patent so significant, Goldfarb said, "Most of our major diseases are associated with aging. Seeking drugs that target conserved lifespan processes is a relatively new strategy for the prevention and treatment of age-related diseases. This patent discloses a long list of drug-like molecules that affect aging in yeast, a model organism that ages in some of same ways as humans. I suspect that researchers combed through this list of hits and found some to be biologically active in ways that warranted patent protection. We have also had success showing that some of these molecules are active in mammalian disease models."

UR Ventures is currently seeking a partner to develop this important discovery.

Address:
Box URV
265 Crittenden Boulevard
Rochester, NY 14642

Contact:
585.276.6600
Suite B-360, Saunders Research Building
URVentureInfo@ur.rochester.edu
www.rochester.edu/ventures