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EXTending Life

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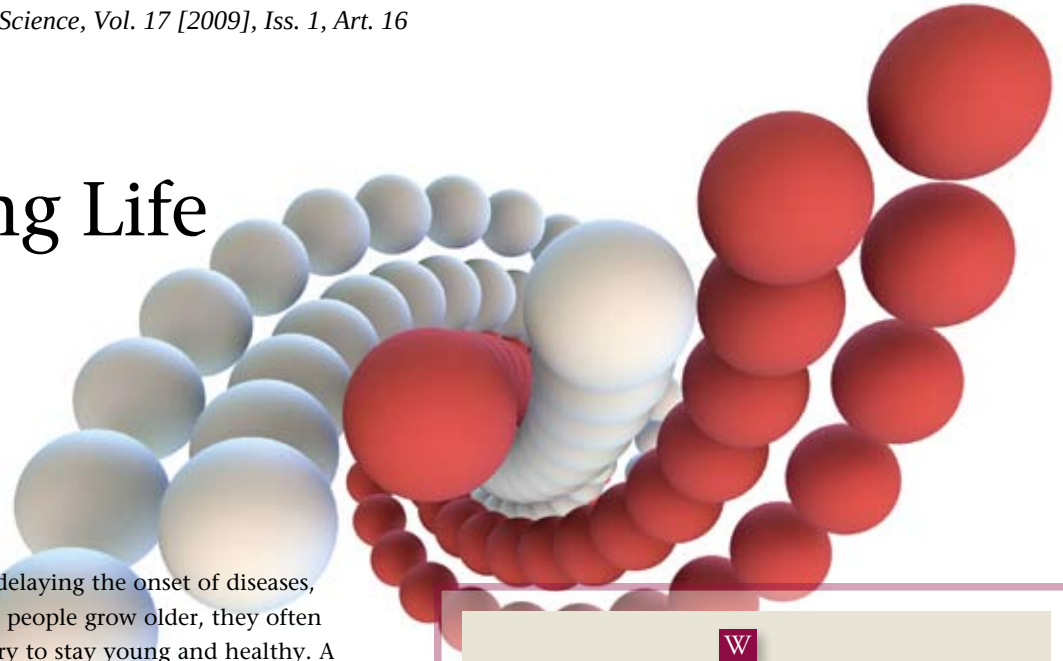

Slowing the aging process, delaying the onset of diseases, extending cellular life… as people grow older, they often seek products or therapies to try to stay young and healthy. A researcher in the School of Medicine at Wayne State University may have discovered the proverbial "fountain of youth" that may one day help us all to live better and happier lives.

Stanley R. Terlecky, Ph.D., associate professor of pharmacology in the School of Medicine has identified a novel technology that can reduce or even eliminate accumulation of free radicals or oxidants in cells long associated with the aging process. His research focuses on peroxisomes, essential subcellular structures whose critical roles in metabolism, aging, and disease have only recently come to light.

The technology

As we age, our cells undergo an irreversible physiological decline caused by a variety of factors including shortening of chromosome ends, DNA damage and the accumulation of harmful oxygen species. Peroxisomes are at the center of this process to an extent never before appreciated. They not only carry out critical cellular functions but also produce potentially toxic metabolites as the "spent fuel" from these reactions. Hydrogen peroxide is one of these harmful byproducts generated by peroxisomes that can be deadly to cells.

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>
> **— Dr. Stanley Terlecky**

To neutralize its toxic effects, peroxisomes pull the antioxidant enzyme catalase from the cytosol of the cell – the "soup" within which all the other cell organelles reside. A healthy peroxisome will then use the imported catalase to convert potentially dangerous hydrogen peroxide to harmless water and oxygen. This process can be thrown off kilter however, as cells age or are affected by disease or mutation. The result is that catalase

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Mr. John Tesija, vice president and head of operations, EXT Life Sciences, Inc

is not properly utilized by peroxisomes, with dire consequences to the cell and the entire organism.

"By doing focused research on the peroxisome, we discovered it is a viable, druggable target," said Dr. Terlecky. "Unlike mitochondria, to which you can't deliver a protein directly, peroxisomes are mechanistically much different." Dr. Terlecky and fellow expert in cellular trafficking pathways, Paul A. Walton, Ph.D., from the University of Western Ontario, created a novel protein therapeutic that can be delivered into a human cell and then sent to the peroxisome to neutralize harmful oxidants. This proprietary technology is called CATSKL™.

> "Through all of this, I have learned that it takes time to develop a marketable compound."
>
> **— Dr. Stanley Terlecky**

"The compound has great potential for treating serious health problems including ischemia-reperfusion injury associated with heart attack or stroke, inflammation and related arthritic conditions, and type 2 diabetes, among others," Terlecky commented. In addition, idiopathic pulmonary fibrosis kills 40,000 people per year and there are no cures or effective treatments. There is evidence the pathology is associated with excessive production of reactive oxygen species (i.e. oxidants). "We are currently examining whether or not our biologic can be aerolized in a form which permits delivery to the lung as a potential treatment for this devastating class of pulmonary disease," added Dr. Terlecky.

Dr. Terlecky and a team of researchers also are looking at other potential uses for their technology including treatment of a number of skin diseases such as psoriasis and dermatitis, as well as treating and protecting surrounding skin tissue exposed or damaged by radiation or photodynamic therapies. "We are also looking at CATSKL™ as a preservation solution," Dr. Terlecky said. In heart, lung, liver, and kidney transplants, the cessation and subsequent commencement of blood flow causes reperfusion injury that result in inflammation and oxidative damage to the organ. "CATSKL™ may be able to thwart this from occurring in the transplant process," he said.

In addition to the many pharmaceutical uses, CATSKL™ has tremendous potential as an "active" component of so-called cosmeceutical products. It can be formulated with a number of other ingredients as an effective antioxidant in various skincare products.

Bringing CATSKL™ to life – *EXT Life Sciences, Inc.*

In 2004, Dr. Terlecky and his friend, John Tesija, were having a discussion about this discovery. What was meant to be a casual conversation turned into a partnership that brought EXT Life Sciences, Inc.,

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Dr. Stanley Terlecky, associate professor of Pharmacology and co-founder, EXT Life Sciences, Inc.

to fruition. With Terlecky's scientific expertise and Tesija's legal and business savvy, the two became partners, along with Gary Novara. Tesija and Novara are the principle partners of Southfield's Novara and Tesija, P.L.L.C., a law firm with expertise in pension and corporate law. Today, EXT Life Sciences, Inc. is working with development partners to bring their first product to market.

"We are currently partnering with carefully selected companies to develop the product, with the goal of bringing an over-the-counter skin care product to market in 2009," said Dr. Terlecky. The product will be marketed as a novel targeted antioxidant in a formulation specifically designed to prevent collagen breakdown and reduce skin aging.

"Through all of this, I have learned that it takes time to develop a marketable compound," said Dr. Terlecky. He welcomes the process adding, "Our research truly bridges the translational gap – having been developed in the laboratory but ultimately being of benefit in the clinic." Through his important research, Dr. Terlecky may one day find potential treatments or cures for numerous skin and systemic pathologies, ultimately helping many in their fight against disease.

About Dr. Stanley Terlecky: Dr. Terlecky received his B.A. in the history of art from New York University and his Ph.D. in cellular and molecular physiology from Tufts University. He joined Wayne State University in 1998 after completing an NIH-sponsored postdoctoral fellowship in the Department of Biology at the University of California, San Diego.