REVISED AND EXPANDED

A COMPREHENSIVE & UP-TO-DATE SELF-HELP APPROACH TO GOOD HEALTH

Prescription for NUTRITIONAL HEALING

SECOND EDITION

A PRACTICAL A–Z REFERENCE TO DRUG-FREE REMEDIES USING VITAMINS, MINERALS, HERBS & FOOD SUPPLEMENTS

JAMES F. BALCH, M.D. • PHYLLIS A. BALCH, C.N.C.

Prescription for NUTRITIONAL HEALING

Here is the expanded second edition of America's best-selling guide to nutritional, herbal, and complementary therapies. With nearly two million copies of the first edition in print, this new edition carries on the tradition of providing drug-free remedies for over three hundred ailments and disorders—adding fifty additional health problems to its coverage. The new edition incorporates the most important up-to-date findings in the field of nutrition—from chromium picolinate to melatonin to shark cartilage. It also provides the latest research on herbal medicine—examining cat's claw, saw palmetto, yohimbe, kombucha, and much more. Written by a medical doctor and a certified nutritionist, this newly revised book provides all the information needed for the average person to design his or her own nutritional program for better health.

The book is divided into three parts. Part One explains and lists the various types of nutrients, food supplements, and herbs found in health food stores and drugstores; Part Two describes common disorders, from acne to cancer to yeast infection, and names the supplements that can be used to combat the conditions; and Part Three is a guide to traditional remedies and therapies that can be used in conjunction with a nutritional program. In addition, there are helpful self-diagnostic tests and insets throughout the book that offer in-depth coverage of a wide variety of topics.

Included in this edition of *Prescription for Nutritional Healing* are the latest research and theories on the treatment of aging, Alzheimer's disease, chronic fatigue, endometriosis, fibromyalgia, HIV and AIDS, infertility, inflammatory bowel disorders, osteoporosis, and a host of other critical subjects. Written in an easy-to-understand style, this new edition will fast become an indispensable health resource for you and your family.

ABOUT THE AUTHORS

Dr. James Balch is a graduate of Indiana University's School of Medicine. He completed his surgical residency at Indiana University Medical Center, specializing in urology. Following a two-year tour of duty in the United States Navy, Dr. Balch established a private practice as a urologist. He is presently a member of the American Medical Association, is board certified in the American Board of Urology, and is a fellow in the American College of Surgeons.

During the past seventeen years, Dr. Balch has helped patients to assume a portion of responsibility for their own well-being. This philosophy is reflected in his newspaper column and his radio broadcast. Through the years, Dr. Balch has appeared on numerous television and radio shows throughout North America.

Phyllis Balch is a certified nutritional consultant who received her certification from the American Association of Nutritional Consultants, and has been a leading nutritional counselor for almost two decades. Her interest in natural foods led to the establishment of a health foods store, *Good Things Naturally*. Phyllis Balch continues to study nutritionally-based therapies, procedures, and treatments both here and abroad. She is also a highly sought-after lecturer, and continues to appear on television and radio shows throughout the United States and Canada.

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GLAUCOMA

Glaucoma is a serious eye disease marked by an increase in the pressure that the fluids within the eyeball exert on other parts of the eye. If this pressure is unrelieved, it may harm the retina and ultimately damage the optic nerve, resulting in vision loss, even blindness. It is most common in people over thirty-five, in nearsighted people, and in people with high blood pressure. *See* GLAUCOMA in Part Two for a more complete discussion of this condition.

ITCHY OR TIRED EYES

Itchy or tired eyes can be the result of many different factors, including allergies, eyestrain, fatigue, infection (conjunctivitis), and an inadequate supply of oxygen to the cornea and outer eye tissues.

NUTRIENTS

SUPPLEMENT	SUGGESTED DOSAGE	COMMENTS
Vitamin A	50,000 IU daily. If you are pregnant, do not exceed 10,000 IU daily.	Needed for all eye disorders.
Vitamin B complex plus extra vitamin B_2 (riboflavin)	50–100 mg daily. 50 mg daily.	Improves intraocular cellular metabolism. Helps improve oxygenation of eye tissues.

Recommendations

❑ For quick relief of occasional itchy or tired eyes, close your eyes and apply a cold compress. Leave the compress in place for ten minutes. Compresses can be used as often as necessary.

Considerations

❑ If the problem is a recurrent one, allergies are a likely culprit. (*See* ALLERGIES in Part Two.)

❑ If itching and aching are accompanied by a bright pink or red color and thick secretions, you may have conjunctivitis. (*See* CONJUNCTIVITIS in this section.)

❑ If itchy and tired eyes persist over a long period of time, there may be an underlying nutritional cause. Supplement your diet with the B vitamins as described under Nutrients, above.

MACULAR DEGENERATION

This disorder causes a progressive visual loss due to degeneration of the macula, the portion of the retina responsible for fine vision. Macular degeneration is the leading cause of severe visual loss in the United States and Europe in people over fifty-five years old. This loss of vision may appear suddenly or it may progress slowly. Usually peripheral and color vision are unaffected.

There are two types of macular degeneration: atrophic (or "dry") and exudative ("wet"). In the latter type, the degeneration of the macula is accompanied by hemorrhaging or leaking of fluid from a network of tiny blood vessels that develop under the center of the retina. This results in scarring and loss of vision.

Macular degeneration is probably the result of free radical damage similar to the type of damage that induces cataracts. Factors that predispose a person to developing macular degeneration include aging, atherosclerosis, hypertension, annd environmental toxins. Heredity may play a role as well.

NUTRIENTS

SUPPLEMENT	SUGGESTED DOSAGE	COMMENTS
Natural beta-carotene or carotenoid complex (Betatene)	2,000 IU daily. As directed on label.	Good for all eye disorders.
Bilberry		*See under* Herbs, below.
Grape seed extract	As directed on label.	A powerful antioxidant that protects against free radical damage.
Selenium	400 mcg daily.	An important antioxidant.
Shark cartilage (BeneFin)	1 gm per 15 lbs of body weight daily, divided into 3 doses. If you cannot tolerate taking it orally, it can be administered rectally in a retention enema.	To prevent and possibly halt the progression of exudative macular degeneration by inhibiting the growth of tiny blood vessels in the eye that contribute to vision loss.
Vitamin A	50,000–100,000 IU daily.	Potent antioxidant and important in eye function. Use emulsion form for easier assimilation and greater safety at high doses.
Vitamin C with bioflavonoids	1,000–2,500 mg 4 times daily.	An important antioxidant and a necessary free radical destroyer. Prevents eye damage; also relieves pressure from cataracts.
Vitamin E	600–800 IU daily.	An important antioxidant and free radical destroyer.
Zinc	45–80 mg daily. Do not exceed a total of 100 mg daily from all supplements.	Deficiency has been linked to eye disorders. Use zinc picolinate form.

Herbs

❑ Clinical studies have shown that taking bilberry extract (160 milligrams and up daily) and eating fresh blueberries (8 to 10 ounces per day), plus taking ginkgo biloba extract and zinc, can help halt the loss of vision. Blueberries are rich in valuable flavonoids. Treatment at an early stage is most effective.

Recommendations

❑ Increase your consumption of legumes; yellow vegetables; flavonoid-rich berries such as blueberries, blackberries, and cherries; and foods rich in vitamins E and C, such as raw fruits and vegetables.

❑ Avoid alcohol, cigarette smoke, all sugars, saturated fats, and foods containing fats and oils that have been subjected to heat and/or exposed to the air, such as fried foods, hamburgers, luncheon meats, and roasted nuts.

Considerations

❑ In a study reported in the *Archives of Ophthalmology*, ophthalmologists at Louisiana State University Medical School tested the effects of supplemental zinc on people suffering from macular degeneration. Half the group received a 100-milligram tablet of zinc twice a day; the other half received a placebo. After twelve to twenty-four months, the zinc group showed significantly less deterioration than the placebo group.

MUCUS IN THE EYES

❑ A number of different conditions can cause mucus to accumulate in the eyes, such as allergies, head colds, and infection (conjunctivitis).

Herbs

❑ Gently and carefully wash each eye with diluted alcohol-free goldenseal extract or cool goldenseal tea.

Caution: Do not use goldenseal during pregnancy, and use it with caution if you are allergic to ragweed.

PHOTOPHOBIA

Photophobia is an abnormal inability of the eyes to tolerate light; exposure to light hurts the eyes. It is more common in people with light-colored eyes, and usually is not a serious problem. In some cases, however, it may be associated with irritation or damage to the cornea, acute glaucoma, or uveitis. It can also be a symptom of developing measles.

NUTRIENTS

SUPPLEMENT	SUGGESTED DOSAGE	COMMENTS
Vitamin A	50,000 IU daily. If you are pregnant, do not exceed 10,000 IU daily.	Needed for all eye disorders.

Considerations

❑ *See also* GLAUCOMA and/or MEASLES, both in Part Two.

❑ *See also* the discussion of uveitis under Dimness or Loss of Vision in this section.

PINKEYE

See CONJUNCTIVITIS in this section.

RETINAL EDEMA

See VASCULAR RETINOPATHY in this section.

RETINAL HEMORRHAGE

See VASCULAR RETINOPATHY in this section.

RETINITIS PIGMENTOSA

Retinitis pigmentosa is an inherited disease that affects approximately 1 out of every 3,700 people. In this disorder, metabolic flaws slowly but progressively destroy retinal cells. The first symptom usually is loss of night vision, beginning in adolescence or young adulthood. This is followed by loss of peripheral vision and, ultimately, blindness, which sets in anywhere between the ages of thirty and eighty.

NUTRIENTS

SUPPLEMENT	SUGGESTED DOSAGE	COMMENTS
Vitamin A	75,000 IU daily. If you are pregnant, do not exceed 10,000 IU daily.	Helpful for all eye disorders. Use emulsion form for easier assimilation and greater safety at higher doses.

Considerations

❑ High doses of vitamin A can slow the loss of remaining eyesight by about 20 percent per year, according to Dr. Eliot Berson, professor of ophthalmology at Harvard Medical School.

❑ More information on this disorder can be obtained by calling the Retinitis Pigmentosa Foundation at 800–683–5555.

SHINGLES (HERPES ZOSTER)

Shingles is an infection caused by the varicella-zoster virus, a member of the herpes family and the same virus that causes chickenpox. The characteristic symptom is a rash of painful blisters. Shingles can appear anywhere on the body. If it occurs on the forehead near the eyes or on the tip of the nose, the eyes are likely to become involved, and damage to the cornea can occur. Taking the proper supplements when blisters first appear can make the blisters dry up quickly, and the discomfort may be alleviated.

NUTRIENTS

SUPPLEMENT	SUGGESTED DOSAGE	COMMENTS
Vitamin C with bioflavonoids	2,000–6,000 mg daily and up.	An antiviral and immune system enhancer.
Vitamin A	50,000 IU daily.	Needed for all eye disorders.
Vitamin B_{12}	2,000 mcg 3 times daily, on an empty stomach.	Prevents damage to the nerves in the eyes. Use a lozenge or sublingual form.
Vitamin E	1,000 IU daily. If you have high blood pressure and have not taken vitamin E previously, start with 400 IU daily and slowly increase to 800 IU daily.	Helps to prevent scarring and tissue damage.

Prescription for NATURAL CURES

REVISED EDITION

OVER 500,000 COPIES SOLD!

COMPLETELY REVISED & UPDATED

A Self-Care Guide for Treating Health Problems with Natural Remedies Including Diet, Nutrition, Supplements, and Other Holistic Methods

JAMES F. BALCH, M.D.
coauthor of *Prescription for Nutritional Healing*
MARK STENGLER, N.M.D.
ROBIN YOUNG BALCH, N.D.

Natural Health/Healing

THE BESTSELLING NATURAL HEALTH BIBLE

REVISED AND UPDATED

Hundreds of thousands of readers have relied on *Prescription for Natural Cures* as the optimal source for accurate, easy-to-understand information on natural treatments and remedies for common ailments. The new edition of this invaluable resource has been thoroughly updated to reflect the very latest recommendations based on global research. It prescribes remedies for almost 200 conditions, including many new ones.

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- Comprehensive guide to natural remedies for almost 200 common health ailments organized by problem from A to Z
- Features scores of new supplements and many new conditions
- Clear, authoritative advice on your diet, healing foods, and nutritional supplements
- Indispensable reference includes down-to-earth descriptions of each health problem and the whole range of natural remedies, from nutrition to bodywork
- Up-to-date information reflecting the latest natural health research and treatment recommendations

JAMES F. BALCH, M.D., is one of the bestselling health book authors of all time. A renowned medical doctor, he is the coauthor of the first two editions of the landmark 8-million-copy bestseller *Prescription for Nutritional Healing*; he is also the coauthor of *Prescription for Drug Alternatives*. Dr. Balch has made numerous appearances on television and radio and lectures regularly around North America.

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Macular Degeneration

The macula is the part of the eye that allows us to see detail in the center of our vision field. When the macula breaks down or is damaged, fine work like reading, sewing, and painting becomes difficult or impossible. Small objects—stitches on fabric, for example, or type on a page—may look wavy or bent, and there may be dark spots over the item you're trying to see. This visual impairment begins at the center of the vision and, if not halted, will slowly expand toward the periphery. In the United States, macular degeneration is the leading cause of serious visual impairment in people over fifty-five, and in those sixty-five and older, it is the second-highest cause of blindness, next only to cataracts. There are two kinds of macular degeneration: atrophic (or "dry") and neovascular ("wet"). Atrophic is by far the more common of the two and accounts for 80 to 95 percent of all cases. Although its effects usually don't show until a relatively advanced age, atrophic macular degeneration happens over a lifetime, as cellular debris gradually accumulates under the retina. No one knows exactly why this debris builds up, but it is thought that damage by free radicals (the unbalanced molecules that damage cells), along with inadequate supplies of blood and oxygen to the macula, play a significant role. Although no conventional treatment exists, many alternative therapies can halt and possibly reverse the retinal damage by fighting free radicals and improving circulation.

Neovascular macular degeneration isn't actually degeneration at all. Instead, it is caused by an abnormal growth of blood vessels under the retina. If these blood vessels leak, the fluid can scar the macula and impair central, detailed vision. Unlike atrophic degeneration, this form of the disease can frequently be reversed with laser treatment, as long as it's caught early enough. It can often be prevented altogether, with the same alternative therapies used to treat atrophic degeneration.

Major conventional risk factors for macular degeneration include smoking, atherosclerosis, aging, and high blood pressure. Research in recent years has proven that diet is a critical element in the prevention of this disease. A diet that's high in cholesterol and saturated fat appears to increase susceptibility, while a diet that's rich in fruits, vegetables, and fish is protective. Carotenoids, found in fruits and particularly in vegetables, are quite protective antioxidants against macular damage from sunlight. A holistic approach also considers the role of inefficient digestion and absorption, which can contribute to mineral deficiencies that play a role in this disease. Also, toxic metals can increase free radical damage of the macula and the eye and should be dealt with, if a problem. Finally, several nutritional supplements, especially minerals and carotenoids, have proven to be effective in the prevention and the treatment of macular degeneration.

If you experience any kind of blurred vision, do not attempt to diagnose yourself. See a physician or an eye doctor to rule out an underlying disorder; if you do have macular degeneration, your doctor should run a test to discover whether you are affected by the atrophic or neovascular form. And since both kinds of macular degeneration—as well as many other eye problems—can be detected by a doctor long before the symptoms appear, you should always have regular eye exams, especially if you're age fifty-five or older.

SYMPTOMS

- Blurring, distortion, or dark spots at the center of the vision field, especially when looking at detail.

ROOT CAUSES

Anything that causes free radical damage or poor circulation can contribute to macular degeneration, including the following:

- Aging
- Smoking
- A diet that's low in antioxidants, which fight free radical damage
- Arteriosclerosis (hardening of arteries)
- High blood pressure
- Exposure to ultraviolet light
- Environmental toxins (particularly toxic metals)
- Poor digestion and detoxification
- Nutritional deficiencies

Testing Techniques

The following tests help assess possible reasons for macular degeneration:

Blood pressure

Hormone testing (thyroid, DHEA, cortisol, testosterone, IGF-1, estrogen, progesterone)—saliva, blood, or urine

Intestinal permeability—urine

Detoxification profile—urine

Vitamin and mineral analysis (especially zinc, carotenoids, vitamins E and C, selenium)—blood

Digestive function and microbe/parasite/candida testing—stool analysis

Blood-sugar balance—blood

Toxic metals (mercury, lead, arsenic, etc.)—hair or urine

TREATMENT

Diet

If you have arteriosclerosis or high blood pressure, see the relevant entry for additional dietary recommendations. Reducing the blockage or the pressure in your arteries will also improve the circulation of blood and oxygen to your eyes.

Recommended Food

Keep toxins moving quickly through your body by eating plenty of fiber, especially whole grains and beans.

Water will also help flush away toxins and keep the eye tissues supple. Drink a glass of clean quality water every two waking hours.

Consume your carotenoids, which are fruits and vegetables that fight free radicals. Good sources include dark leafy greens, spinach, collard greens, kale, bell peppers (all colors), yellow squash, carrots, tomatoes, celery, oranges, red grapes, mangoes, and melons.

Vitamin C and bioflavonoids work together against free radicals; they also strengthen the capillaries and the tissues of the eye. Eat red, blue, and purple fruits and vegetables—berries, cherries, tomatoes, and plums—for bioflavonoids, and enjoy citrus fruits as a source of vitamin C.

Food to Avoid

Stay far away from foods that contain free radicals. Fats that are saturated, hydrogenated, or partially hydrogenated are the worst offenders in the American diet, but caffeine, sugar, alcohol, and charred or grilled meats are also sources of these disease-causing molecules.

Rx Super Seven Prescriptions—Macular Degeneration

Super Prescription #1 Lutein
Take 15 mg daily with a meal. It prevents oxidative damage of the macula.

Super Prescription #2 Zeaxanthin
Take 3 mg daily with a meal. It prevents oxidative damage of the macula.

Super Prescription #3 Betaine hydrochloride
Take 1 to 3 capsules with each meal or as directed by a health-care professional. This supplement increases stomach acid for the improved absorption of nutrients, especially minerals.

Super Prescription #4 Zinc
Take 45 mg daily, along with 2 mg of copper. Zinc is required for proper vision and is an antioxidant, which was shown in studies to help macular degeneration.

Super Prescription #5 Ginkgo biloba
Take 120 mg twice daily of a product standardized to 24 percent flavone glycosides. Ginkgo improves circulation and has potent antioxidant effects. One study found it helpful for early-stage macular degeneration.

Super Prescription #6 Bilberry (*Vaccinium myrtillus*)
Take 240 to 600 mg a day of a standardized formula containing 25 percent anthocyanosides. This herb contains flavonoids—phytochemicals that protect the eyes against oxidative damage. It also strengthens the capillaries and the connective tissues of the eye.

Super Prescription #7 High-potency multivitamin
Take a high-potency multivitamin. It provides a base of antioxidants and nutrients for eye health.

General Recommendations

Fish oil contains DHA, which is concentrated in the retina of the eye. The consumption of fish has been shown to reduce the risk of macular degeneration. Take a fish oil product containing 1,000 mg of DHA daily.

Vitamin E-complex acts as an antioxidant and has been shown to improve vision in people with age-related macular degeneration. Take 400 IU daily with a meal.

A mixed carotenoid complex contains a blend of carotenoids that protects against ultraviolet light damage. Take 25,000 IU twice daily.

Digestive enzymes improve digestion and absorption. Take a full-spectrum complex with each meal.

Grapeseed extract or maritime pine bark extract scavenges free radicals from the eye and the brain and improves circulation. Take 150 to 300 mg daily.

Taurine is an amino acid that is believed to protect the retina from ultraviolet light damage. Take 500 mg twice daily on an empty stomach.

One study involved over 3,600 people, ages 55 to 80 years, who were at risk for age-related macular degeneration. Those who took antioxidants plus zinc were less likely than those who took only antioxidants or only zinc to lose their vision over the six-year study. Individuals who took a placebo were the most likely to develop advanced age-related macular degeneration and vision loss.

A survey of 876 elderly individuals found that people whose intake of lutein and zeaxanthin was in the top twentieth percentile were 56 percent less likely to have age-related macular degeneration, as compared with people who had a low intake of these two carotenoids.

A double-blind trial found that supplementation with 45 mg of zinc daily for one to two years significantly slowed the rate of visual loss in people with macular degeneration.

Intravenous nutrient therapy by a holistic doctor can be very helpful for this condition. See a local doctor for this treatment.

Homeopathy

Homeopathy may be helpful for macular degeneration. See a homeopathic practitioner for a constitutional remedy.

Acupressure

See pages 675–681 for information about pressure points and administering treatment.

Work Large Intestine 3 and 4 (LI3 and LI4) to improve circulation to your head.

Bodywork

An all-over massage will improve circulation and help deliver oxygen to all parts of the body, including the eyes.

Reflexology

See pages 691–692 for information about reflexology areas and how to work them.

Work the eye/ear area of the foot, which is located at the base of the toes.

Hydrotherapy

Alternating hot and cold cloths to the eyes will improve circulation.

Stress Reduction

General Stress-Reduction Therapies

Vision problems can be alarming and discouraging. Cope with the stress by setting aside time to relax every day.

Other Recommendations

- Smoking is a potent way to deliver free radicals to your body. If you smoke, stop. If you don't, protect yourself from secondhand smoke.
- Regular, moderate exercise will help keep your blood flowing properly to the eyes.
- Protect your eyes from the sun. In bright light, wear sunglasses that filter out 98 percent of the ultraviolet spectrum.
- For advanced cases of macular degeneration, consider a nutrition-oriented doctor who uses intravenous vitamin and mineral therapy.

REFERENCES

Newsome, D. A., M. Swartz, N. C. Leone, et al. 1988. Oral zinc in macular degeneration. *Archives of Ophthalmology* 106:192–98.

Seddon, J. M., et al. 1994. Dietary carotenoids, vitamins A, C, and E, and advanced age-related macular degeneration. *Journal of the American Medical Association* 272:1413–20.

The Orthomolecular Treatment of Chronic Disease

65 Experts on Therapeutic and Preventive Nutrition

Edited by
ANDREW W. SAUL, PHD

With contributions by
Robert Cathcart, MD • Allan Cott, MD • Harold D. Foster, PhD • Abram Hoffer, MD, PhD
Ronald Hunninghake, MD • Frederick Klenner, MD • Humphry Osmond, MD
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Hugh D. Riordan, MD • Roger Williams, PhD • Atsuo Yanagisawa, MD, and many more

The Orthomolecular Treatment of Chronic Disease

High doses of vitamins have been known to cure serious illnesses for nearly 80 years. But, unlike other books, this book is not about simple "deficiency" diseases. Instead, *The Orthomolecular Treatment of Chronic Disease* targets all-too-common, often severe ailments that are generally not believed to be treatable with nutrition therapy.

Claus Jungeblut, MD, prevented and treated polio in the mid-1930s, using a vitamin. Chest specialist Frederick Klenner, MD, was curing multiple sclerosis and polio back in the 1940s, also using vitamins. William Kaufman, MD, cured arthritis, also in the 1940s. In the 1950s, Drs. Wilfrid and Evan Shute were curing various forms of cardiovascular disease with a vitamin. At the same time, psychiatrist Abram Hoffer, MD, was using niacin to cure schizophrenia, psychosis, and depression. In the 1960s, Robert Cathcart, MD, cured influenza, pneumonia, and hepatitis. In the 1970s, Hugh D. Riordan, MD, was obtaining cures of cancer with intravenous vitamin C. Dr. Harold Foster and colleagues arrested and reversed full-blown AIDS with nutrient therapy, and in just the last few years, Atsuo Yanagisawa, MD, has shown that vitamin therapy can prevent and reverse sickness caused by exposure to nuclear radiation. All of these doctors used very high doses, and all consistently reported striking success rates. And, all these doctors reported great patient safety.

Orthomolecular (nutritional) medicine is based on physicians' reported experiences as well as laboratory study. Since 1967, much of this research has been published in the *Journal of Orthomolecular Medicine (JOM)*. This book brings forward important material selected from over forty-five years of *JOM* directly to the general reader, and the general reader's doctor. *The Orthomolecular Treatment of Chronic Disease* is a very large book, but it is also a very practical book. As you read it, you will see that it takes a problem-based approach, not an encyclopedic one. If you want to know which illnesses best respond to nutrition therapy, and how and why that therapy works, this is the book for you. Part One presents the principles of orthomolecular medicine and the science behind them. Part Two is devoted to orthomolecular pioneers, presenting an introduction to maverick doctors and nutrition scientists in a reader-friendly way that brings the subject to life. Part Three brings together extraordinary clinical and experimental experiences with vitamins by experts in the major chronic illnesses discussed. Physician reports and patient case histories appear throughout to illustrate safe, successful nutrition-based treatment.

If the word "cure" intrigues you, this book will also. Inside, you will find a body of knowledge that you, and your doctor, have likely never been exposed to. Many people have heard their doctor say, "I have never seen any evidence that nutrient therapy cures disease." Those doctors are telling the truth: no, they personally have never seen the evidence. But that is not because it doesn't exist. It does, and *The Orthomolecular Treatment of Chronic Disease* shows exactly how innovative physicians have gotten outstanding clinical results with high-dose nutrient therapy. Their work is here for you to see and decide for yourself. Be prepared to marvel at the power of vitamins to save lives.

Andrew W. Saul, PhD, is founder and editor-in-chief of the *Orthomolecular Medicine News Service* and is on the editorial board of the *Journal of Orthomolecular Medicine*. He has published over 180 peer-reviewed articles and has written or coauthored twelve books. Those books have been translated into a number of languages, including Japanese, Chinese, Hindi, Arabic, Spanish, Norwegian, and Italian. Dr. Saul was on the faculty of the State University of New York for nine years, and has twice won New York Empire State Fellowships for teachers. *Psychology Today* magazine named him one of seven natural health pioneers, and he is featured in the popular documentary movie *Food Matters*. In 2013, Dr. Saul was inducted into the Orthomolecular Medicine Hall of Fame and was appointed to the board of the Japanese College of Intravenous Therapy. His personal website is andrewsaul.com, and his educational website is DoctorYourself.com, the largest non-commercial natural healing resource on the Internet.

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EYE DISEASES

THE EYE IS A DELICATE sensory organ exposed daily to bright light and environmental toxins. Light and toxins such as chemicals and smoke generate free radicals that cause damage in eye tissues. Therefore the eye is susceptible to degenerative diseases related to oxidative stress and aging.

In macular degeneration, oxidized products of metabolism gradually build up in a layer underneath the retina, eventually causing retinal detachment and blindness. In glaucoma, the intraocular pressure builds up due to oxidative stress, causing retinal axons entering the optic nerve to progressively die. In retinitis pigmentosa, rods die from a genetic abnormality and cones progressively die due to oxidative stress. In diabetic retinopathy, high blood sugar causes progressive damage to the retina.

High levels of antioxidants such as vitamins C and E in the body are associated with a lower incidence of these diseases, and oral administration of these and other antioxidants reduces oxidative stress and the disease risk. Success is dependent on a sufficient level of supplements taken over a sufficient duration of time. There is abundant evidence that many eye diseases can be effectively slowed or prevented using supplements of antioxidants and other essential nutrients at high enough doses.

— ROBERT G. SMITH, *JOM* 2010

TERMS OF EYE DISEASE

AQUEOUS HUMOR. The clear fluid inside the eye in front of the lens; poor outflow of aqueous humor may elevate pressure and damage the optic nerve at the back of the eye.

CATARACTS. A clouding of the lens inside the eye that gradually restricts vision.

GANGLION CELLS. Cells located in the retina that transmit signals representing different aspects of vision (contrast, color, motion) through the optic nerve to the brain.

GLAUCOMA. A progressive eye disease in which increased pressure in the eye causes nerve cells in the retina to die.

INTRAOCULAR. Inside the eye.

MACULA. Visual center of the retina that is required for reading and is primarily composed of cells that sense color (cone photoreceptors).

MACULAR DEGENERATION. A progressive eye disease in which photoreceptors near the center of the retina slowly die.

MITOCHONDRIA. Parts of cells where the energy molecule (ATP; adenosine triphosphate) is produced.

PHOTORECEPTORS. Light-sensing cells in the retina that convert photons of light into chemical and electrical signals.

RETINAL PIGMENT EPITHELIUM (RPE). A layer of cells attached to the retina, which is continually active in the nourishment and maintenance of the photoreceptors.

RETINITIS PIGMENTOSA. A group of night-blindness diseases related to age-related macular degeneration in which rod photoreceptors die, usually due in part to a genetic abnormality but with a nutritional component; this is often followed by the gradual death of cone photoreceptors and subsequently blindness.

VITREOUS HUMOR. Also known as vitreous jelly or vitreous body; the gel-like transparent liquid behind the lens that fills most of the eye.

NUTRITION AND EYE DISEASES

by Robert G. Smith, PhD

The eye is one of the most wondrous organs in the body because of its function, sight, but also because of its structure.[1] It is a sphere that maintains its shape with a higher pressure inside than outside. At the front of the eye, a clear protective coating called the cornea, nourished and lubricated by tears and a fluid inside the eye called the aqueous humor, allows our eyelids to quickly slide up and down. Behind the cornea and aqueous humor sits the iris, which can open and close its pupil like a camera lens diaphragm. Just behind the iris sits the lens, which is a transparent tissue analogous to a camera lens comprising cells containing a clear crystalline protein. Behind the lens, filling most of the eye, is a gel-like transparent liquid called the vitreous humor. Near the back of the eye, attached to the inner lining of the eyeball, sits the retina. The neurons in the retina convert the light into electrical impulses, which are carried by the axons of ganglion cells across the surface of the retina to the optic disc, where they exit the eyeball and become the optic nerve that carries visual impulses to the brain. The retina is attached to the pigment epithelium (RPE), a layer of cells that are continually active in the nourishment of the photoreceptors. At the back of the eye, behind the pigment epithelium sits the choroid, a plexus of blood vessels nourishing the pigment epithelium and retina.

Antioxidants

A variety of mechanisms cause damage to the biological machinery of life, and the eye is particularly susceptible because it is right at the surface of the body and is delicate. Although oxygen is necessary to efficiently metabolize food and provide energy, it also can cause damage when an oxygen molecule binds to biochemicals in a way that damages them, called oxidative stress. This can result in molecules with a free unbound and energized electron, known as free radicals, which are highly reactive.[2] Free radicals can bind to any of a cell's biochemicals, damaging them. Such oxidative stress can also be caused by bacterial or viral infections, toxins, physical damage (bruises), or free radicals generated by light. The body's main defense against such oxidative stress is antioxidants such as vitamin C, vitamin E, and glutathione.[3] Vitamin C is transported into cells where it helps to maintain a reducing environment in the cytoplasm (a gel-like substance surrounding a cell's nucleus). Vitamin C in the cytoplasm and nucleus can prevent free radicals floating among the biochemicals there from damaging the intricate metabolic pathways and its deoxyribonucleic acid (DNA). It can also regenerate other antioxidants such as vitamin E and glutathione. Vitamin E sitting in the lipid bilayer of the cell's membrane can prevent oxidation of its fatty acids and proteins. Thus, antioxidants are essential to prevent mutations in a cell's DNA and to keep our cells functioning normally, so they are crucial for life and health.[2] Vitamin C is also important beyond its role as an antioxidant, for it is necessary in the synthesis of collagen, a crucial component of the body's organs and vasculature. Further, some evidence suggests that vitamin E acts as a cell-signaling modulator to reduce damage in addition to its known antioxidant properties.[4,5]

Effects of Light on the Eye

The eye is the only part of the body besides the skin that is exposed to ultraviolet (UV) and blue light for long periods. Light rays that pass into the eye are damaging because the photons when absorbed can create free radicals that damage the essential proteins and DNA throughout the eye.[6] Although the cornea, lens, and retina are transparent, they all absorb a small amount of the light and thus are susceptible to damage over many years of exposure. This, of course, is one good reason to wear dark glasses and broad-brimmed hats outside. By reducing the high-energy light, especially UV and blue, you can greatly reduce your eyes' exposure to oxidative damage from light. Most of the UV

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light is absorbed in the cornea and lens,[6] but much of the blue light passes on to the retina, which has one of the highest metabolic rates of any tissue in the body. Because the retina contains a lot of polyunsaturated lipids and has a higher concentration of oxygen than most other tissues, it has one of the highest risks of oxidative damage.[7,8]

Mitochondria in the axons of retinal ganglion cells, necessary for the high metabolic rate, contain cytochromes (biochemicals) that can absorb light and generate free radicals, damaging the cell's metabolism and ability to recover from further oxidative stress.[2,7,9] The iris helps to prevent the light damage. Its pupil, the central open area that passes light, is controlled by the brain according to the light intensity outside (and our mood), and its pigment absorbs light. The pigment, a melanin molecule similar to the pigment in skin, is a dark brown color; people with blue eyes are at greater risk of damage because the blue color represents a lack of the light-absorbing pigment.

The eye can recover and regenerate to some extent from the chemical reactions caused by light. Photoreceptor pigment (opsin) is located in flat discs located in the outer segments of the photoreceptors at the back of the retina. Each opsin molecule contains retinal, a submolecule that is chemically modified (bleached) when it absorbs a photon, and must be regenerated. The bleached retinal is released by the opsin, and transported into the RPE cells, which regenerate it and transport it back to the photoreceptors. In addition, the photoreceptors slough off their oldest discs to allow them to be renewed. In a process called phagocytosis, the old discs at the photoreceptor tip are digested by the RPE.[10] New discs containing a fresh array of pigment molecules and enzymes are generated at the base of the photoreceptor's outer segment and move progressively outward. Interestingly, whenever we go out into sunlight, virtually all the pigment in our rod photoreceptors is bleached in a few seconds and must be regenerated before we can see again in the dark.[1] The pigment is regenerated using vitamin A (retinyl or carotene), which we must obtain from our food. This is the normal process of vision, and the eye is normally able to keep this up over our whole lifetime, as long as we keep eating enough carrots and dark green leafy vegetables.

But over years of exposure to sunlight, cells in the cornea, lens, and retina are damaged by photon absorption in other molecules besides the photoreceptor pigment. The energy in a blue or UV photon is great enough to break chemical bonds between atoms, and, thus, when a photon is absorbed, it can generate a free radical ready to attack any molecule nearby. After many decades spent outside in bright sunlight, the oxidative damage can build up and cause the cells to be dysfunctional or die.

Antioxidants and the Eye

Oxidative stress can overwhelm the eye's antioxidant defenses, and many lines of evidence suggest that oxidative stress such as light exposure is a major factor in age-related eye diseases.[6,7] Early studies showed that aging eyes derived a prompt (within two weeks) benefit in vision from 600 milligrams (mg) of supplemental vitamin C. The benefit was thought to be in the retina, optic nerve, and their vasculature[11] and was shown even for patients who did not have an acute vitamin C deficiency. The eye concentrates vitamin C by a factor of 25 over its level in the blood, which is thought to help the eye prevent damage caused by light.[12] The eye is also susceptible to other types of oxidative damage such as free radicals in the bloodstream caused by environmental toxins like smoke and pesticides. Smokers have lower vitamin C levels in the bloodstream and also in the eye, so they are at risk for eye diseases. Obesity is also a risk factor for eye disease, possibly due to increased oxidation of lipids (fats) and lower production of antioxidant compounds such as glutathione.[13] The carotenoids lutein and zeaxanthin, the principal phytochemicals in green leafy vegetables, are the primary constituents of the macular filter that removes blue light from traversing the retina. These are antioxidants and are thought to lessen oxidative stress in the macula, the central part of the retina. A diet supplemented with lutein and zeaxanthin is associated with lower risk for eye disease.[13] Vitamin E is known to be helpful in preventing oxidative stress to photoreceptors in vitro[14] and can lower intraocular pressure.

Further, vitamin E and other antioxidants such as glutathione have synergistic effects.[15] These lines of evidence may all be related because vitamin C can regenerate vitamin E and other antioxidants to their reducing form. Recent evidence suggests that natural antioxidants concentrated in mitochondria are essential for preventing oxidative damage.[16] New antioxidants designed with properties that target mitochondria have been found to prevent damage in RPE cells, extend the life of mice, and prevent oxidative eye damage in dogs, cats, and horses.[8,17] Thus, abundant evidence suggests that antioxidants are important in preventing damage from free radicals in the eye.

Retinal Detachment

In a normal eye, the retina is only weakly attached to the pigment epithelium and can be easily separated by physical damage such as a blow to the eye or inflammation. In diseased retinas such as wet age-related macular degeneration or diabetic retinopathy (described below), the attachment is weakened so retinal detachment is more common. When this occurs, fluid may accumulate beneath the retina, progressively detaching a larger area from the pigment epithelium. Wherever the retina is detached for more than a few hours from the pigment epithelium, the photoreceptors start to degenerate, and, after a few days of detachment, the photoreceptors will start to die.[18] Once such damage has occurred, the remainder of the retinal neurons do not receive normal responses and will eventually degenerate and die as well. Thus, acute retinal detachment is a medical emergency, where quick treatment is very important to preserve sight. An ophthalmologist can save the retina by pulsing a laser to cause small spots of scar tissue in the retina and pigment epithelium that holds the retina in place at the back of the eye. Although good nutrition is important in recovering from a detached retina, taking adequate amounts of antioxidants throughout our lives is crucial to prevent the build-up of oxidative stress-induced damage that can cause retinal detachment.

Macular Degeneration

Macular degeneration is a progressive disease of the retina where photoreceptors slowly die near the center of the eye.[19] Age-related macular degeneration (AMD) is the leading cause of blindness in people ages 50 years or more worldwide.[20] In the "dry" form of AMD, cellular waste deposits called drusen and lipofuscin build up between retinal photoreceptors and the choroid. How or why these deposits build up is unknown. They are thought to be waste deposits caused by oxidative damage to the retina and pigment epithelium. In the "wet" form of AMD, new blood vessels grow from the choroid at the back of the eye, pushing the retina away from the choroid, tending to cause retinal detachment. Although a large risk factor for AMD is genetic, both forms are thought to be initiated by oxidative damage, consistent with a typical onset after age 50.

The single most important environmental risk factor for developing AMD is smoking, which causes oxidative damage in many tissues of the eye.[19,20] Several toxic chemicals present in smoke are known to induce cell death in the retinal pigment epithelium.[21] Other important risk factors are exposure to bright sunlight and inflammation.[19] Cumulative exposure to light is associated with AMD in people with low antioxidant levels.[22] Conversely, a diet with a low glycemic index, high in omega-3 fatty acids and antioxidants (vitamins C, E, zinc, and lutein/zeaxanthin), is associated with the lowest risk of drusen and advanced AMD.[23–27] The protective effect is thought to be greater when the antioxidants and other beneficial nutrients are taken at a sufficient level for a decade or more. Antioxidants can prevent oxidative stress-induced damage to arteries in the retina and choroid, which helps to prevent wet AMD. This benefit is thought to come from reducing free radicals.[28] A relatively low level of vitamin E, an average of 300 international units (IU) per day, produced a small reduction in the risk for AMD, but a greater effect was shown for those who also took multivitamins.[29] The levels of supplements necessary to achieve an optimal reduction in AMD are easy to get but are not contained in most multivitamin tablets.[30] The

level of vitamins C and E in most eye studies has not been high by orthomolecular standards. For example, a vitamin C level of 500 mg per day or lower and a vitamin E level of 200–400 IU per day (the amounts typically used in studies) are considered low to minimal, and higher levels of these nontoxic antioxidants are very likely beneficial in the long term.

Night Blindness

A variety of problems with the eye can cause difficulty seeing at night. A reduction of contrast sensitivity from cataracts can cause low vision at night because glare from bright lights can obscure low-contrast details. Night-blindness from a lack of vitamin A to regenerate the rhodopsin pigment in the rod photoreceptors can be prevented with an adequate intake of vitamin A or carotene. Deterioration at the back of the eye generates waste products from oxidation of fatty acids (lipofuscin and drusen) that can cause night blindness symptoms and AMD. In some cases this has been cleared by application of polyphenols (plant-based antioxidants) that remove metal ions.[31] Many genetic diseases can cause rod photoreceptors or other retinal neurons to die or malfunction, causing night blindness. A common type of night blindness is caused by retinitis pigmentosa.

Retinitis Pigmentosa

Retinitis pigmentosa (RP) is a group of night blindness diseases related to AMD in which rod photoreceptors die, usually due to a genetic abnormality.[32] In a common form of RP, the cone photoreceptors survive but then progressively die, resulting in gradual blindness. This gradual cone death is thought to originate in part from oxidative stress due to free radicals generated by light, possibly through an effect on vasculature. The stress is thought to spread through oxidative damage to lipids.[33] Compared to rods the cones are scarcer and therefore use less oxygen. After the rods die in RP, the cones still receive the same amount of oxygenation from the choroidal blood vessels, so they are subject to increased oxidative stress. Antioxidants and omega-3 fatty acids can slow or prevent this damage. Vitamin C reduces oxidative stress in photoreceptors due to bright light, but only when taken before the light exposure, implying that it directly prevents free radical formation by light.[34] In a mouse model of RP, a supplement of vitamins C, E, and other antioxidants reduced cone cell death.[35] Genetic manipulation of a RP model that increased expression of natural antioxidants in cones also prevents cone cell death.[36] Further, people with a genetic abnormality that prevents vitamin E uptake are prone to RP,[5,37] supporting the oxidative stress hypothesis. Painkiller drugs that affect mitochondrial function are thought to cause oxidative stress and this may contribute to RP and other ocular diseases.[38] Depending on which genes are affected, vitamin A, necessary for vision, can delay loss of cone function in RP to preserve sight.[32,39]

Glaucoma

Glaucoma, a leading cause of blindness worldwide, is a progressive disease of the eye in which the nerve cells that send visual signals to the brain degenerate and gradually die. By the time this is noticed, it is usually too late to preserve sight. It is usually associated with high pressure inside the eyeball, which pinches the axons of the ganglion cells where they exit the eyeball. The pressure in the eye is created by fluid pumped into the eye from the bloodstream. The fluid pressure is drained by small canals around the edge of the iris. When the trabecular meshwork covering the canals gets blocked, the intraocular pressure increases and the optic nerves become damaged. Normal-tension glaucoma causes a similar type of damage to the optic nerve but is not associated with high pressure in the eyeball. It is thought to be caused by unusually fragile axons in the optic nerve, or restricted blood flow in the optic nerve.

In all types of glaucoma, damage to their axons causes the ganglion cells on the surface of the retina to progressively degenerate. Oxidative stress is thought to be a common component in the degeneration of ganglion cells in glaucoma.[7] Oxidative stress has been shown in the axons of animal models of glaucoma, and free radical scavengers can

prevent retinal ganglion cell death.[40,41] The damage to the axons may be worsened when microcirculation of blood flow within the optic nerve is disrupted.[42] The ganglion cells are thought to die at different times during the disease because they receive differing secondary insults, including oxidative stress from light.[9]

The canals that normally regulate the intraocular pressure can be blocked by debris from degenerating eye tissue, especially the neurons of the retina, the iris, and lens due to oxidative damage from light absorption. The debris is carried to the canals where it can clog them and allow the pressure to build. The trabecular meshwork is also directly affected in glaucoma from oxidative stress, which damages the meshwork cells and their DNA.[40,43] This can be countered very effectively with antioxidants such as vitamins C and E, lutein, and glutathione.

The standard treatment for glaucoma is to lower the intraocular pressure. High levels of vitamin C (2,000–10,000 mg per day or higher) are very effective at reducing intraocular pressure, through its osmotic effect, and likely other mechanisms such as reducing lipid oxidation and increasing outflow through the trabecular mesh and canals that drain the eye.[44,45] In normal-tension glaucoma, supplemental magnesium may allow the blood vessels supplying the optic nerve to relax, increasing its blood supply. Increasing the neural energy supply is currently hypothesized to increase ganglion cell survival. One way to achieve this is with antioxidants that scavenge free radicals generated by light and oxidative stress.[41] To preserve ganglion cells under oxidative stress, oral supplements to enhance mitochondrial function such as lipoic acid, niacinamide (vitamin B3), and creatinine may prove useful.[42] In glaucoma, levels of vitamin C and other antioxidants such as glutathione are lower inside the eye, suggesting that they are protective against damage.[46] Although glaucoma is not considered to be a vitamin deficiency disease, vitamin E is known be an important regulator of the oxidative damage that causes glaucoma.[15] Vitamin E can delay the onset of glaucoma symptoms in retinal blood vessels.[5]

Diabetic Retinopathy

Diabetes is produced by an inability to utilize blood sugar (glucose), which causes damage to tissues throughout the body. Insulin secreted by the pancreas causes cells of most tissues to take up glucose from the bloodstream. Because the retina does not respond to insulin, it is particularly susceptible to diabetes and to damage caused by high blood sugar. Several nutrients, including alpha-lipoic acid, vitamins C and E, and magnesium and zinc, are thought to increase uptake of blood sugar and reduce blood pressure and are known to be helpful in preventing retinopathy.[47]

Cataracts

Cataracts are another leading cause of vision loss very common past age 60. During most of our life, the lens tissue can actively repair itself to keep the lens proteins intact. But with old age and damage due to oxidation from absorbing UV rays and ionizing radiation (the kind that has traditionally been considered most worrisome), the lens tissue cannot maintain itself in good condition,[6] and its crystalline protein becomes cloudy and absorbed water causes it to swell. Airline pilots have a higher rate of cataracts, thought to be caused by their exposure to radiation from outer space.[48] Although currently there is no treatment to cure cataracts, their onset can be delayed or prevented by antioxidants in the diet. The blood level of vitamin E is lower in patients with cataracts, suggesting the use of supplements to prevent cataract occurrence.[5,49,50] A combined supplement of vitamins C, E, and other antioxidants such as selenium and alpha-lipoic acid is helpful in reducing the occurrence of cataracts,[13,45,51] and this is thought to remove free radicals and enhance the activity of glutathione in the eye. Vitamin supplements are associated with reduced risk of cataracts if taken for 10 years or more.[45,52]

Need for Sufficient Doses

What are we to make of these tantalizing results and tentative conclusions? From test tube and animal studies, it is clear that to effectively neutralize free radicals the level of antioxidants must be

sufficiently high. Indeed, large human studies using relatively low levels of supplemental nutrients have sometimes found little effect. For example, some randomized controlled trials (RCTs), widely considered to be the gold standard for testing the benefit of supplements, have not shown statistically significant health benefits for antioxidants. But when a benefit of supplements from an observational study on a specific at-risk group is backed up by a likely mechanism such as preventing oxidative stress, a negative result in a RCT cannot trump the positive result in the observational study.[53] The reason is that RCTs can be confounded by bias factors such as the complexities of diet and daily habits like smoking and related physiological and disease states. For example, some participants who take supplements are at risk because they have early indications of disease. Alternately, participants who take supplements may be health-conscious individuals without indications of disease. Both of these possibilities will introduce bias in a study about the benefits of supplements, which can confound the conclusion of the study.[53]

Thus, it seems likely that the equivocal results from some RCTs testing the benefits of antioxidants for prevention of eye disease are a consequence of the relatively low doses of supplements involved. For example, the amount of vitamin C typically taken in RCTs (often 500 mg or less) would not be expected to show a large effect.[3] The effects of low supplement levels on eye diseases are likely to be confounded by differences in diet correlated with other risk factors.[54] Further, many RCTs testing the effect of antioxidants on eye diseases have collected only short-term data (less than a few months) on antioxidant intake. Because oxidative damage in the eye is age-related, antioxidants are more likely to be beneficial when taken at relatively high doses over several decades.

Orthomolecular Doses

Although the minimum Recommended Dietary Allowance (RDA) for nutrients prevents the symptoms of acute deficiency, taking additional amounts of nutrients (i.e., orthomolecular doses) allows the body's metabolic reactions to proceed more fully, providing a greater health benefit.[55] An individual's need for nutrients such as vitamins C and E differs depending on his or her unique genetics, biochemistry, diet, and level of stress and disease.[3,51,56] Vitamin C cannot be synthesized by humans, primates, and guinea pigs, but most other animal species make 10,000–20,000 mg per day (relative to human body weight), and they make more when they are stressed physically or by disease. Typically, vitamin C is titrated to bowel tolerance, which for a healthy individual is an oral dose of 10,000–20,000 mg per day. However, when disease or oxidative stress affects the body, the gut absorbs more vitamin C according to the body's need, and then the individual's bowel tolerance can be tenfold greater.[3] Vitamin E to prevent oxidative stress and disease has been shown to be safe and effective at high doses (800–3,200 IU per day) for most people.[57] For these "megadoses," the benefit in reducing oxidative stress is likely to be more obvious. When taken in combination, a cocktail of nutrients including antioxidants dosed according to the individual's need will likely multiply the beneficial effects.

Common Benefit

Current knowledge about the risk of oxidative stress for eye diseases suggests the use of nutrient supplements because of the extensive literature over the past 70 years showing large benefits. Yet, because the necessary random controlled trials to test the optimal combinations and levels of supplements in eye disease have not been performed, the proper rationale depends on one's outlook; should one simply heed the standard conservative advice to wait until more is known before taking supplements?[53] From the evidence, it is apparent that many eye diseases have a common root in age-related oxidative stress, and that a common set of antioxidant supplements is likely to be helpful. What combinations and doses of supplements are optimal? The field of nutrition and age-related oxidative stress is moving quickly, and, as more trials of dietary and supplemental nutrients are published, we will surely learn much more about

which combination is best. However, because the efficacy and safety of vitamins and nutrients is well known,[3,55] the rationale for picking the combination of nutrients seems clear. Individuals should take generous doses of those vitamins and nutrients known to be nontoxic, and a helpful guide is the orthomolecular literature.[55] Those with special conditions or needs should consult a nutrition-aware medical professional for precautions and to determine doses. Antioxidants are known to be synergistic, and it seems likely that a combination that maximally protects against age-related cataracts, for example, may also be effective in protecting against retinitis pigmentosa, macular degeneration, diabetic retinopathy, and glaucoma.

CONCLUSION

A combination of nutrients is most effective. A multitude of evidence shows that supplemental antioxidants and nutrients are effective at preventing eye disease, and when taken in combination is more effective than one or two taken alone. Thus, vitamins C and E, carotenoids (lutein/zeaxanthin), zinc, selenium, magnesium, and omega-3 fatty acids, when taken at the proper levels in combination with a well-balanced diet containing lots of fruits and vegetables over a decade or more, can do much to prevent oxidative damage to the eye and prevent or delay the onset of typical age-related eye diseases.[24,45,47] Zinc is found in relatively high concentrations in the retina and is necessary for several enzyme systems to preserve health.[24] Selenium in the proper amount is an important antioxidant and can help to prevent macular degeneration. Supplemental magnesium can correct a very common deficiency and helps to reduce blood pressure, maintain health of arteries, and prevent retinopathy. The carotenoids are helpful in preventing light from reaching the macular photoreceptors and are antioxidants that help to prevent oxidation caused by light. Vitamin E is helpful in reducing oxidation of fatty acids in cell membranes, which is very important for reducing damage to the retina and its photoreceptors. Vitamin C is helpful to prevent permeability and fragility of capillaries, and to neutralize free radicals, and it helps the body to regenerate vitamin E. It is also helpful in reducing oxidation in all the tissues of the eye, and in reducing ocular pressure to prevent glaucoma. The omega-3 fatty acid docosahexaenoic acid (DHA) is concentrated in the retina; eicosapentaenoic acid (EPA) is used to make DHA. Low levels of DHA lead to degradation of the retina and loss of vision, and low levels may also contribute to diabetic retinopathy and macular degeneration.

Although proper nutrition is not a panacea, when taken together in a medically supervised program, these nutrients can do much to prevent diseases of the eye (and in the rest of the body). They are most effective taken at a sufficient level starting early in life.

REFERENCES

1. Rodieck RW. The First Steps in Seeing. Sunderland, MA: Sinauer, 1998.

2. Finkel T, Holbrook NJ. Oxidants, oxidative stress and the biology of ageing. Nature 2000; 408:239–247.

3. Hickey S, Saul, AW. Vitamin C: The Real Story–The Remarkable and Controversial Healing Factor. Laguna Beach, CA: Basic Health Publications, 2008, 91–102.

4. Azzi A. Molecular mechanism of alpha-tocopherol action. Free Radic Biol Med 2007;43:16–21.

5. Engin KN. Alpha-tocopherol: looking beyond an antioxidant. Mol Vis 2009;15:855–60.

6. Young RW. The family of sunlight-related eye diseases. Optom Vis Sci 1994;71:125–144.

7. Tezel G. Oxidative stress in glaucomatous neurodegeneration: mechanisms and consequences. Prog Retin Eye Res 2006;25: 490–513.

8. Skulachev VP, Anisimov VN, Antonenko YN, et al. An attempt to prevent senescence: a mitochondrial approach. Biochim Biophys Acta 2009;1787:437–461.

9. Osborne NN, Li GY, Ji D, et al. Light affects mitochondria to cause apoptosis to cultured cells: possible relevance to ganglion cell death in certain optic neuropathies. J Neurochem 2008; 105:2013–2028.

10. Young RW. The renewal of rod and cone outer segments in the rhesus monkey. J Cell Biol 1971;49:303–318.

11. Bouton SM Jr. Vitamin C and the aging eye: an experimental clinical study. Arch Intern Med 1939;63:930–945.

12. Gross RL. Collagen type I and III synthesis by Tenon's capsule fibroblasts in culture: individual patient characteristics and response to mitomycin C, 5-fluorouracil, and ascorbic acid. Trans Am Ophthalmol Soc 1999;97:513–543.

13. Rhone M, Basu A. Phytochemicals and age-related eye diseases. Nutr Rev 2008;66:465–472.

14. Terrasa AM, Guajardo MH, Marra CA, et al. Alpha-tocopherol protects against oxidative damage to lipids of the rod outer segments of the equine retina. Vet J 2009;182:463–468.

15. Veach J. Functional dichotomy: glutathione and vitamin E in homeostasis relevant to primary open-angle glaucoma. Br J Nutr 2004;91:809–829.

16. Skulachev VP. New data on biochemical mechanism of programmed senescence of organisms and antioxidant defense of mitochondria. Biochemistry (Mosc) 2009;74:1400–1403.

17. Jin HX, Randazzo J, Zhang P, et al. Multifunctional antioxidants for the treatment of age-related diseases. J Med Chem 2010;53:1117–1127.

18. Abouzeid H, Wolfensberger TJ. Macular recovery after retinal detachment. Acta Ophthalmol Scand 2006;84:597–605.

19. de Jong PT. Age-related macular degeneration. N Engl J Med 2006;355:1474–1485.

20. Bertram KM, Baglole CJ, Phipps RP, et al. Molecular regulation of cigarette smoke induced-oxidative stress in human retinal pigment epithelial cells: implications for age-related macular degeneration. Am J Physiol Cell Physiol 2009;297:C1200–1210.

21. Tan JS, Mitchell P, Kifley A, et al. Smoking and the long-term incidence of age-related macular degeneration: the Blue Mountains Eye Study. Arch Ophthalmol 2007;125:1089–1095.

22. Fletcher AE, Bentham GC, Agnew M, et al. Sunlight exposure, antioxidants, and age-related macular degeneration. Arch Ophthalmol 2008;126:1396–1403.

23. Age-Related Eye Disease Study Research Group. A randomized, placebo-controlled, clinical trial of high-dose supplementation with vitamins C and E, beta carotene, and zinc for age-related macular degeneration and vision loss: AREDS report no. 8. Arch Ophthalmol 2001;119:1417–1436.

24. Head KA. Natural therapies for ocular sisorders (part I): diseases of the retina. Altern Med Rev 1999;4:342–359.

25. van Leeuwen R, Boekhoorn S, Vingerling JR, et al. Dietary intake of antioxidants and risk of age-related macular degeneration. JAMA 2005;294:3101–3107.

26. Chiu CJ, Milton RC, Klein R, et al. Dietary compound score and risk of age-related macular degeneration in the age-related eye disease study. Ophthalmology 2009;116:939–946.

27. Tan JS, Wang JJ, Flood V, et al. Dietary antioxidants and the long-term incidence of age-related macular degeneration: the Blue Mountains Eye Study. Ophthalmology 2008;115:334–341.

28. Pemp B, Polska E, Karl K, et al. Effects of antioxidants (AREDS medication) on ocular blood flow and endothelial function in an endotoxin-induced model of oxidative stress in humans. Invest Ophthalmol Vis Sci 2010;51:2–6.

29. Christen WG, Glynn RJ, Chew EY, et al. Vitamin E and age-related macular degeneration in a randomized trial of women. Ophthalmology 2010;117(6):1163–1168.

30. Raniga A, Elder MJ. Dietary supplement use in the prevention of age-related macular degeneration progression. NZ Med J 2009;122:32–38.

31. Richer S, Stiles W, Thomas C. Molecular medicine in ophthalmic care. Optometry 2009;80:695–701.

32. Hamel C. Retinitis pigmentosa. Orphanet J Rare Dis 2006;1:40.

33. Tanito M, Kaidzu S, Anderson RE. Delayed loss of cone and remaining rod photoreceptor cells due to impairment of choroidal circulation after acute light exposure in rats. Invest Ophthalmol Vis Sci 2007;48:1864–1872.

34. Organisciak DT, Wang HM, Li ZY, et al. The protective effect of ascorbate in retinal light damage of rats. Invest Ophthalmol Vis Sci 1985;26:1580–1588.

35. Komeima K, Rogers BS, Lu L, et al. Antioxidants reduce cone cell death in a model of retinitis pigmentosa. Proc Nat Acad Sci USA 2006;103:11300–11305.

36. Usui S, Komeima K, Lee SY, et al. Increased expression of catalase and superoxide dismutase 2 reduces cone cell death in retinitis pigmentosa. Mol Ther 2009;17:778–786.

37. Kono S, Otsuji A, Hattori H, et al. Ataxia with vitamin E deficiency with a mutation in a phospholipid transfer protein gene. J Neurol 2009;256:1180–1181.

38. Neustadt J, Pieczenik SR. Medication-induced mitochondrial damage and disease. Mol Nutr Food Res 2008;52:780–788.

39. Berson EL. Long-term visual prognoses in patients with retinitis pigmentosa: the Ludwig von Sallmann lecture. Exp Eye Res 2008; 85:7–14.

40. Izzotti A, Bagnis A, Saccà SC. The role of oxidative stress in glaucoma. Mutat Res 2006; 612:105–114.

41. Schober MS, Chidlow G, Wood JP, et al. Bioenergetic-based neuroprotection and glaucoma. Clin Experiment Ophthalmol 2008;36:377–385.

42. Osborne NN. Pathogenesis of ganglion "cell death" in glaucoma and neuroprotection: focus on ganglion cell axonal mitochondria. Prog Brain Res 2008;173:339–352.

43. Saccà SC, Izzotti A. Oxidative stress and glaucoma: injury in the anterior segment of the eye. Prog Brain Res 2008;173: 385–407.

44. Linnér E. The pressure lowering effect of ascorbic acid in ocular hypertension. Acta Ophthalmol (Copenhagen) 1969;47: 685–689.

45. Head KA. Natural therapies for ocular disorders (part II): cataracts and glaucoma. Altern Med Rev 2001;6:141–166.

46. Ferreira SM, Lerner SF, Brunzini R, et al. Antioxidant status in the aqueous humour of patients with glaucoma associated with exfoliation syndrome. Eye (London) 2009;23:1691–1697.

47. Bartlett H, Eperjesi F. An ideal ocular nutritional supplement? Ophthalmic Physiol Opt 2004;24:339–349.

48. Rafnsson V, Olafsdottir E, Hrafnkelsson J, et al. Cosmic radiation increases the risk of nuclear cataract in airline pilots: a population-based case-control study. Arch Ophthalmol 2005; 123:1102–1105.

49. Rouhiainen P, Rouhiainen H, Salonen JT. Association between low plasma vitamin E concentration and progression of early cortical lens opacities. Am J Epidemiol 1996; 144:496–500.

50. Nourmohammadi I, Modarress M, Khanaki K, et al. Association

of serum alpha-tocopherol, retinol and ascorbic acid with the risk of cataract development. Ann Nutr Metab 2008;52:296–298.

51. Packer L. Protective role of vitamin E in biological systems. Am J Clin Nutr 1991;53:1050S–1055S.

52. Jacques PF, Taylor A, Hankinson SE, et al. Long-term vitamin C supplement use and prevalence of early age-related opacities. Am J Clin Nutr 1997;66:911–916.

53. Fletcher AE. Controversy over "contradiction": should randomized trials always trump observational studies? Am J Ophthalmol 2009;147:384–386.

54. Millen AE, Gruber M, Klein R, et al. Relations of serum ascorbic acid and alpha-tocopherol to diabetic retinopathy in the Third National Health and Nutrition Examination Survey. Am J Epidemiol 2003;158:225–233.

55. Hoffer A, Saul AW. Orthomolecular Medicine for Everyone: Megavitamin Therapeutics for Families and Physicians. Laguna Beach, CA: Basic Health Publications, 2008.

56. Williams RJ, Deason G. Individuality in vitamin C needs. Proc Nat Acad Sci USA 1967;57:1638–1641.

57. Papas A. The Vitamin E Factor: The Miraculous Antioxidant for the Prevention and Treatment of Heart Disease, Cancer, and Aging. New York: HarperCollins, 1999.

PHYSICAN'S REPORT: TREATMENT OF IRITIS AND HERPES ZOSTER WITH VITAMIN C

by Herschell H. Boyd, MD

A 56-year-old woman contacted me for treatment of her acute iritis (a painful inflammation of the eye), secondary glaucoma, and herpes zoster (an infection that increases risk of iritis). The patient was also suffering from frequent allergies and had had multiple episodes of iritis. Both cataracts had been removed. The patient lived in Butte, Montana, a mining town where pollution is so great that it caused vegetation to be denuded over a large radius. Hence, the patient needed to leave Montana with her family other than her husband who needed to work three more years before his retirement. The patient's daughter was diagnosed with chronic fatigue syndrome (CFS). The patient's husband and mother were suffering from multiple illnesses.

Treatment and Results

- **July 8, 1994, phone call:** Patient complained over the telephone of an iritis attack for several days. The symptoms were treated by another ophthalmologist but did not respond to dilation and cortisone. The patient was advised to take in addition to her cortisone and dilating drops 4,000 mg of vitamin C every 30 minutes.
- **July 9, 1994, phone call:** Patient called again. Iritis improved. No diarrhea. Patient was advised to increase her intake to 6,000 mg of vitamin C every 30 minutes.
- **July 11, 1994, office visit:** This was the first visit of this patient to the office. Iritis improving. The intraocular pressure was elevated to 23 mmHg in the eye affected by iritis. Cortisone drops were decreased to four times a day. Cycloplegic drops were discontinued.
- **July 13, 1994, office visit:** Iritis improved. No diarrhea yet. Patient was advised to increase intake to 8,000 mg of vitamin C every 30 minutes.
- **July 14, 1994, office visit:** No iritis. Intraocular pressure 22 mmHg. Patient developed a headache on right side of head. No diarrhea yet. Patient was advised to increase her intake to 12,000 mg of vitamin C every 30 minutes.
- **July 17, 1994, phone call from California:** Patient had traveled to California. The right side of her scalp was sore but no vesicles of zoster herpes visible. The 12,000 mg of vitamin C were continued.
- **July 20, 1994, phone call from California:** A physician was seen in California and diagnosed herpes zoster. A few vesicles developed on the scalp for three days, and the pain disappeared. Bowel dosage was reached. Patient slowly decreased her intake to 4,000 mg of vitamin C every hour in the following days.
- **August 8, 1994, office visit:** Patient returned from California. No iritis was present. Intraocular pressure was measured at 20 mmHg. Pain in her head had disappeared. Patient was advised to continue with 4,000 mg of vitamin C every hour since this seemed her bowel dosage at that time.
- **August 12, 1994, office visit:** No iritis. Interocular pres-

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Macular Degeneration

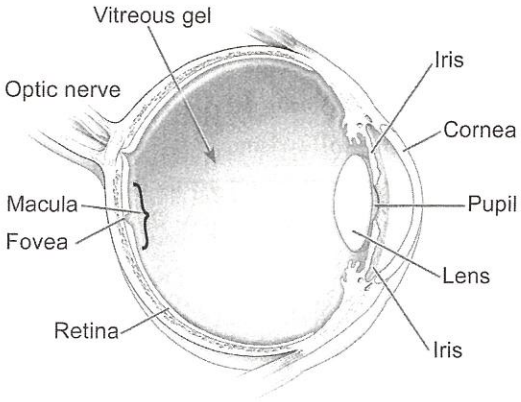
- Progressive visual loss due to degeneration of the macula
- Eye exam may reveal spots of pigment near the macula and blurring of the macular borders

The *macula* is the area of the retina where images are focused. It is the portion of the eye responsible for fine vision. Degeneration of the macula is the leading cause of severe visual loss in the United States and Europe in people 55 or older, and is second to cataracts as the leading cause of decreased vision in people over 65. It is estimated that more than 150,000 Americans are legally blind from age-related macular degeneration, with 20,000 new cases occurring each year.[1,2]

The major risk factors for macular degeneration are smoking, aging, atherosclerosis (hardening of the arteries), and high blood pressure.[1–4] The degeneration appears to be a result of free radical damage, similar to the type of damage that induces cataracts (see the chapter "Cataracts"). However, decreased blood and oxygen supply to the retina is the key factor leading to macular degeneration.

Types of Macular Degeneration

The two most common types of age-related macular degeneration (ARMD) are the *atrophic* ("dry") form, by far the more frequent, and the *neovascular* ("wet") form.[2,3] In either form, patients may experience blurred vision. The patient may note that straight objects appear distorted or bent, that there is a dark spot near or around the center of the visual field, and that, while he or she is reading, parts of words are missing.



Anatomy of the Eye

Dry ARMD

Between 80 and 85% of people with ARMD have the dry form of the disease. The primary lesions are atrophic changes in the *retinal pigmented epithelium* (RPE), which composes the innermost layer of the retina. Beginning in early life and continuing throughout life, cells of the RPE gradually accumulate sacs of cellular debris known as *lipofuscin*. The lipofuscin sacs are either remnants of incompletely degraded abnormal molecules from damaged RPE cells or derivatives of dam-

aged membranes of nearby cells. Progressive engorgement of the RPE cells with lipofuscin is associated with the leakage (extrusion) of other cell components.[1–3] The hallmark feature of macular degeneration is the appearance of this extrusion beneath the RPE. This extrusion, which can be seen with the aid of an ophthalmoscope, is referred to as *drusen*.

The disease progresses slowly, and only central vision is lost; peripheral vision remains intact. It is rare for anyone to become totally blind from dry ARMD. Currently there is no standard medical treatment for this common form of ARMD, though the use of nutritional supplements designed to address the underlying oxidative damage is becoming the "unofficial" standard of care.

Wet Age-Related Macular Degeneration

Wet ARMD is also known as the neovascular form or advanced ARMD. It affects 5% to 20% of people with ARMD. Wet ARMD is characterized by the growth of abnormal blood vessels. Because the disease can rapidly progress to a point at which laser surgery cannot be used, treatment should be performed as soon as possible. A common early symptom of wet ARMD is that straight lines appear wavy.

Wet ARMD can be treated quite effectively in the early stages with laser surgery and other medical treatments such as lower-powered laser or low-dose radiation therapy. Drugs known as antiangiogenics or anti-VEGF (anti–vascular endothelial growth factor) agents are also used. These drugs can shrink the abnormal blood vessels and improve vision when injected directly into the vitreous humor of the eye. The injections have to be repeated on a monthly or bimonthly basis. Examples of these agents include ranibizumab (Lucentis), bevacizumab (Avastin), and pegaptanib (Macugen).[1,2]

Therapeutic Considerations

Treatment of the dry form and prevention of the wet form of ARMD involve the use of antioxidants and natural substances that correct the underlying free radical damage to the macula. Reduce the risk of ARMD by focusing on preventive factors against atherosclerosis, increasing dietary intake of fresh fruits and vegetables, supplementing with nutritional and botanical antioxidants, and not smoking.

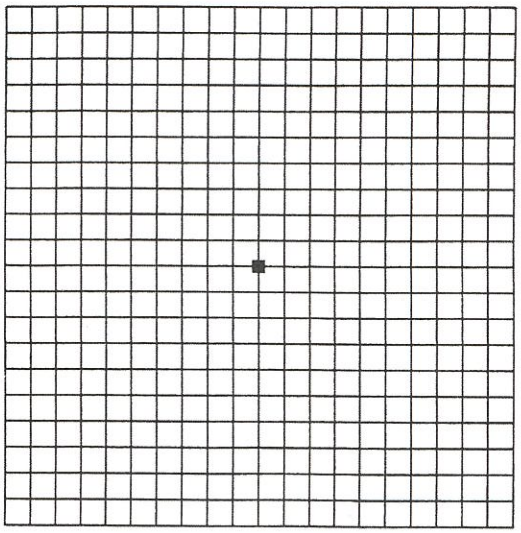
In particular, smoking tobacco greatly increases the risk of ARMD.[3] Someone who smokes a pack of cigarettes a day for any significant length of time increases the risk of ARMD by two to three times that of someone who has never smoked.[3] The risk does not return to the normal level until after someone has stopped smoking for 15 years.

There is also a strong genetic component to consider. While a number of genetic markers have been identified, a family history may be the easiest screening method. The lifetime risk of developing late-stage macular degeneration is 50% for people who have a relative with macular degeneration, vs. 12% for people who do not.[5]

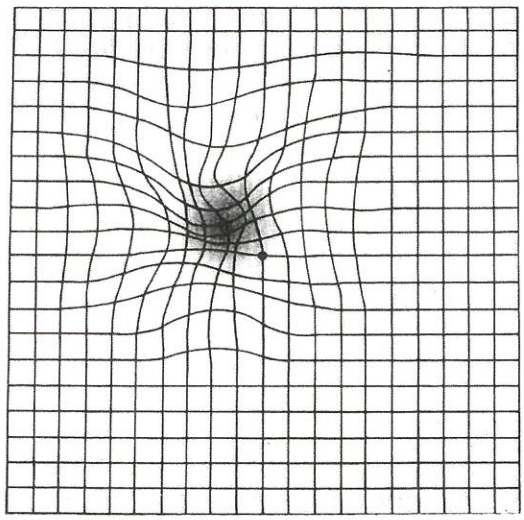
Interestingly, higher birth weight and a lower ratio of head circumference to birth weight are associated with significantly higher risk for ARMD.[6]

Diet

Not surprisingly, the dietary factors important in the prevention and treatment of ARMD are the same as those that prevent other chronic degenerative diseases including atherosclerosis. A diet rich in fruits and vegetables is associated with a lower risk for ARMD. Presumably this protection is



Normal Appearance of Amsler Grid



Appearance of Amsler Grid in Macular Degeneration

the result of greater intake of antioxidant vitamins and minerals.[7–10] However, various nonessential food components such as flavonoids and the carotenes lutein, zeaxanthin, and lycopene are proving to be even more significant in protecting against ARMD than traditional nutritional antioxidants such as vitamin C and E, zinc, and selenium. The macula, especially its central portion, the fovea, owes its yellow color to its high concentration of lutein and zeaxanthin. These yellow carotenoids function in preventing oxidative damage to the area of the retina responsible for fine vision and have a central role in protecting against the development of macular degeneration.[9,10]

The carotene lycopene, a component of tomatoes and other red fruit and vegetables, is also protective. In one study, individuals with the lowest levels of lycopene content were twice as likely to have ARMD.[11]

Moderate wine consumption is also associated with decreased risk of ARMD.[12] Red wine contains anthocyanins, powerful antioxidants that are probably responsible for its protective effect. It is important to note that beer consumption increases drusen accumulation and the risk of exudative macular disease and therefore should be avoided.[13]

Just as in atherosclerosis, types of dietary fat appear to play a role in ARMD. A cohort study of 261 individuals with early or intermediate stages of ARMD revealed a twofold increased risk of progression with a diet high in animal fat and commercial baked goods (sources of sugar and trans-fatty acids). In contrast, higher intakes of fish and nuts are associated with a lower risk of ARMD progression.[14] A higher intake of long-chain omega-3 fatty acids was shown to be inversely associated with progression to ARMD over a period of 12 years.[15–17]

Nutritional Supplements

In addition to a diet high in antioxidants, supplementation with nutritional antioxidants such as vitamin C, selenium, beta-carotene, and vitamin E is certainly important in the treatment and prevention of macular de-

Food Sources of Carotenes Important for the Eyes	
CAROTENOID	**FOOD SOURCE**
Lycopene	Tomatoes, carrots, green peppers, apricots, pink grapefruit
Zeaxanthin	Spinach; paprika; corn; richly colored fruit, especially kiwi fruit and grapes
Lutein	Corn, potatoes, spinach and other greens, carrots, tomatoes, mangoes

generation. Studies conducted by the Age-Related Eye Disease Study Research Group (AREDS) confirm that a combination of these nutrients will be likely to produce better results than any single nutrient alone, because other studies have demonstrated that none of these antioxidants alone accounts for the impaired antioxidant status in ARMD.[18] Instead, the lower antioxidant status reflects decreases in a combination of nutrients. The specific amounts of antioxidants and zinc used in the study were 500 mg vitamin C, 400 IU vitamin E, 15 mg beta-carotene (often labeled as equivalent to 25,000 IU vitamin A), 80 mg zinc (as zinc oxide), and 2 mg copper (as cupric oxide).

Several other studies utilizing various commercially available broad-based antioxidant formulas have shown promising results. For example, a 1½-year study demonstrated that the progression of dry ARMD could be halted (but not reversed) with a broad-spectrum, 14-component antioxidant capsule (Ocuguard).[19,20] A retrospective study of a nutritional supplement called ICAPS Plus (which contains beta-carotene, vitamins C and E, zinc, copper, manganese, selenium, and riboflavin) compared 38 patients who used the preparation regularly with 37 patients who used only one bottle and who served as controls. Fifteen of the treated patients showed improvement in their vision by one line or more on a vision acuity chart, compared with only 6 of the control group. In addition, only 3 of the 38 in the treatment group lost one line or more of vision, compared with 13 in the control group.[21] In a second blinded clinical trial reported in the same review, after six months, visual acuity was the same or better in 36 of 61 controls compared with 168 of 192 treated patients.

B vitamins are also important. In a randomized, double-blind, placebo-controlled trial, 5,442 female health care professionals 40 years or older with preexisting cardiovascular disease or three or more cardiovascular disease risk factors randomly received a combination of folic acid (2.5 mg per day), vitamin B_6 (50 mg per day), and vitamin B_{12} (1 mg per day) or a placebo. After an average of 7.3 years of treatment and follow-up, there were 55 cases of ARMD in the combination treatment group and 82 in the placebo group. There were 26 cases of more severe ARMD in the combination treatment group and 44 in the placebo group. These results indicate a 34% and 41% reduced relative risk, respectively.[22]

Lutein

In addition to a high-lutein diet, supplementation with additional lutein is of benefit. One 12-month double-blind study, the Lutein Antioxidant Supplementation Trial (LAST),[23] sought to determine whether nutritional supplementation with lutein or lutein together with antioxidants, vitamins, and minerals improves visual function and symptoms in ARMD. Patients receiving lutein (10 mg) alone or in combination with other vitamins and minerals in a broad-spectrum supplementation formula showed improvements in visual function.

In another study, 27 patients with ARMD

were randomly divided into two groups: 15 patients took vitamin C (180 mg), vitamin E (30 mg), zinc (22.5 mg), copper (1 mg), lutein (10 mg), zeaxanthin (1 mg), and astaxanthin (4 mg) every day for 12 months, while 12 patients served as controls. Visual acuity assessments indicated quite clearly that early-stage ARMD can respond positively to supplementation with carotenoids and antioxidants.[24]

Zinc

Zinc plays an essential role in the metabolism of the retina, and the elderly are at high risk for zinc deficiency. In addition to the studies with a combination of nutrients, a two-year, prospective, randomized, double-blind, placebo-controlled trial involving 151 subjects with dry ARMD demonstrated that the group taking 200 mg per day of zinc sulfate (approximately 80 mg elemental zinc) had significantly less visual loss than the placebo group.[25]

In another study, using a zinc-monocysteine (ZMC) supplement, 40 subjects with ARMD were randomly assigned to either ZMC 25 mg or a placebo twice per day for six months. The ZMC group showed improved visual acuity, contrast sensitivity, and macular light flash recovery time. No improvement occurred in the placebo group. ZMC was well tolerated, with a gastrointestinal irritation rate of under 2%.[26]

Flavonoid-Rich Extracts

Flavonoid-rich extracts of bilberry (*Vaccinium myrtillus*), ginkgo biloba, grape seed, or pine bark (e.g., Pycnogenol) offer significant benefits in the prevention and treatment of ARMD. In addition to exerting excellent antioxidant activity, all of these extracts have been shown to have positive effects on retinal blood flow and function. Clinical studies of humans have demonstrated that all three are also capable of halting the progressive visual loss of dry ARMD and possibly even improving visual function.[27–30] Of the three, bilberry extracts standardized to contain 25% anthocyanidins appear to be the most useful. The anthocyanosides of bilberry have a very strong affinity for the retinal pigmented epithelium, reinforcing the collagen structures of the retina and preventing free radical damage and improve blood and oxygen supply to the macula.

QUICK REVIEW

- **Degeneration of the macula is the leading cause of severe visual loss in the United States.**
- **The major risk factors for macular degeneration are smoking, aging, atherosclerosis (hardening of the arteries), and high blood pressure.**
- **The treatment goals in the dry form and prevention of the wet form involve the use of antioxidants and natural substances that protect against free radical**
- **A diet rich in fruits and vegetables is associated with a greatly lowered risk for macular degeneration.**
- **In addition to a high-lutein diet, supplementation with additional lutein is of benefit.**
- **Antioxidant formulas have been shown to halt and even reverse macular degeneration.**

damage. Because the RPE is the portion of the eye affected in ARMD, bilberry anthocyanosides appear to be ideal therapeutic agents for the disorder. However, ginkgo biloba extract (24% ginkgo flavonglycoside content) is perhaps a better choice if a person is also showing signs of decreased blood flow to the brain.

TREATMENT SUMMARY

As with most diseases, prevention or treatment of ARMD at an early stage is most effective. The treatment of the wet form is clearly laser therapy, used as soon as possible. Because free radical damage and lack of blood and oxygen supply to the macula appear to be the primary causes of macular degeneration, consumption of antioxidant supplements and promotion of retinal blood flow are the keys to effective treatment.

The use of nutritional supplementation in ARMD has undergone extensive cost-benefit analysis. Compared with no therapy, antioxidant therapy yielded a cost-effective improvement in quality of life and lowered the percentage of patients with ARMD who ever developed visual impairment in the better-seeing eye from 7.0 to 5.6%.[31]

Diet

Follow the guidelines given in the chapter "A Health-Promoting Diet." Foods to avoid in cases of ARMD are:

- **Fried and grilled foods, and other sources of free radicals**
- **Animal fat**
- **Processed baked goods**
- **Beer**

Important foods to emphasize are:

- **Yellow vegetables, green vegetables, tomato products**
- **Flavonoid-rich berries (blueberries, blackberries, cherries, etc.)**
- **Other fresh fruits and vegetables, nuts, and fish**
- **Moderate amounts of red wine**

Nutritional Supplements

- **A high-potency multiple vitamin and mineral formula as described in the chapter "Supplementary Measures"**
- **Key individual nutrients:**
  - **Vitamin B_6: 25 to 50 mg per day**
  - **Folic acid: 800 to 2,000 mg per day**
  - **Vitamin B_{12}: 800 mcg per day**
  - **Vitamin C: 500 to 1,000 mg per day**
  - **Vitamin E (mixed tocopherols): 100 to 200 IU per day**
  - **Magnesium (bound to aspartate, citrate, fumarate, malate, glycinate, or succinate): 200 to 300 mg three times per day**
  - **Selenium: 100 to 200 mcg per day**
  - **Zinc: 30 to 45 mg per day**
  - **Vitamin D_3: 2,000 to 4,000 IU per day (ideally, measure blood levels and adjust dosage accordingly)**
- **Fish oils: 1,000 mg EPA + DHA per day**

- Lutein: 10 to 20 mg per day
- Zeaxanthin: 1 to 2 mg per day
- Astaxanthin: 4 to 6 mg per day

Botanical Medicines

One of the following:

- Ginkgo biloba extract (24% ginkgo flavonglycosides): 120 to 240 mg per day
- Bilberry extract (25% anthocyanidin content): 120 to 240 mg per day
- Grape seed or pine bark extract (95% procyanidolic content): 150 to 300 mg per day

Letter to my Good Friend. Hi David,

I'm sad to hear that your eyesight has been severely damaged.
2 years ago you called me, and told me that you were going blind.
You also told me that you were sorry how things had gone between us.
Shortly, thereafter, you ended the call, and it sounded like you were in tears.
I was shook up, no doubt, and didn't know what to think.
This call sounded like you were saying good bye for the last time.

I never called back, because I thought that was it, for you.
I was shocked when you called me back a few months ago.
I was pleasantly surprised, and happy to hear from you.
I'm glad that you were still around and surviving just like me.
America is a strange place right now, and hopefully will get better.

I was quite moved in our last 2 hour conversation last week.
You shocked me once again by not only acknowledging the favors that I've done for you long ago, but now you acknowledge that you owe me.
And since it's been over ten years, you owe me even more so.
I've got friends that owe me for what I've done for them, but over time have swept it all under the rug in hopes that it will go away.
But not you. Thank you buddy for your consideration of me.
This means a lot to me.

Anyway, I'm very concerned about your eyesight.
I didn't spend the last 35 years learning about health and nutrition for nothing.
I've got hundreds of books and manuals on health and nutrition.
I often refer to them for advise to others for their health conditions.
I don't have health insurance, so I have learned to be my own doctor over the years.

I'm in excellent health at this ripe old age I'm at.
I work out, as you well know. I eat right, and I don't poison my self with toxins.
As I get older, my health becomes more precious with every day that goes by.

I put together a 32 page report and guide for you to get up to speed on how to improve your condition and maybe cure your Macular Degeneration.
I copied exerts from the four top manuals and have highlighted the parts that are important.
These manuals are written by PHD's in the field of Medicine and Nutrition.
The authors are the Best of the Best. You need to pay attention and read what I'm sending you.

The Title of these Books and Manuals are: "Prescription for Nutritional Healing, Prescription for Natural Cures, The Orthomolecular Treatment of Chronic Disease, and The Encyclopedia of Natural Medicine."

I know you think your doing all you can to keep your eyesight, but believe me, you can do better.
With the right information and action, you will be able to possibly reverse your condition.
Face it David. you are a target. If you are spending $5k to $7k a month and not getting better, something is wrong here.
You need to determine what's wrong by reading what I'm sending you, and figure out what is causing your Macular Degeneration.

I have read through all this literature and have determined that you can radically improve you condition with the right action, and if you are willing to supplement your diet with the right nutrition. Now, don't be negative here.
We're talking about your eyesight. Don't you want it back ?
You have an extraordinary condition here, and it's going to take extraordinary treatment and action to possibly cure.

According to the second section, there are 9 Root Causes of Macular Degeneration. They are:
1. Aging,
2. Smoking,
3. A diet that's low in antioxidants, which fight free radical damage,
4. Arteriosclerosis (hardening of arteries),
5. High blood pressure,

6. Exposure to ultraviolet light,
7. Environmental toxins (particularly toxic metals),
8. Poor digestion and detoxification,
9. Nutritional deficiencies.

As I said, you need to read and study what I've sent you.
You didn't loose you eyesight overnight, and it's not going to be cured overnight either.
But if you work at it, over time you condition will gradually improve.

Two years ago, by being sloppy with my health habits, I got Peripheral Neurophethy in my right foot. I lost feeling in the top half of my foot.
I read all the literature on this and learned that it was curable but it wasn't going to be instant.
With a very strict diet, limited sugar intake, upping my vitamin intake, and physical therapy, I'm happy to say that after 2 years, I got 96% of the feeling back in my right foot.
And it cost me very little, compared what mainstream medicine was going to charge me.
And mainstream medicine offered no guarantees, just a hefty price tag.

Bottom Line Here David, is that there are answers for your condition, but you have to be open to them.
You can think that you, or your doctors know it all. You have to question and get a second opinion.
And this information that I'm giving you is the start of that second opinion.
There is a ton of stuff you can do to improve your condition in the literature I'm giving you.

But right off the bat, what I can recommend to you is a few supplements to take and the amounts.
People often say, "Oh I've taken Vitamins and they do nothing".
This is a very common answer from most people.
The main problem is that people don't know the quantity to take.
Too little will do nothing. Too much won't cause much harm except to you wallet.

Unlike most drugs, the toxicity from vitamins is very low.
Vitamins can be expensive, but this is nothing compared to drug prices.
I spend about $3 every day on my supplements that I take. That's about $100 a month.
This is really cheap insurance when you think about it.

Here is my recommendations to you.
These amounts are high and experts may scare you and tell you this is dangerous, but this is based on the literature I've read and 35 years experience on staying healthy with supplements.
Look on the third page of the first section (page 266), and this should be your beginning guide.

Vitamin "A"	100,000 IU	Daily	50,000 = Morning, 50,000 = Evening
Vitamin "C"	10,000 mg	Daily	2,500 mg 4 times Daily
Vitamin "E"	2000 IU	Daily	1,000 IU = Morning, 1,000 IU = Evening
Vitamin "D3"	5,000 IU	Daily	
Fish Oils: (EPA + DHA)	1000 mg	Daily	
Zinc	100 mg	Daily	50 mg = Morning, 50 mg = Evening
Selenium	400 mcg	Daily	
Vitamin "B-Complex"	100 mg	Daily	with food (Vitamin "B-Complex")
Calcium / Magnesium	800mg/400mg	Daily	

Also Very Helpful

Lutein	20 mg	Daily
Zeaxanthin	3 mg	Daily
Astaxanthin	6 mg	Daily
Lycopene	50 mg	Daily
Bilberry	240-600 mg	Daily
Grape Seed Extract	As Directed on the Label	

If you need help or have any question about the above recommendations, feel free to call me anytime.
I'm more than happy to help you with getting better.
I'll say it again, Read and Study what I have given you and pay attention to the highlighted parts.

Good Luck Buddy,
Take Care.