Preventing Macular Degeneration A New Theory

Pioneering Eye Surgeon Sees Hope for Treating Macular Degeneration with Natural Hormones

By Debora Yost

Plant caroteinoids such as lutein and zeaxanthin were long ago shown to help prevent macular degeneration. But is there more that can be done to protect against this epidemic of blindness?

George W. Rozakis, MD is a Cornell-trained biomedical engineer specializing in laser eye surgery and lens implants. A pioneer in the field of LASIK surgery,[1] Dr. Rozakis is now vigorously involved in anti-aging medical research.

Dr. Rozakis is focusing on a potential breakthrough in treating macular degeneration, a condition that gradually destroys central vision. Also called age-related macular degeneration, it is the leading cause of blindness in people aged 65 and older.

Dr. Rozakis believes that restoring the correct balance of natural hormones that decline with age can retard and possibly even reverse the progression of macular degeneration. To investigate this hypothesis, he is setting up a long-term study and is currently seeking subjects to participate in the trial.

Hormones and Your Vision

The hormonal link with macular degeneration began to evolve when Dr. Rozakis met another medical pioneer, Sergey A. Dzugan, MD, PhD, during a conference in Chicago four years ago. Dr. Dzugan is a cardiovascular surgeon and internationally known expert in anti-aging and hormonal medicine.

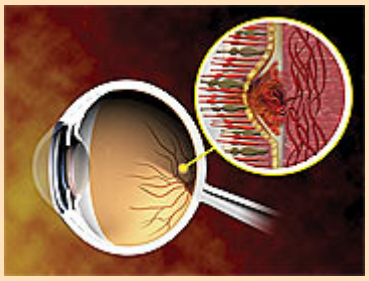
“Dr. Dzugan has done numerous studies[2-4] and written numerous articles on the association between low hormone levels and multiple disease states, including the problem of atherosclerosis and cholesterol elevation,” says Dr. Rozakis. “As an ophthalmologist I was impressed by the evidence that restoring and optimizing levels of key hormones improve brain function, largely because the retina is part of the brain. For example, there is very impressive literature that testosterone slows down the progression of Alzheimer’s disease.[5] Pregnenolone is extremely important for the brain and nervous system, as are progesterone and estrogens. Women whose progesterone levels drop develop negative personality changes.[6] In animal models, pregnenolone and DHEA have been shown to profoundly stimulate the healing of neurologic injury.[7-9] Women who enter into menopause at a young age develop macular degeneration, presumably because of the absence of estrogens.[10,11] Blocking estrogens with the anti-cancer drug tamoxifen is harmful to the retina.[12] This leads us to wonder if optimal hormonal health also positively impacts ocular health.”

“When an article appeared in the *American Journal of Ophthalmology* indicating that DHEA, or dehydroepiandrosterone, is exceptionally low in macular degeneration patients,[13] I was shocked and excited,” says Dr. Rozakis. This finding provided a major clue that hormonal imbalance was part of the problem of macular degeneration.

“DHEA is like the Grand Central Station of hormone chemistry,” says Dr. Rozakis. “When DHEA levels drop, it strongly implies that levels of other hormones such as pregnenolone, estrogens, and testosterone are out of balance or suboptimal.” All of these hormones make the body thrive—they give us virility, fertility, and help us act and react quicker. Since the retina contains hormone receptors, hormones must be part of the biophysiology of vision itself.

An eye affected by wet age-related macular degeneration. Details of the back of the retina are shown at upper right.

At left are the photoreceptors (red and brown) with the blood vessels that supply the eye behind them in the choroid layer. In wet, or neovascular, macular degeneration, weakened blood vessel formation in the back of the eye can lead to bleeding, which prevents light from reaching the back of the eye. This causes a central spot in the vision as well as distortion, and often leads to blindness.



THE ANATOMY OF MACULAR DEGENERATION

Macular degeneration, or age-related macular degeneration, is characterized by loss of the sharp, central vision you need to read, drive a car, or watch a movie. Peripheral vision—sight out of the corner of the eye—is not affected.

The macula is located near the center of the retina. The retina, a thin layer of cells that resides in the back of the eyeball, contains millions of photoreceptors that capture light and sends signals via the optic nerve to the brain where they are converted into the images that you perceive.

Age-related macular degeneration occurs when drusen, tiny yellow particles that consist largely of cholesterol, begin to accumulate behind the eye and damage the photoreceptors, causing degradation of vision. This is known as dry macular degeneration and is the most common form of the disease. Though the disease usually progresses slowly, there is no known cure.

Approximately 10% of people with age-related macular degeneration have the wet form of the condition. It is characterized by the growth of abnormal retinal blood vessels that leak, which can cause rapid and irreversible loss of vision.

Dry macular degeneration does not always lead to wet macular degeneration, but wet macular degeneration starts off as the dry form. According to the National Eye Institute, risk factors include smoking, poor diet, lack of exercise, high blood pressure, and overweight or obesity.

Cardiovascular Link

Low DHEA levels in macular degeneration could also explain its association with heart disease, as it is known that macular degeneration is an independent risk factor for stroke and coronary artery disease. In a study conducted by Australian scientists,[14] macular degeneration predicted a five-fold higher risk of cardiovascular mortality and a 10-fold higher risk of stroke mortality. After controlling for traditional cardiovascular risk factors, age-related macular degeneration predicted a doubling of cardiovascular mortality. Since hormone deficiency has been linked with both heart disease and eye disorders,[13,15] it is a prime suspect that links the heart to the eye.

Further examination of the literature reveals a major review article from Italy that explains the importance of hormones to the retina.[16] In this article, it is shown that the retina is able to attempt to make its own hormones, just like the brain. “The article also indicates that many of the hormones we use in anti-aging programs have a role in the retina, such as pregnenolone, DHEA, testosterone, estrogens, and progesterone. Few ophthalmologists and optometrists are aware of this relationship. This was the smoking gun that led to our hypothesis,” Dr. Rozakis notes.

Macular Degeneration and Cholesterol

A good theory needs to connect all the dots. Dr. Rozakis explains that one challenge in shaping his theory was explaining the presence of “drusen” or spots that appear in the retina in patients with macular degeneration. Many consider these spots to be “degradation products.”

Recently, Goldis Malek, PhD, and others[17-19] found that cholesterol was present in those spots. This led some people to think that cholesterol-lowering agents, such as statins, might help macular degeneration—but they do not. In fact, there is concern that statins actually increase the risk of dry macular degeneration advancing to the neovascular form of the disease, whereby tiny blood vessels in the eye begin to bleed.[20]

Dr. Rozakis notes, "To Dr. Dzugan and me, the presence of cholesterol in the macula was the key piece of data that integrated everything. The presence of cholesterol in the macula suggests that the retina is trying to make hormones—but that it can't. So, the body's accumulation of cholesterol and drusen worsen." He continues, "The macula can't get the hormones it needs from the blood because there aren't much there. As a result, if the macula is having trouble converting cholesterol into hormones, drusen form, and this results in the drusen we see in macular degeneration. Why the macula stops making hormones is unknown, but it is associated with aging. We can speculate that it happens because the enzymes which do the conversion decrease or are down-regulated with aging."

"This same 'story' of cholesterol and hormones plays itself out in the body as a whole," says Dr. Rozakis. "We do know that the adrenal gland, which produces DHEA, loses the ability to manufacture hormones as we age. As Dr. Dzugan published, this hormonal decline stimulates the liver to produce more cholesterol in an attempt to create more hormones.[3] This is why restoring hormones to their normal levels causes the liver to produce less cholesterol. That same paradigm may be happening in the macula. This is the basis of our hypothesis. The goal therefore must be to provide the retina the hormones it needs through supplementation."

WHAT YOU NEED TO KNOW: PREVENTING MACULAR DEGENERATION—A NEW THEORY

- Macular degeneration is the leading cause of age-related vision loss in adults aged 65 and older. The condition is characterized by the accumulation of cholesterol-containing lesions called drusen in the eye's retina.
- Since hormones are known to benefit brain health, scientists wondered if they might likewise benefit the retina, which has an embryologic association with the brain.
- The macular requires hormones to function, and is able to make its own hormones. Recent studies have shown that individuals with macular degeneration tend to have low blood levels of the hormone dehydroepiandro-sterone (DHEA) as well as a higher risk of cardiovascular mortality.
- These observations led Dr. George Rozakis and Dr. Sergey Dzugan to propose "The Hormonal Theory of Macular Degeneration." This theory hypothesizes that low blood hormone levels cause the retinal macula to accumulate cholesterol in an attempt to produce its own hormones. The macula's accumulation of cholesterol may lead to the production of pathological drusen and subsequent macular degeneration.
- Drs. Rozakis and Dzugan are conducting a clinical study to determine if restoring optimal hormone balance while providing nutrients that support eye health can prevent or reverse the progression of macular degeneration.
- If you would like to inquire about the study, please call Dr. Rozakis' office at 440-777-2667.

Reviewing the Evidence

There is already evidence to support the notion that DHEA protects the eyes against oxidative damage[21] and that the hormone pregnenolone improves electrical activity in the retina, as measured by the electroretinogram (ERG).[22,23] There is also evidence to support the use of melatonin in the treatment of macular degeneration.[24,25]

The theory that optimizing hormones may help promote macular health is based on these scientific facts:

1. The macula, which is located in the center of the retina, uses hormones to function.[16]
2. The normal macula has the unique ability to make its own hormones.[26]

3. The bloodstream of patients with macular degeneration is deficient in hormones.[11,13]
4. Drusen—the tiny yellow abnormalities that appear behind the macula in individuals with macular degeneration—contain cholesterol.[17-19]
5. Age-related macular degeneration is related to cardiovascular mortality.[14]

Dr. Rozakis speculates that the solution for treating macular degeneration is to measure and restore age-depleted hormones to optimal levels so that the macula can absorb the hormones it needs from the blood. "Hopefully restoring hormones to their normal levels in the bloodstream will cause the macula to stop absorbing cholesterol and, as a result, drusen formation will hopefully decline," says Dr. Rozakis. "We certainly need a better understanding of the pathophysiology of this blinding disease."[27]

ARE YOU A CANDIDATE FOR THE MACULAR DEGENERATION STUDY?

Macular degeneration is diagnosed as either dry (non-neovascular) or wet (neovascular). Neovascular macular degeneration is characterized by the growth of new blood vessels in the macula where they are not supposed to be. The dry form is more common than the wet form, with about 85-90% of macular degeneration patients diagnosed with dry macular degeneration. The wet form of the disease usually leads to more serious vision loss.

If you have been diagnosed with dry macular degeneration or have a family history of this disease, you may be a candidate for Dr. Rozakis' study. The ideal participant is someone with the dry form of macular degeneration, which is characterized by the accumulation of drusen behind the retina, and who still has useful vision (20/80 vision or better, using corrective lenses as needed). Dr. Rozakis says, however, that there are exceptions to this rule.

The study involves taking bioidentical hormones—meaning natural hormones such as progesterone, rather than synthetic hormones such as progestin—and a regimen of vitamins that have been found to be beneficial to slowing the progress of age-related macular degeneration. Blood work and a detailed baseline ophthalmology evaluation will be required. The data that will be generated will be compared with other data that already exist on the progression of the disease.

The purpose of the study is to measure the progression of the disease. Progress will be measured against currently known standards and the average rate at which the dry form of the disease converts to the wet form. If the program is successful, there should be slower progression, or even reversal, of age-related macular degeneration, and less conversion from the dry to wet form of the disease.

Dr. Dzugan will be assisting in this clinical study. Individuals who would like to inquire about the study should call Dr. Rozakis' office at 440-777-2667.

A Higher Level of Natural Treatment

Dr. Rozakis sees hormone restoration as a strategy to improve on existing studies showing that certain nutrients can reduce the progression of age-related macular degeneration. The long-term Age-Related Eye Disease Study (AREDS), conducted by the National Eye Institute, found that supplementing the anti-oxidants beta-carotene, vitamin C, vitamin E, and the mineral zinc reduced the risk of developing advanced states of macular degeneration in more than 4,700 high-risk patients aged 55 to 80 who were enrolled in the study.[28]

The specific amounts of nutrients used by the study researchers were:

- 500 mg of vitamin C
- 400 IU of vitamin E
- 15 mg of beta-carotene
- 80 mg of zinc

- 2 mg of copper.

The copper, administered as cupric oxide, was included in the formula to prevent copper-deficiency anemia, which is associated with high zinc intake.

As a result of the AREDS trial, many ophthalmologists are recommending supplements containing the study's recommended dosages for patients with or at a high risk for age-related macular degeneration.

Dr. Rozakis is currently developing his own study to test his theory concerning the relationship between low levels of DHEA and macular degeneration. "Our study is going to focus on overall hormonal balance and will include the supplements used in the AREDS study as well," says Dr. Rozakis. "Our goal is to do everything we can to stop macular degeneration. The fact that hormones are much more powerful than vitamins holds hope that the results will be significant."

If you have any questions on the scientific content of this article, please contact a Life Extension Health Advisor at 1-800-226-2370.

Article review by Richard P. Kratz, MD, DSci Life Extension Scientific Advisory Board Member

Tragically, the leading cause of age-related visual loss is macular degeneration which remains largely untreatable. By the age of 65, nearly one-third of adults or 20-25 million Americans will have experienced some decrease in their ability to read, drive, or see fine details. At present, the cause of age-related macular degeneration is unknown. The disorder is characterized by the development of small yellow spots in the retina called drusen. Theories to explain the occurrence of drusen include accumulation of cellular waste products, age-related reduction of blood flow, inflammation, nutrient deficiency, cigarette smoking, and high fat intake. New strategies for the prevention and management of macular degeneration are sorely needed.

The past decade has seen an explosion of interest in managing wellness by restoring hormones. Unfortunately, progress in this arena has been complicated by the use of non-bioidentical, pharmaceutical hormones such as Premarin® (horse urine estrogen). The scientific literature contains many studies examining the use of single hormones, which further confuses the issues at hand. Studies that focus on the balance of all hormones are greatly needed. For example, a study to determine the value of estrogen therapy alone in managing a particular disorder is insufficient, as an estrogen deficiency must be looked at in the context of progesterone levels and other adjacent hormones in the biological hormonal cascades.

Today, innovative clinicians are increasingly using bioidentical hormones in their practice. These are true hormones that are identical to those naturally produced by the body, which often become depleted due to the aging process. Examples of these bioidentical hormones include pregnenolone, dehydroepiandro-sterone (DHEA), estriol, estradiol, estrone, progesterone, testosterone, dihydrotestosterone, and cortisol.

George W. Rozakis, MD, has been a student of hormonal medicine for a number of years, thanks to his association with Sergey A. Dzugan, MD, PhD, one of the leading experts in hormonal medicine. Dr. Rozakis has proposed a new theory for one of the leading causes of blindness, which he titles "The Hormonal Theory of Macular Degeneration." The prime mover for this idea is the embryologic association between the retina and the brain. Since hormones are known to benefit the brain, Dr. Rozakis theorizes whether hormones also benefit the macula. When recent scientific literature showed that blood DHEA levels are low in patients with macular degeneration, that the macula can make its own hormones, and that cholesterol is present in the pathological lesions known as drusen, the stage was set for Dr. Rozakis' theory.

When it comes to eye health and vision-saving technology, Dr Rozakis is at the forefront as a visionary, an inventor, and a pioneer. In 1989, he was one of the first surgeons in the world to perform LASIK refractive eye surgery, and he went on to advance the technique by developing and refining his own patented laser system incorporating LASIK surgery.[1] Now used worldwide, the technique is often called a modern medical miracle that eliminates the need for eyeglasses.

Seeing that LASIK is not the solution for all refractive lens problems, the 53-year-old graduate of Cornell Medical College and the Duke Eye Center has now pioneered next-generation technology that will likely make LASIK obsolete: a very thin lens that can be permanently implanted into the eye and which, unlike LASIK, can be reversed.

Dr. Rozakis postulates that cholesterol-containing drusen are the retina's failed last-ditch attempt to make needed hormones, including DHEA, from cholesterol. Such a failed attempt leads to the findings we see in the retina, namely the small yellow spots called drusen.

If Dr. Rozakis is correct, restoring normal hormone levels should help to prevent macular degeneration and might even improve early-stage macular degeneration. This is a novel idea, which he intends to test in clinical trials. His theory is in keeping with the modern trend of measuring hormone levels and then administering hormone replacement to re-establish hormonal balance and restore health.

Careful clinical trials will be required to evaluate Dr. Rozakis' hormonal theory of macular degeneration.

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