Preventing Eye Disease

Mary Jo Fahey
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WARNING...

The information that you will read in Chapter 3 (Searching For Good Fats) will contradict most of the information that is published for consumers.

**Dr. C. Everett Koop and the Mistaken Consensus**

In an October 9, 2007 *New York Times* article titled, “Diet and Fat: A Severe Case of Mistaken Consensus,” author John Tierney calls the fat-is-bad theory a diet myth. Tierney says that surgeon general C. Everett Koop was caught in a mistaken consensus or a cascade in 1988 when he announced that high-fat food caused heart disease. Tierney and a science correspondent Gary Taube, who wrote, *Good Calories, Bad Calories*, say that an informational cascade occurs when people go along with mistaken conclusions simply because they assume that the “rest can’t be all wrong.”

**Trans Fats and Eye Disease**

One of the most serious consequences of the low-fat diet advice was the introduction of margarine and other harmful fats. This book’s Chapter 3 explains the dangers of trans fats and provides information about healthy fats.

**The Fat Dissidents**

Most of America believes that it is healthy to eat a low-fat diet. We believe that this is inaccurate advice. Although fat has been blamed for coronary heart disease for over fifty years, there are a handful of researchers who have endorsed dietary fat including:
Authors Sally Fallon and Dr. Mary Enig
Sally Fallon and Mary Enig have collaborated on books and numerous articles on what has been called “the other side of the cholesterol debate.” In their book *Eat Fat, Lose Fat*, they warn that manufacturers, without stating such on the label, add powdered milk to reduced-fat milk, yogurt and other dairy products to give them body. They explain that this added powdered milk is produced by a high-heat process that damages the cholesterol molecules in milk, and that these damaged cholesterol molecules can injure arterial walls leading to a plaque buildup on the blood vessels of the body.

Dr. Uffe Ravnskov
Dr. Ravnskov’s book called *The Cholesterol Myths: Exposing the Fallacy That Saturated Fat and Cholesterol Cause Heart Disease* is a very good resource for understanding the healthcare and food industry’s interests in such things as: selling vegetable oil in lieu of animal sources of fats, selling cholesterol-lowering drugs, or statins, and the promotion of low-fat and no-fat milk products.

Dr. Ancel Keys
University of Minnesota professor Ancel Keys first introduced the “lipid hypothesis” in the 1950s. Although it was his hypothesis that first established
a connection between saturated fat, cholesterol in the diet and the incidence of coronary heart disease, near the end of his life (he died in 2004 at the age of 101), he told an interviewer that “there's no connection whatsoever between cholesterol in food and cholesterol in the blood. And we’ve known that all along.”

• Dr. William Castelli, Director, Framingham Heart Study
The Framingham Heart Study, now 59 years old, under the direction of the National Heart, Lung and Blood Institute and in collaboration with Boston University, is one of the largest studies that contradicts the diet-cholesterol-coronary heart disease theory. Although Framingham study director Dr. William Kannel made the claim in the early 1980s that “total plasma cholesterol is a powerful predictor of death related to coronary heart disease,” a decade later in 1992, director Dr. William Castelli, admitted in an article published in the Archives of Internal Medicine:

In Framingham, Massachusetts, the more saturated fat one ate, the more cholesterol one ate, the more calories one ate, the lower the person’s serum cholesterol…
About This Book...

The information in this book is based on research done for a series of presentations given by the local Weston A. Price Foundation (www.westonaprice.org) chapter leaders in Madison, Wisconsin.

Dr. Weston A. Price

Dr. Weston Price of Cleveland, Ohio, was a dentist who spent nine years in the 1930s traveling to investigate the diets of traditional societies, and found that native diets contained ten times more fat-soluble and four times more water-soluble vitamins than did Western diets at that time. Price’s book, titled, *Nutritional and Physical Degeneration*, chronicles his journeys around the world.

Pocket-Sized Books

We have plans to continue adding the research that we present at chapter meetings to small paperback books. The next title in this series will be:

*Iodine Remedies: Secrets From the Sea*

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Notes
Introduction

Nutrition and Toxins

The Cells of Your Eyes Are Particularly Sensitive to Nutrient Levels and Toxins

Nutrition and toxins play a role in all disease, and the delicate cells of your eyes are particularly sensitive to nutrient levels and to the toxins that enter your body through food and your environment.

Nutrition research has increased in the last 10 years and even the most conservative health practitioners and government researchers are beginning to concede that we have a lot more control over our health than was previously believed.

This book covers age-related macular degeneration and cataracts, two leading eye diseases. Although diabetes is beyond the scope of this book, dietary factors related to diabetic retinopathy are also included because this condition is pervasive, and the numbers of individuals affected by it have increased dramatically.

A study conducted by the Johns Hopkins Bloomberg School of Public Health and published in the May 7, 2007, issue of the European Journal of Clinical Nutrition, predicts
that seventy-five percent of Americans will be overweight by 2015 and forty-one percent of those will be obese.

Most people who are fifty pounds or more overweight are at increased risk of developing Type II diabetes at some point in their lifetime (Note: Chapter 4 contains a review of the types of diabetes). Type II diabetes is a form that often may be controlled with diet. Education about the connection between diabetes and vision problems just might be the catalyst that prompts people to understand how they can prevent blindness later in life.

**FYI...**

One out of every four people with Type II diabetes is not obese.

**Baby Boomers’ Early Hearing Loss**

Baby boomers, who are America’s first rock n’ roll generation, are losing their hearing and it would be tragic if large numbers also lose their sight.

According to the National Institute on Deafness and Other Communication Disorders, more people are losing their hearing earlier in life.
Stephanie Rosenbloom’s article, in the July 12th, 2007 edition of the New York Times, titled “The Day the Music Died,” reports that there are now more people age 45 to 64 with hearing loss (10 million) than there are people over 65 with hearing loss (9 million).

**Nutrition**

Nutritional support for the prevention of macular degeneration has been endorsed for over a decade. There have been several studies that have shown that antioxidants decrease the development of macular degeneration. The National Institutes of Health (NIH) studies are examples:

**NIH Study, October 2001**

The Age-Related Eye Disease Study (AREDS), published in the October 2001 issue of Archives of Opthamology, was the first large-scale clinical trial to confirm that antioxidant supplements may slow down the progression of advanced age-related macular degeneration. The study was conducted by researchers from the National Institutes of Health’s (NIH) National Eye Institute. Researchers found that supplements containing a mixture of Vitamin C, Vitamin E, beta-carotene and zinc lowered the risk of advanced AMD by 25% in people at high risk of developing the condition.

**NIH Researchers Are Examining Other Nutrients**

A follow-up AREDS II trial examines the effects of antioxidants lutein, and zeaxanthin, as well as the omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). This new phase of the AREDS study is expected to conclude by July 2007.
Toxins That Threaten the Health of Your Eyes

Toxins that threaten the health of your eyes fall into four categories:

**Trans Fats**
Trans fats are unnatural polyunsaturated fatty acids that get incorporated into the cell membranes of the body (including the cells of your eyes) because their molecular structure is similar to the saturated fatty acids that normally make up fifty percent of every cell membrane. The incorrect placement of the trans fatty acid in place of saturated fats may cause many health problems all over the body.

**Heavy Metals**
Heavy metals are an enormous threat to human health, but the subject is largely ignored by mainstream medicine. The work that is being done on the detection of heavy metals and safe removal is primarily being carried out by a handful of alternative medical doctors. One non-medical researcher named Andy Cutler has written two books on these subjects. Cutler is a Ph.D. from Princeton University, who solved his own problem with mercury, and now he is helping other people. Look for a brief self-help section on heavy metals (Chapter 5) for further information.

**Neurotoxins**
Like heavy metals, neurotoxins are largely ignored by mainstream medicine. Theses toxins include environmental toxins as well as biotoxins that are secreted by microorganisms, i.e. Borrelia Burgdorferi (Lyme Disease). Look for a brief self-help section on neurotoxin detection (Chapter 6).
Homocysteine
Homocysteine is not really a toxin, but an amino acid that is recognized as an important marker for degenerative disease. Homocysteine can increase cellular levels of oxidative stress. It’s included here because doctors in Boston recently found that elevated homocysteine correlates with an increased risk of macular degeneration.
Chapter 1

Macular Degeneration

The Second Most Serious Vision Problem

Age-Related Macular Degeneration (AMD) results in the deterioration of central vision, and is caused by changes in the cells of the macula where the highest concentration of cones, responsible for central vision, are found. The macula, an area rich in vision receptors, is located in the back of the eye, and is part of the retina.

In the United States, it is estimated that 17 million people have macular degeneration. Cataracts are the leading cause of blindness worldwide, and the second largest eye problem is age-related macular degeneration (AMD):

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage with AMD</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-74</td>
<td>25%</td>
</tr>
<tr>
<td>Over 75</td>
<td>33%</td>
</tr>
</tbody>
</table>

Besides blurred vision, people with AMD may have a loss of color perception, and may have a dark or empty spot in the center of the field of vision.

The photographs that follow illustrate the central vision loss in AMD patients.
Preventing Eye Disease
Types of Macular Degeneration

There are two types of macular degeneration. Both types are associated with the macula, located in the central portion of the retina, at the back of the eye.

**Dry AMD**

Dry macular degeneration may be an early form of the disease. It is characterized by a gradual loss of central vision that is caused by a build up of cellular wastes in a part of the retina called the Bruch’s membrane.

**Wet AMD**

A wet type of macular degeneration occurs when fluid builds up within the layers of the macula. Degeneration is more sudden and often more severe than in dry AMD.
Layers of the Retina

The retina is a thin layer of neural cells that lines the back of the eye and is considered to be part of the central nervous system (CNS). To understand the role of nutrition and the effect of toxins on the development of AMD, it is helpful to understand how nutrients pass into the retinal cells, and how cellular debris is discarded.

Nutrients and discarded cellular material pass through a membrane called Bruch’s membrane (See: diagram on p. 21). The membrane forms a layer between the cells of the retina and the blood vessels behind the retina in an area known as the choroid.

Some researchers believe that AMD begins with a thickening of Bruch’s membrane. As the membrane thickens, nutrients cannot reach the Retinal Pigment Epithelium (RPE) and other retinal layers. When this happens, nutrients that are needed by the macula and photoreceptor cells (rods and cones), become scarce and cells can die off (Note: Rods are more numerous in the periphery of the retina and cones are more numerous in the central part of the retina).

Some researchers have theorized that new blood vessels, which are fragile, form when cellular wastes build up in Bruch’s membrane. When this happens, nutrients cannot pass through it. The formation of leaky new blood vessels (neovascularization) is a characteristic of wet AMD.
FYI...

If you have dry macular degeneration, the risk of developing the wet form of AMD will increase 10% per year every year that you have the disease.
Risk Factors Associated with AMD

Besides age and nutrition, there are several other risk factors associated with AMD including:

- **Genetics**
  Macular degeneration appears to be hereditary in some families.

- **Gender**
  More women have macular degeneration than men. Note: Although it may only be one piece of the dietary puzzle, zinc is needed to transform plant-based polyunsaturated fats into forms that researchers now realize play a protective role in eye health, e.g. eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). All minerals have antagonists, and copper has a see-saw relationship with zinc. The gender-related risk factor may be related to a copper overload that seems to be associated with surging estrogen levels that take place prior to menopause. This, combined with high environmental xenoestrogens that behave like estrogens in the body, could cause many women to have precariously low zinc levels for an extended period of time. Given that zinc is needed by more than 225 enzyme reactions in the body, it would be hard to recover from a copper overload, without extra zinc (See High Estrogen, High Copper and Low Zinc in Chapter 3).

- **Race**
  Caucasians have a higher incidence of macular degeneration than other races, and people with blue eyes seem to be at the greatest amount of risk.
• **Smoking**
  In a 2005 study, published in the *British Journal of Ophthalmology* (89:550-553), researchers concluded that smoking doubles the risk of macular degeneration.

• **Ultraviolet Light Exposure**
  Prolonged exposure to ultraviolet light seems to be a risk factor (See: FYI on this page).

---

**Sunlight and Cataractogenesis**

Although sunlight overexposure is an accepted risk factor for cataracts and a suspected risk factor for age-related macular degeneration, Dr. Richard Hobday, author of *The Healing Sun*, says the sunlight hypothesis of cataractogenesis evolved in the early years of the 20th century when cataracts were observed to be more common in third-world countries than in the West. He explains that although the hypothesis ignored diet, culture, poverty, malnutrition and disease—the hypothesis survives.

Although Hobday says that the causal relationship between cataracts and solar radiation has never been established, he does say that malnutrition, smoking and pollution are all possible contributory factors.
Scientists have only recently started to look at the relationship between fats and cataracts. In 2005, a group of researchers at the Human Nutrition Research Center at Tufts University in Boston looked at the relationship between dietary fat intake, and age-related lens opacities (cataracts). They found that a diet high in plant-derived linoleic acid (omega-6 fatty acid) and linolenic acid (omega-3 fatty acid) correlated with an increased risk of age-related nuclear opacity, or yellowing of the lens of the eye. This was the first published study that performed an extensive analysis of the relationship between diet and cataracts.

The fatty acid cascade on page 29 shows that mineral co-factors are necessary to transform linoleic acid, found in flax, walnuts and green leafy vegetables, into DHA and EPA, that researchers have recently discovered play a protective role in eye health. If the diet is low in these co-factors, the necessary conversion will not take place (Note: DHA and EPA are present in fish oil, but these were not part of the Tufts University study).

As described in chapter 3, a four-to-one ratio of omega-6 to omega-3 fatty acids is the ratio that is required for a healthy diet. Besides difficulties of conversion of fats that occur in people without
How to Reduce the Risk of Macular Degeneration

To reduce the risk of macular degeneration, you’ll want to:

• Quit smoking
• Eliminate trans fats from your diet (See: chapter on fats)
• Increase your intake of healthy fats (See: chapter on fats)
• Eat brightly-colored fruits and vegetables (See: chapter on carotenoids)
• Take zinc and antioxidant supplements
• Exercise regularly
• Control your weight

Test To Detect Macular Degeneration

A black and white drawing called an Amsler Grid has been used as a test for macular degeneration, and other macular diseases for over 50 years. To test your eyes for early stage macular degeneration:

1. Position the black on white grid so that it is about 20 inches in front of your eyes.

co-factors, one may also have an imbalance in the proportion of omega-6 to omega-3 fatty acids. Most Americans consume a ratio of twenty-to-one or a ratio as high as fifty-to-one of omega-6s to omega 3s.
2. Wear your glasses if you use them for close work.
3. Cover your left eye.
4. With your right eye, stare at the spot in the center of the grid and do not look away.
5. Notice the horizontal and vertical lines in your peripheral vision and try to determine if the lines look curved, distorted or broken.

6. Repeat the test with your other eye and then repeat the test with the white on black grid.
If you notice curved, distorted or broken lines on either grid, you may have an early state of macular degeneration (Note: Similar distortions may occur with other eye diseases such as diabetic retinopathy).

Try repeating the test later in the day or on another day. If the result is the same, have your eyes examined by an optometrist or ophthalmologist.

**Australia’s Macular Degeneration Foundation**

Dr. Paul Beaumont, Director of Australia’s Macular Degeneration Foundation, has seen an alarming fivefold increase in macular degeneration. Beaumont says the increase is tied to an increase in consumption of trans fats, and that there has been a similar increase all over the world. As he explains, “The major reason for blindness in Australia 30 years ago was diabetes, and it was rare to find macular degeneration. That situation has changed. I’ve seen an exponential rise from the early 1970s through to the 1990s.”

**Colleen McCullough’s Macular Degeneration**

Colleen McCullough, Australia’s best-selling author who is most known for *The Thorn Birds* (1977), was diagnosed with macular degeneration in 2004 and has been named the patron of the Macular Degeneration Foundation. She has increased public awareness of age-related macular degeneration (AMD) by speaking publicly about the disease. When interviewed, Colleen tells people who are over
fifty to have the macula of their eye checked. She says, “Don’t put it off. Make checking for macular degeneration a part of your routine. It’s an absolutely terrible sentence; really an awful thing to try and compensate for. I urge everyone to watch what they eat, try not to smoke and to have regular eye checks, so that at least you give yourself a chance to prevent it.”

Celebrities With Macular Degeneration

Comedienne Phyllis Diller has macular degeneration. Like Colleen McCullough, Phyllis has speaks publicly about her condition so that others may learn how to protect their own eyes.
Chapter 2

Cataracts

The World’s Leading Cause of Blindness

Cataracts are very common. They are the leading cause of blindness worldwide, affecting nearly one in two people over the age of sixty-five.

Most People Know Very Little About Cataracts

Most adults do not realize that cataract formation begins in all adults over the age of thirty. In a healthy lens, proteins are arranged in a specific pattern, and light can pass through it. A cataract is the result of folding and clumping of proteins that aggregate in the lens of the eye, causing clouding and a gradual loss of vision. Forms of cataracts include:

Nuclear Cataract

The most common form of cataract is nuclear cataract that occurs in the center of the lens and causes a yellowing in the lens tissue. Nuclear cataracts are often found in people who have been exposed to sunlight, radiation and environmental toxins (Note: Not every scientist agrees that sunlight causes cataracts. See Richard Hobden’s comments about sunlight in Chapter 1).
**Cortical Cataract**
Cortical cataracts form around the outer part of the lens and extend into the center. They are often found in people with diabetes and Alzheimer’s disease.

**Subcapsular Cataract**
Subcapular cataracts form in the back of the lens, in front of the lens capsule that holds the lens. This form is most often seen in people who have taken high doses of steroids, are farsighted, or have retinitis pigmentosa.

**The Cost of Eye Diseases**
A study conducted by researcher David B. Rein and colleagues at the RTI International, in Research Triangle Park, North Carolina, that was published in the December issue of the *Archives of Ophthalmology*, reported that major vision problems in people over 40 are costing the U.S. economy an estimated $35.4 billion a year. Direct medical costs were estimated to be $6.8 billion for cataracts, $2.9 billion for glaucoma, $575 million for AMD and $493 million for diabetic retinopathy.

**Risk Factors**
While the cause of cataracts remains largely unknown, there are important risk factors, including diets deficient in proper nutrition. Knowing what the risk factors are will help you ensure that you are not in the fifty percent of the population that has cataracts over the age of seventy-five.
Cataract extractions are the most common surgical procedure in the United States. More than two million procedures are performed each year. The following list contains established (and most widely accepted) risk factors:

- Age (over 30)
- Ocular trauma
- Diabetes
- Hypertension (high blood pressure)
- Hypercalcemia (increased calcium levels)
- Chronic steroid use
- Sunlight overexposure (See: FYI on page 19)
- Excessive tobacco use
- Excessive alcohol use
- Genetics (Native Americans and African Americans have the highest risk)
- Diets that do not include sufficient antioxidants
- Oxidative stress

**Glutathione Deficiency is Associated With Cataract Development**

A deficiency of a selenium-dependent antioxidant called glutathione is associated with the development of cataracts, Parkinson’s Disease and Alzheimer’s Disease. Selenium is a mineral that the body needs to make glutathione.
Chapter 3

Searching for Good Fats

Finding Healthy Fats

The cell membranes of photoreceptors are comprised of fats and proteins, and an appropriate composite of fats is needed to make these cell membranes, as well as other membranes in the body. Fats are one of the most complicated topics in nutrition and it is helpful to review the different types of fats.

The Fat Families

A healthy diet should include fats from all the fat families including:

<table>
<thead>
<tr>
<th>Fatty Acid (Family)</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Saturated Fat</em></td>
<td>This very important family of fats is comprised of long chain fatty acids that give cell membranes necessary rigidity. Fifty percent of a cell membrane consists of saturated fat.</td>
</tr>
<tr>
<td>Sources:</td>
<td></td>
</tr>
<tr>
<td>Butter</td>
<td></td>
</tr>
<tr>
<td>Cream</td>
<td></td>
</tr>
<tr>
<td>Coconut</td>
<td></td>
</tr>
<tr>
<td>Palm</td>
<td></td>
</tr>
<tr>
<td>Cocoa butter</td>
<td></td>
</tr>
<tr>
<td>Beef Tallow</td>
<td></td>
</tr>
</tbody>
</table>
### Fatty Acid (Family) | Function
---|---
**Monounsaturated**
Sources:  
Chicken, turkey, goose and duck fat  
Olives, avocado and nuts  

This very important family of fats may be converted to saturated fatty acids (and back) as needed.  
Monounsaturated fats are known to provide a efficient source of energy.

**Polyunsaturated, Omega-3**
Sources:  
Fish oil, cold water fish, grassfed beef, bison, organ meats, and eggs from pastured hens.  
Flax, hemp and perilla  

This important group of fatty acids (Omega-3 and Omega-6) react with enzymes to form important derivatives that are critical for our metabolism.

---

**Did You Know...**
Research on fats reveals that phospholipids, a form of fat, are critical to cell health? And, that milk and egg yolks are excellent sources of these critical phospholipids?
Polyunsaturated, 
**Omega-6** 
Sources:

- Borage, primrose and black currant
- Grassfed beef and bison, organ meats and eggs from pastured hens.

**Fatty Acid Cascade**

The chart on the following page may look complex at first. It's an important diagram that illustrates how fats, with the help of enzymes and co-factors (vitamins and minerals), are metabolized in the body. When you look at the chart, notice:

- **The Fat Families**
  The names of the fat families at the top of the chart include monounsaturated and polyunsaturated. The abbreviation n-3 and n-6 represent omega-3 and omega-6. You'll notice that the saturated fat family is not in the cascade. This is because saturated fats are stable molecules that do not undergo very much transformation. The chart on the previous page mentions that monounsaturated fats may be converted to saturated fats (and back) as needed.

- **Enzymes**
  Enzymes are chemicals that facilitate biochemical reactions. You'll notice the word desaturase with different number
Monounsaturates, Omega-9
(Oleic acid, OA, olive, avocado, etc.)

6 Desaturase with cofactors
B6, Mg, Zn, B3 and C

Polyunsaturates, Omega-6
(Linoleic acid LA, safflower, corn, etc.)
6 Desaturase with cofactors
B6, Mg, Zn, B3 and C

Gamma-linolenic acid
(GLA, borage, primrose, black currant)
Elongase with cofactor
B6

Dihomo-gamma-linolenic acid
(breast milk, spirulina)

5 Desaturase with cofactor
Zn, B3 and C

Series - 1
Prostaglandins, PGE1

Arachidonic acid
(meat, milk, eggs, shrimp)

Series - 2
Prostaglandins, PGE2

Series - 4
Leukotrienes, LT4

Series - 3
Prostaglandins, PGE3

Series - 5
Leukotrienes, LT5

Eicosapentaenoic acid
(EPA, cold water fish)

Stearidonic acid
Elongase with B6

Eicosatetraenic acid
5 Desaturase with cofactors
Zn, B3 and C

Docosahexanoic acid
(DHA, cold water fish)

Series - 2
Prostaglandins, PGE2

Series - 3
Prostaglandins, PGE3

4 Desaturase

4 Desaturase
Docosahexanoic acid
(DHA, cold water fish)
prefixes. These prefixes represent different sites of action on the fat molecule where the specific enzymes act. The designations are pronounced delta 6 desaturase and so on. Other enzymes on the chart include elongase, cyclooxygenase, and lipooxygenase. Each of these names describes a biochemical reaction, the nature of which is beyond the scope of this book.

The co-factors listed after many of the enzymes are important because they are nutrients that may be missing from your diet.

Although textbooks say that these reactions take place in the body, the reactions will not take place without the co-factors. For this reason, it may be necessary for many people to take supplements that contain the intermediary fats listed in the cascade. Examples of these fats include important fats, such as GLA, DGLA and EPA.

### Trans Fats Have a Long Shelf Life

Trans fats are polyunsaturated fats that are heated to very high temperatures to prolong their shelf life. The high temperature alters the molecular structure and fools the body into thinking the fat is saturated. Because the body uses saturated fat in cell membranes, trans fats can become incorporated into a cell’s structure and can lead to structural and functional changes in the cell.
(Note: The AREDS II trial, mentioned in the first chapter, is assessing the importance of DHA in ocular health. DHA, as can be seen, is at the bottom of the cascade. If you think you may not be eating the nutritional co-factors needed to produce EPA, it is best to take EPA and DHA as a supplement in the form of fish oil).

• **Fats That Our Bodies (are supposed) to Synthesize**

The fats listed in the middle and end of the cascade are the intermediate fats that our body is capable of synthesizing. As noted above, the synthesis is dependent on co-factors. Examples of these co-factors include:

- Vitamin C
- Vitamin B6
- Vitamin B3
- Magnesium (Mg)
- Zinc (Zn)

**High Estrogen, High Copper and Low Zinc**

High estrogen levels are associated with high copper, a mineral that is antagonistic to the zinc. Zinc is a critical mineral that is needed to transform plant-based linolenic acid into the omega-3 polyunsaturated fats that play a protective role in eye health. If zinc is unavailable, then a deficiency of these fats may occur.

**Most People Are In the Dark About Trans Fats**

In a 1995 Food and Drug Administration (FDA) study, the FDA found that 90 percent of those polled were either unaware of the dangers of trans fats, or they mistakenly
Test for Fatty Acid Imbalance
If you’re wondering whether there is a fatty acid imbalance in your body, a red blood cell lipid analysis will help you determine if you are deficient in any of the important fat families.

Sources:
BodyBio Corporation (888-320-8338).
Direct Laboratory Services, Inc.
300 Mariners Plaza, Ste. 320
Mandeville, LA 70448
800-908-0000
directlabs.com

thought that trans fats are beneficial. Even those who knew that trans fats are something to be avoided were confused about how to avoid them.

Sources of Trans Fats
Most trans fats are found in processed foods. It is estimated that as much as 40 percent of the food sold in the United States contains trans fats. Examples of foods that contain trans fats include:

• Margarine
• Vegetable shortening
• Ice-cream
• Puddings & pudding mixes
• Ready-made pies, cakes & cake mixes
• Cookies
• Biscuits
• Pizza
• Potato chips
• Doughnuts
• Gravy & sauce mixes
• Artificial creamers
• Children’s foods, including some breakfast cereals

Quality Fats vs. Trans Fats

Healthy polyunsaturated fats will turn rancid from exposure to light. Companies that make high-quality oils that are expeller or cold-pressed understand this, and they package oils in dark bottles or tins.

Oils sold in clear bottles are either high in trans fats due to high temperature exposure, or may have become rancid due to light exposure. Most restaurants, particularly fast-food restaurants, use inexpensive oils that fall into these categories.

The Canola Con Game

The health food industry, as well as many high-profile cooks, have been conned into thinking that canola oil is healthy. There are very few groups reporting on this and
Women Have a Higher Risk For AMD

Estrogen levels typically surge prior to menopause, that may explain why women are at greater risk for age-related macular degeneration (AMD) than men. In addition, members of both sexes are also subject-ed to chemicals in the environment that behave like estrogen in the body.

The industrialized world is full of estrogen-like compounds derived from petrochemicals. They are found in the air, food and water, and include pesticides and herbicides (such as DDT, dieldrin, heptachlor, etc.) as well as various plastics (polycarbonated plastics found in babies bottles and water jugs) and PCBs. The estrogen-mimics, also known as xenoestrogens, are highly fat-soluble, not biodegradable or well excreted, and they accumulate in the fat tissue of animals and humans.

In his book, Trace Elements and Other Essential Nutrients, mineral analyst Dr. David L. Watts, founder of Trace Elements, Inc., explains that females between the age of 30 and 48, who send in their hair for analysis, have high copper levels, and/or low zinc-to-copper ratios, five times more frequently than males of the same age. People with a copper overload may not realize that they have low zinc, due to the natural antgonistic relationship between these two minerals. Besides xenoestrogens that have already
been mentioned, numerous other factors also contribute to a pattern of high copper including:

- Dental fillings
  Current dental amalgams contain copper (Note: amalgam fillings contain approximately 50% mercury, 30% copper, 14% each of tin and silver, and 1% zinc).

- Vegetarian diet
  Chemicals in plants, called phytates, as well as calcium, hinder zinc absorption in the body.

The following chart shows the anticipated percentages of older adults who will develop AMD:
it is unfortunate that many high-profile institutions in the United States are telling people to use canola oil.

Britain’s Campaign Against Trans Fats in Foods (tfx.org.uk) is an organization that is reporting on the presence of trans fat in canola oil. Their source is author Sally Fallon, president of the Weston A. Price Foundation (www.westonaprice.org), and her co-author, Dr. Mary Enig:

[…] most of the omega-3s in canola oil are transformed into trans fats during the deodorization process; and research continues to prove that the saturates are necessary and highly protective.

[…] it can be said that canola oil is a good source of monounsaturated fat-like olive oil—and therefore not harmful… Or is it? Obviously, monounsaturated fatty acids are not harmful in moderate amounts in the context of a traditional diet, but what about in the context of the modern diet, where the health-conscious community is relying on monounsaturated fats almost exclusively? There are indications that monounsaturated fats in excess, and as the major type of fat, can be a problem. Overabundance of oleic acid (the type of monounsaturated fatty acid in olive and canola oil) creates imbalances on the cellular level that can inhibit prostaglandin production. In one study, higher monounsaturated fat consumption was associated with an increased risk of breast cancer.
Even the dogma that monounsaturated fatty acids are good for the heart is at risk. According to a 1998 report, mice fed a diet containing monounsaturated fats were more likely to develop atherosclerosis than mice fed a diet containing saturated fat. In fact, the mice fed monounsaturated fats were even more prone to heart disease than those fed polyunsaturated fatty acids.

This means that the type of diet recommended in books like The Omega Diet—low in protective saturates, bolstered with high levels of omega-3 fatty acids, and relying on monounsaturated fatty acids, whether from olive or canola oil, for the majority of fat calories—may actually contribute to heart disease. Such diets have been presented with great marketing finesse, but we need to recognize them for what they are—payola for the food companies and con-ola for the public.

Mary Enig’s Report on Interesterification

Dr. Mary Enig is a nutritionist, biochemist and Science Editor of the Weston A. Price Foundation’s quarterly magazine called Wise Traditions. In the summer 2007 issue, Mary’s regular feature called “Know Your Fats,” contains a report about interesterification, the food industry’s replacement for trans fats:

The word is out on the dangers of trans fatty acids and with the new laws calling for trans fat labeling, food processors are scrambling for trans-free alternatives.
In her report, Mary describes the process of hydrogenation that produces trans fats (Note: any food with the word hydrogenated or partially hydrogenated on the label contains trans fat). She also explains why the food industry is reluctant to use natural saturated fats for frying and baking:

The obvious solution for the food industry is to use natural saturated fats such as coconut oil, palm oil and tallow (from ruminant animals such as cows and sheep) for frying and baked goods, as they used to do. But this would involve admitting that the demonization of saturated fats that has been going on for the last fifty years is completely unscientific. And a return to a sensible policy of using natural, traditional fats would bring down the huge and powerful seed oil industry, which is the lynch pin of the American commodity agricultural system.

Mary says the food industry’s solution is an industrial process known as interesterification that involves heat and begins with oils that have been subjected to a highly industrialized process. She says the result may be trans-free but it will contain chemical residues and many hazardous breakdown products full of free radicals.

**FYI...**

Books written by Sally Fallon and Dr. Mary Enig are listed in the Resources section at the back of the book.
Saturated Fats Have a High Smoke Point

Natural saturated fats are also known for their high smoke point (or point at which the fat will burn). As a result, oils such as coconut oil, palm oil, and butter are good for cooking. The fumes that are generated from oils with low smoke points are toxic when they burn, and should not be used at high temperatures. Here are some smoke points of well-known oils:

Butter, 66% saturated, 30% monounsaturated, 350 degrees (stable at high temperature)

Palm oil, 52% saturated, 38% monounsaturated, 446 degrees (stable at high temperature)

Coconut oil, unrefined, 92% saturated, 350 degrees (very stable at high temperature)

Olive Oil, extra virgin (73% monounsaturated), 320 degrees (stable at moderate temperature)

Safflower oil, 77% polyunsaturated, 450 degrees (avoid polyunsaturated oils that have been made heat-stable through processing)

Sesame oil, (45% monounsaturated), 350 degrees

Note: Mary Enig suggests an equal parts of coconut oil, sesame oil, and olive oil for frying for maximum health benefits.
Nutrients Are Needed to Synthesize Fats

**Dihomo-gamma linolenic acid (DGLA)**
Text books say that this omega-3 polyunsaturated fatty acid is produced in the body by enzymatic elongation (lengthening) and desaturation (change in the structure of the chemical bonds) of essential fatty acids. However, this ability is often lacking due to an insufficient supply of an enzyme called elongase, and/or its several important co-factors. The easiest way to obtain DGLA is to take borage, primrose or black currant oil. It should be noted that a low level of DGLA is considered to be a marker for heart disease.

**Docosahexaenoic acid (DHA)**
Text books also say that DHA can also be synthesized from alpha linolenic acid (ALA) through the intermediate eicosapentaenoic acid (EPA). This conversion facility is often lacking due to:

- age
- drugs
- caffeine
- diabetes and insulin resistance
- cancer
- viral infections
- allergy-related eczema
• excess alcohol
• trans fats (hydrogenated fats) in the diet
• too much saturated fat
• insufficient co-factors that include zinc, magnesium, vitamin C and B vitamins

DHA is an important polyunsaturated fatty acid that contributes to the development of the brain, the nervous system and the eyes.

**Gamma linolenic acid, (GLA)**
Text books also say that GLA can be synthesized from linoleic acid found in (high-quality) expeller or cold pressed safflower, sunflower or hemp oil. Many people cannot synthesize this important omega-6 fatty acid due to an insufficient amount of an enzyme called omega-6 desaturase that requires co-factors B6, Magnesium, Zinc, B3 and C.

**Important Concepts**

Fats are perhaps the most challenging nutritional concept to understand, particularly since large and seemingly trustworthy institutions such as the Mayo Clinic and food gurus such as Martha Stewart—are telling people to use canola oil.

Without in-depth research into the subject of fats (and fat politics), it’s a very confusing topic. To help clarify some of
the most confusing information, here are some important concepts:

• A healthy diet should contain a range of fats as well as high quality protein, vitamins and minerals.
• Overdosing with any one family of fats can impair cell function.
• A healthy diet should contain a 4:1 ration of omega-6 to omega 3 polyunsaturated fatty acids (Note: most Americans consume a ratio as high as 50:1).

Phospholipids in Eggs and Milk

Phospholipids are a class of lipids (or fats) that are a major component of all biological membranes. All living cells have a semipermeable phospholipid layer that serves a function that is similar to skin. Membranes separate the cell from the outside world, and they also separate compartments inside the cell to protect important processes.

Phospholipids are a component of retinal and photoreceptor cells, just as they are components in every other cell in the body.

Recently, Dr. Sam Baxas at Baxamed Medical Center in Binningen, Switzerland and other doctors around the world have started to emphasize the importance
of two types of phospholipids that are critical to cell membrane function. The two phospholipids are phosphatidylcholine (PC), and sphingomyelin (SM). Some researchers consider these two phospholipids to be so important that they’re calling them essential phospholipids, or EPLs.

• Phosphatidylcholine (PC)
  Eggs naturally contain from 68 to 72% phosphatidylcholine. PC is such a major component of lecithin, that the terms are often used as synonyms.

• Sphingomylin (SM)
  Sphingomylin (SM), found in milk and whey protein, has been shown to suppress colon cancer in animals, and the loss of sphingomylin turnover in the liver is associated with aging.

Environmental Toxins are Lipophilic or Fat-Loving

Toxins in the environment are fat-loving and they are attracted to the fatty acids in our cell membranes. Stephen Byrnes, who wrote an article titled, “The Skinny on Fats and Breast Cancer,” for the Townsend Letter for Doctors and Patients, mentions this in his article:

It’s important to try to obtain organic sources of your fats as environmental toxins are lipophilic, or fat loving. It’s worth a few more dollars to look for organic butter, milk,
Preventing Eye Disease

cheese, and other animal foods. If your budget just won’t permit you to buy organic all of the time, then purchase organic sources of the food items that you use the most to minimize your exposure to possible toxins.

Supplements Can Provide Important Fats

Fats in the polyunsaturated category may be hard to obtain in food. Thus, supplements provide an alternative source for these fats. Examples of supplements you may need to take daily include:

• Fish oil (Omega-3)
• Borage, primrose and black currant (Omega-6)

Finding High-Quality Saturated Fat

National networks that help consumers find local sources for high-quality food, including high-quality fats are:

• The Weston A. Price Foundation (WAPF)
  www.westonaprice.org
  The Weston A. Price Foundation is a non-profit organization that has a headquarters in Washington, D.C. and more than 470 volunteer chapters across the country. Local chapters exist to help people find high-quality sources of all food, including raw dairy products. Although the Weston Price raw milk network was set up to help consumers find milk, many of the same sources also sell butter, a good source of high-quality saturated fat. The foundation is the country’s most significant promoter of the raw milk movement that rec-
ognizes the health benefits of unpasteurized milk from healthy dairy animals. The Weston Price Foundation has created the realmilk.org site to help people find information on raw milk including:

- Articles about real milk including “The Case for Butter” by Trauger Groh, a biodynamic farmer, author & lecturer
- How to identify “real milk”
- State-by-state listing of farmers who sell raw milk
- Raw milk laws in each state
- Herdshare, cowshare and farmshare agreements

The Weston A. Price Web site also contains a list of local chapter leaders who can provide the names of further sources of raw milk.

- Jo Robinson’s Eatwild.com
  Jo Robinson is an investigative journalist and New York Times best-selling writer. Her Eatwild.com Web site contains a national list of farmers who raise grassfed animals and sell products directly to consumers. Although her site contains a list of sources for mostly grassfed meat products, her directory also contains sources for milk, butter and cream.

- Localharvest.org
  This Internet resource was founded by computer programmer Guillermo Payet to help consumers find
local farms, food co-ops and farmers markets across the country.

Use the Name/Description/Product field (e.g. type butter) and the Where? field (e.g. Wisconsin) on the home page to search for farms that sell dairy and meat products directly to the public.

Founded in 1998, Localharvest.org now has 9,000 members, and the site receives a half million page views per month.

**Did You Know...**
Once fat-loving toxins become embedded in our cell membranes, they are difficult to remove.
Chapter 4

Carbohydrates and Diabetic Retinopathy

Diets That Promote An Imbalanced N6/N3 Ratio Will Have Negative Consequences

D iets that are high in carbohydrates may be low in important omega-3 fatty acids that protect eye health (i.e. EPA and DHA). The same high carb diets that are low in protective fats are usually high in starch, driving up blood insulin levels, leading to diabetes and obesity. (Note: Diabetes is a leading cause of blindness in the United States).

Diabetes Has Skyrocketed

According to a study by International Diabetes Federation, the number of people around the world with diabetes has skyrocketed in the last two decades (from 30 million to 230 million). There has been an increase in both Type I and Type II diabetes. (See: The Types of Diabetes). It is also estimated that over 50 million adults ages 40-to-74 have prediabetes, up from an estimate of 41 million two years ago.

As we will see in the chapter on heavy metals, part of the increase in the number of people with diabetes, is partially
correlated with mercury pollution, and an increase in worldwide mercury exposure.

To understand the connection between diet and diabetes, it is helpful to review the different types of diabetes:

**Type I or Insulin-Dependent Diabetes**
This form of diabetes is the result of a deficiency of insulin, and is usually diagnosed in childhood. The disease is understood to be due to destruction of pancreatic beta cells, and is believed to be the result of autoimmunity to one or more components of those cells, and/or and to environmental factors. Because individuals with Type I diabetes do not secrete insulin, this type is controlled by insulin injections to minimize the effects of this disease on blood vessels, nerves, eyes, and other organ systems.

**Type II or Non-Insulin-Dependent Diabetes**
Type II diabetes begins when the tissues of the body fail to respond to insulin—a syndrome known as insulin resistance. Although this usually happens in adulthood, there is an increased incidence of Type II diabetes in people under 40 and in children. Because insulin levels are normal or high (the problem appears to be in the body’s tissues and/or insulin receptors, and not due to a lack of insulin), this type of diabetes does not require insulin injections. This form of the disease can be controlled through dietary therapy, although most Type II diabetics are treated with oral hyperglycemic drugs or, if the drugs fail to control blood sugar levels, with insulin injections.
Evolutionary Diet To Manage Insulin and Obesity

Dr. Robert Crayhorn, author of “The Paleolithic Diet and Its Modern Implications,” suggests that we need to go back more than 10,000 years to find a selection of the best carbohydrates that nature has to offer. Crayhorn divides carbs into two groups:

- **Paleocarbs**
  Crayhorn says paleocarbs are the most beneficial form that include vegetables, fruits and tubers (root vegetables).

- **Neocarbs**
  According to Crayhorn, we should avoid neocarbs or carbohydrates introduced in the last 10,000 years including grains, legumes and flour products. The most detrimental carbs in this group include refined sugar and white flour.

By restricting our carbohydrate choices to paleocarbs, we will be eating the type of carbohydrate that is least likely to lead to diabetes. Indirectly, this will also drive down the numbers of people who will develop diabetic retinopathy.
Notes
Chapter 5

Heavy Metals

Mercury and Copper

We have already covered a possible connection between copper overload and macular degeneration due to copper’s influence on zinc levels in the body. In this chapter, we will briefly look at the connection between mercury and diabetes. As we said in chapter 4, diabetes may lead to diabetic retinopathy, a major cause of blindness.

We Receive a Microgram of Mercury a Day

Existing mercury pollution in this country, as well as that from rapidly developing countries such as China, may contribute to an increase in the number of people with diabetes. Together, these sources are contributing to an increase in worldwide mercury exposure. Through the air, water and food, it is estimated that we’re all receiving a microgram of mercury each day. This amount contains 3,000 trillion atoms—each having the potential to deactivate the insulin molecule and its receptor sites on the cell membrane.
Mercury’s Attack on the Insulin Molecule and Receptor

Mercury has an affinity for sulfur atoms, and there are three places on the insulin molecule where mercury can be attached (Note: lead also bonds to these same sites). If mercury attaches to any one of these locations, it will interfere with the action of insulin. Adults inhale trillions of mercury atoms a day from a mouth full of amalgam. Fish can add more mercury, and the air still more (Note: amalgams are a greater source of mercury poisoning than fish). In children, vaccines introduce mercury molecules in the form of ethyl-mercury.

Mercury Replaces the Hydrogen Ion in a Sulhydryl Group

The mercury in your body is attracted to amino acids that contain sulfhydryl groups. Although mercury can bind with other groups such as amides, amines, carboxyl, phosphoryl, and the heterocyclic base groups of DNA, its attraction to sulfur is very high. When mercury binds with sulfur, inactivating the sulfhydryl groups, this seriously hampers several metabolic reactions. One of the most devastating consequences of this binding is a buildup of homocysteine that is described later in this book.

In organic chemistry, a sulfhydryl group consists of a sulfur atom and a hydrogen atom. Sulphydryl groups are attached to sulfur-containing amino acids all over the body. The four main amino acids that contain sulfhydryl groups include (Note: cysteine is relevant to diabetes):
Methionine
Methionine is particularly vulnerable to mercury. This is because the body’s methionine cycle provides S-adenosylmethionine (SAM), a methyl donor for many methylation reactions. And methylation, or the addition of a chemical group called a methyl group, is fundamental to DNA repair, liver detoxification and new cell growth. The March 1999 issue of Life Extension Magazine reported that deficient methylation is the major cause of the degenerative diseases of aging.

Cysteine
In a reduced form, cysteine can react with mercury to form mercaptides, altered molecules that can no longer function normally. Cysteine is involved in supplying insulin to the pancreas. Diabetes can develop when there is an insufficient supply of insulin.

Cystine
Heavy metals cause cysteine to be oxidized to form cystine. Cystine is insoluble in water and can form cystine...
calculi or stones in the kidneys. Vitamin C can help keep cysteine in its reduced form, preventing stone formation.

**Taurine**
Heavy metals reduce the level of taurine, that has several important functions. Taurine protects the kidneys, retina, liver, heart and lungs from free radical damage by toxic metals.

**Reduced Mercury Exposure and Chelation Help Diabetes**
There is little doubt that part of the increase in the number of diabetics is related to the increased mercury in our environment (approximately 20 tons a day). Unfortunately, most doctors are not aware of the connection, because the official position of medical, dental and governmental agencies is that mercury poisoning from mercury amalgams and vaccines is not a problem. Yet, patients, on their own, are seeing the benefits of reducing mercury exposure and eliminating mercury from the body through chelation.

**Alfred Werner is the Father of Chelation**
The science of chelation is based on the groundbreaking work of a French Swiss chemist named Alfred Werner who described how chelating agents attract and trap metals. There are a number of natural substances in the body that act as chelators,
including the amino acids histidine and cystine, as well as Vitamin C and E. When too many toxic metals build up in the body, man-made chelators can be used to trap metal molecules to speed the detoxification process.

In the years since the Brechers book was published, details about the chemistry involved in chelation has become available. For example, Dr. Andrew Cutler’s work has provided considerable details about safe oral chelation. The frequent-dose chelation group at Yahoo is a resource for discussing the information in Andy Cutler’s books:

Group address:
http://groups.yahoo.com/group/frequent-dose-chelation

A Hair Analysis Can Determine Heavy Metal Toxicity

Hair analysis is a practical test that can help you determine if you have heavy metal toxicity. Although the subject of hair analysis is beyond the scope of this book, two important books written by Dr. Andrew Cutler are listed in the resources section at the back of this book.

After receiving a Ph.D. in chemistry at Princeton, Andy Cutler became ill from his amalgam fillings. After he had
his amalgams removed, he painstakingly learned how to remove the metal from his body. His books provide a details on how to read a hair analysis report and how to manage the chelation of heavy metals using over-the-counter supplements.

How To Order a Hair Analysis Report

Any licensed healthcare practitioner (MD, DO, podiatrist, optometrist, chiropractor and naturopaths who are licensed to order tests) may order a hair analysis kit from Doctor’s Data, Inc:

Doctor’s Data Inc.
P.O. Box 111
West Chicago, IL 60186
(800) 323-2784
www.doctorsdata.com

If you cannot find a doctor who will order the test, order the test through:

Direct Laboratory Services, Inc.
300 Mariners Plaza, Ste. 320
Mandeville, LA 70448
800-908-0000
directlabs.com
Chapter 5

Neurotoxins

The Visual Contrast Sensitivity (VCS) Test
A Means of Measuring Toxins in the Nervous System

The eye is an extension of the central nervous system (CNS) and the CNS is the part of the body where toxins are most likely to accumulate. Doctors John Foster, M.D., Patricia Kane, Ph.D. and Neal Speight, M.D., who wrote *The Detoxx Book: Detoxification of Biotoxins in Chronic Neurotoxic Syndromes*, explain that parasites and heavy metals coexist in cell membranes, including those of the eye. Their research is based, in part, on the scientific research of Dr. Ritchie Shoemaker, a country doctor and molecular biologist who discovered a link between parasites and debilitating disease patterns on the eastern shore of the Chesapeake Bay in a small town called Pocomoke City, Maryland.

**Toxins of Microbial Origin**

In *The Detoxx Book*, Foster, Kane and Speight say, the complex dance of detoxification involves both toxins of microbial origin (called biotoxins), plus a vast array of toxins from our food supply and environment. They feel that the
patient populations affected with biotoxins include those with Chronic Fatigue, Fibromyalgia, Multiple Sclerosis, Depression, Lyme Disease, Cardiovascular Disease, Stroke, Pulmonary Hemorrhage, Mold, Chemical Exposure, Optic Neuritis, Infertility, Rheumatoid Arthritis, Irritable Bowel Syndrome, Estuary Associated Syndrome (Pfiesteria), Diabetes without family history, Autism and Refractory Heavy Metal Toxicity.

Visual Contrast Sensitivity (VCS) Test

Dr. Shoemaker has pioneered the use of an online Visual Contrast Sensitivity (VCS) test to diagnose the presence of neurotoxins in the central nervous system (CNS). The VCS test is a vision screening tool that can help determine whether or not health problems are caused by toxins in the CNS. If the test is positive, people who are screened can obtain a treatment protocol that Dr. Shoemaker has found to be successful.

FYI...

Look for Dr. Ritchie Shoemaker’s book, Desperation Medicine, listed in the Resources section at the back of the book.

VCS Test Results Can Suggest Biotoxin-Induced Illness

As Dr. Shoemaker explains on his Web site, “Many types of organisms produce substances that are toxic to humans.
These include dinoflagellates found in estuaries, and the ocean, cyanobacteria (blue-green algae) found in fresh water, fungi (mold) found in indoor air and outdoors, and some types of bacteria. Our initial research on acute and chronic, biotoxin-induced illness associated a complex of non-specific symptoms and deficits in visual contrast sensitivity with exposure to estuaries inhabited by the fish-killing dinoflagellate, Pfiesteria piscicida, and other toxic dinoflagellates in the toxic Pfiesteria complex. Treatment for this illness, called Possible Estuary Associated Syndrome (PEAS) by the U.S. Centers for Disease Control and Prevention (CDC; 9), according to our protocol was associated with recovery of vision and resolution of symptoms.”

### Chlamydia Pneumonia Found in the Eye Tissue of People with Wet AMD

In 2005, researchers at the Massachusetts Eye and Ear Infirmary (MEEI) found Chlamydia pneumoniae, a bacterium linked to heart disease and capable of causing chronic inflammation, present in the diseased eye tissue of five out of nine people with neovascular, or wet, age-related macular degeneration (AMD).
Biotoxins Linger After Organisms Have Been Killed

Dr. Shoemaker has written several books and articles about neurotoxic illness, and his research describes how fat soluble neurotoxins move through our cells—from the gastrointestinal tract to other parts of the body, eventually entering the biliary tree and bile. These toxins can linger, even though the disease organisms have been killed with antibiotics. As he explains, “Our research also suggested that toxins from tick-borne pathogens such as Borrelia burgdorferi (Lyme disease organism) and Babesia microti may cause chronic illness even after the spirochetes or intracellular protozoa (also called apicomplexans) have been killed by antibiotics. People who cannot naturally eliminate biotoxins develop chronic illness. The toxins can be eliminated, however, by using our treatment protocol, and good health can be restored.”

How To Order a VCS Self-Test

A Visual Contrast Sensitivity Test may be ordered online at the Visual Contrast Sensitivity Test Center at: www.chronicneurotoxins.com. A single test at the time of this printing cost $15.00. Two packages are available (3 tests for $49.95 and 10 tests for $75). Note: The multiple-test packages are helpful for monitoring your progress during detox.
As you take the online test, be sure to wear glasses that you would normally wear when you work on a computer.

Payment may be made online with a credit card. See General Qs and As on the site for details.
Chapter 6

Homocysteine

*The Marker for Degenerative Disease*

A 2006 study, conducted at the Massachusetts Eye and Ear Infirmary in Boston, Massachusetts, and at Devers Eye Institute in Portland, Oregon, found that people with elevated homocysteine in their blood, an amino acid that is a known biomarker for cardiovascular disease, may also be at an increased risk of developing age-related macular degeneration (Seddon JM, Gensler G, Klein ML, Milton RC. Evaluation of plasma homocysteine and risk of age-related macular degeneration, *American Journal of Ophthalmology* 2006;141(1):201-3).

**What is Homocysteine?**

Homocysteine is produced in the human body through a conversion of methionine, an amino acid that is regularly consumed in the diet. Foods such as fish are methionine-rich. Inside the cells, a methyl group is removed from methionine to form homocysteine. When a methyl group is transferred to homocysteine, the homocysteine is converted back to methionine.
What is a Safe Homocysteine Level?

An article titled, “A Lethal Misconception,” published in the March issue of the Life Extension Magazine, assembles scientific findings that help clarify what level of homocysteine is considered safe. The article explains that although commercial laboratories state that normal homocysteine can range from 5 to 15 micro moles per liter of blood, epidemiological data reveals that a safe level is actually in the range of 6.3 to 7.0 micro moles per liter.

Nutrients That Will Reduce Homocysteine Levels

Several nutrients help your body with methylation (and help reduce homocysteine levels):

- Betaine
- Vitamin B6 (pyridoxyl-5-phosphate)
- Vitamin B12 (methylcobalamin is the preferred form)
- Folic Acid
- Niacinamide (Niacinamide is a B Vitamin that helps two enzymes convert homocysteine to a non-toxic substance. Niacinamide is also needed for the synthesis of the following steroid hormones: cortisol, estrogen, progesterone, testosterone and DHEA)
- Choline
- Magnesium
- Molybdenum (Converts toxic sulfite to sulfate. Sulfate is needed in many biochemical reactions).
Stress Impairs Sulfur-Dependent Detox

Indirectly, if lead and mercury upset the methionine pathway, sulfur groups will not be available for sulfur-dependent detoxification pathways in the liver. The detoxification pathways that depend on sulfur are responsible for clearing hormones that accumulate from stress. Here’s what may occur if stress hormones build up in the body:

• Chronic stress favors the production of a stress hormone known as cortisol (at the expense of other steroid hormones such as DHEA).

• A high ratio of cortisol to DHEA can make tissues insensitive to insulin.

• Excess cortisol needs to be detoxified in the liver which requires sulfur groups.

• If mercury and/or lead bind to sulfur groups in the body, there may be a shortage of these for liver detoxification pathways.
How to Order a Homocysteine Test

A homocysteine blood test may be ordered from the Life Extension Foundation (lef.org) or Directlabs.com. Both of these organizations offer blood tests that cost a fraction of the price charged by commercial laboratories.

Direct Laboratory Services, Inc.
300 Mariners Plaza, Ste. 320
Mandeville, LA 70448
800-908-0000
directlabs.com

Life Extension Foundation
P.O. Box 229120
Hollywood, FL 33022, USA
800-544-4440
www.lef.org
This chapter discusses the beneficial effect of two important carotenoids that have pivotal roles in eye health. Lutein and zeaxanthin are carotenoids that are found in the macula of the human eye. They are known to be powerful antioxidants that are protective against degenerative conditions of the eye, as well as cardiovascular disease and cancer. These nutrients inhibit lipid peroxidation, that is considered to be a key detrimental factor in both retinal and cardiovascular disease.

Carotenoids Protect Your Skin

Carotenoids also protect the skin against damage from ultraviolet light exposure.
**Unsaturated Fat is Vulnerable to Damage**

Lipid peroxidation is a deterioration of lipids (fats) that results from oxidative damage. Damage occurs in cell membranes when free radicals steal electrons from lipid molecules. Lipid peroxidation most often occurs in polyunsaturated fatty acid molecules.

In skin health, carotenoids provide protection from ultraviolet rays that can produce free-radicals and inflammation. Lutein, zeaxanthin, and other carotenoids act as a shield preventing cellular damage, because they are poor absorbers of ultraviolet light.

**Lutein and Zeaxanthin Affinity for Rods and Cones**

The human retina contains hundreds of millions of light receptor cells, each of which have different functions. Research indicates that lutein and zeaxanthin are preferentially taken up by different cells. The chart below shows the location and function of each of these photoreceptor cells, as well as the cells to which the carotenoids have an affinity (lutein and zeaxanthin are also categorized as xanthophylls).
### Preventing Eye Disease

<table>
<thead>
<tr>
<th>Cell</th>
<th>Location/Function</th>
<th>Carotenoid Affinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cone</td>
<td>Primarily in the center of the retina (macula)</td>
<td>Zeaxanthin</td>
</tr>
<tr>
<td></td>
<td>Color vision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Degeneration can lead to macular degeneration</td>
<td></td>
</tr>
<tr>
<td>Rod</td>
<td>Primarily in the periphery of the retina</td>
<td>Lutein</td>
</tr>
<tr>
<td></td>
<td>Black and white for night and side vision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Degeneration can lead to night blindness</td>
<td></td>
</tr>
</tbody>
</table>

Note: Macular degeneration often starts at the edges of the macula.

### Lutein and Zeaxanthin Content of Foods

All carotenoids are taken up in the blood by lipoproteins and are transported to various tissues of the body on lipoprotein molecules. Their absorption is assisted by the presence of fats, so it is important to eat fat when you eat any of the carotenoids. It is thought that their absorption is hindered by alcohol consumption, smoking, and health problems such as liver or kidney disease.
Dark green leafy vegetables contain both lutein and zeaxanthin, but have much more lutein than zeaxanthin. Zeaxanthin is more abundant in yellow, orange and red foods.

<table>
<thead>
<tr>
<th>Food</th>
<th>Lutein Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale (cooked)</td>
<td>20-39 mg./1 cup</td>
</tr>
<tr>
<td>Kale (raw)</td>
<td>22.1 mg./1 cup</td>
</tr>
<tr>
<td>Turnip greens (cooked)</td>
<td>18.1 mg./1 cup</td>
</tr>
<tr>
<td>Collard greens (cooked)</td>
<td>17.2 mg./1 cup</td>
</tr>
<tr>
<td>Spinach (cooked)</td>
<td>15 mg./1 cup</td>
</tr>
<tr>
<td>Spinach (raw)</td>
<td>6.7 mg./1 cup</td>
</tr>
<tr>
<td>Broccoli (cooked)</td>
<td>3.4 mg./1 cup</td>
</tr>
<tr>
<td>Brussels sprouts (cooked)</td>
<td>3.4 mg./1 cup</td>
</tr>
<tr>
<td>Lettuce (Romaine)</td>
<td>1.5 mg./1 cup</td>
</tr>
<tr>
<td>Corn (cooked)</td>
<td>2.9 mg./1 cup</td>
</tr>
<tr>
<td>Green peas</td>
<td>2.3 mg./1 cup</td>
</tr>
<tr>
<td>Egg yolks</td>
<td>.3 mg./1 yolk</td>
</tr>
<tr>
<td>Orange</td>
<td>.25 mg./1 oranges</td>
</tr>
<tr>
<td>Papaya</td>
<td>.25 mg./1 papaya</td>
</tr>
<tr>
<td>Tangerine</td>
<td>.20 mg./1 tangerine</td>
</tr>
</tbody>
</table>
### Preventing Eye Disease

<table>
<thead>
<tr>
<th>Food</th>
<th>Zeaxanthin Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale (cooked)</td>
<td>11-20 mg./1 cup</td>
</tr>
<tr>
<td>Pepper, orange (raw)</td>
<td>16.08 mg./1 pepper</td>
</tr>
<tr>
<td>Turnip greens (cooked)</td>
<td>5.1 - 12.1 mg./1 cup</td>
</tr>
<tr>
<td>Collard greens (cooked)</td>
<td>5.1 - 8.6 mg./1 cup</td>
</tr>
<tr>
<td>Spinach (cooked)</td>
<td>5.9 - 12.7 mg./1 cup</td>
</tr>
<tr>
<td>Spinach (raw)</td>
<td>3.6 - 6.6 mg./1 cup</td>
</tr>
<tr>
<td>Broccoli (cooked)</td>
<td>3.5 mg./1 cup</td>
</tr>
<tr>
<td>Brussels sprouts (cooked)</td>
<td>2.0 mg./1 cup</td>
</tr>
<tr>
<td>Egg yolks</td>
<td>.25 mg./1 cup</td>
</tr>
</tbody>
</table>

### Milligrams of Carotenoids Per Day

Studies suggest that we need 6-20 mg. of lutein per day and 3-6 mg. of zeaxanthin. As you can see from the food charts, foods that contain these two carotenoids contain larger amounts of lutein than zeaxanthin. Human blood serum contains 3-to-10 times more lutein than zeaxanthin.

The molecular structures of lutein and zeaxanthin are very different. Lutein is asymmetrical and has a three-dimensional bent-shape. In contrast, zeaxanthin is straight and very symmetrical. It's thought that zeaxanthin's shape allows it to transverse biological membranes, easily making it a more biologically active molecule. When zeaxanthin
is in short supply, the human retina can make a molecule called meso-zeaxanthin from lutein. Meso-zeaxanthin is structurally similar to zeaxanthin. Researchers now feel that meso-zeaxanthin is better for the macula than lutein, but it is not as good as dietary zeaxanthin. However, both carotenoids perform critical protective functions, and they’re been named conditionally essential nutrients.

**Wolfberries (aka Goji Berries) Are High in Zeaxanthin**

Lycium Chinese Mill berries (LCM) or Wolfberries (also nicknamed Goji berries) are a rich source of zeaxanthin. However, zeaxanthin makes up to 77% of the carotenoids present in wolfberries.

Wolfberries have been used in Traditional Chinese Medicine (TCM) for thousands of years, but they have only become known to Westerners in the 21st century. Because of their high antioxidant content and high level of zeaxanthin, wolfberries are gaining a reputation as a superfood.
Edible Flowers Containing Lutein and Zeaxanthin

The yellow and orange flowers of an edible flower known as tropaeolum majus (the botanical name), commonly known as garden nasturtium, or indian cress, are rich sources of lutein. Small amounts of zeaxanthin are also present.

Nasturtiums are native to Peru where they are grown as ornamental plants. The leaves and flowers are used in salads, and the indigenous people of the Andes use nasturtium as a medicinal disinfectant to heal wounds. It is very high in vitamin C and the entire flower is edible.

The cover feature of the June 2007 issue of AcresUSA Magazine covered organically grown edible flowers. Nasturtium was among the article’s Top 10 Edible Blossoms named Petal Picks, that also included calendula, chrysanthemum, day lily, hibiscus, lavender, marigold, pansy, rose and violet.

FYI...
The consumption of foods high in lutein/zeaxanthin is also associated with a decreased risk of cataracts.
Growing Edible Nasturtiums

Thomas Jefferson’s kitchen garden at Monticello contained Nasturtiums. The whole flower is edible and it is known for its spicy and peppery flavor.

Nasturtium flowers vary in color and may be yellow, orange and red. The yellow flowers contain the highest amount of lutein.

The plants may be annual or perennial, depending on the variety. Nasturtiums prefer light (sandy) and medium (loamy) soil that is well-drained. It cannot grow in the shade and will climb to reach more sun. Some low-growing forms do not climb.

Some Flowers Are Toxic

Not all flowers are edible. Some flowers are toxic. Flowers that are known to be toxic include: Anemone, Autumn, Crocus, Azalea, Bleeding Heart, Buttercup, Calla Lily, Christmas Rose, Clematis, Daffodil, Delphinium, Foxglove, Hydrangea, Iris, Ivy (English Ivy), Larkspur, Lily of the Vally, Lobelia, Lupin, Mistletoe, Monkshood, Morning Glory, Narcissus, Petunia, Potato, Poinsettia, Primrose, Rhododendron, Sweet Pea and Wisteria.
Nasturtiums are good companion for many plants in the garden and will grow particularly well with cabbages and fruit trees. If aphids are found on nasturtiums, this indicates that your soil is low on lime. Snails love nasturtiums, and many gardeners know that these flowers will draw slugs and snails away from the rest of their garden. The cabbage white butterfly caterpillars like nasturtiums and can cause damage to the leaves.

Nasturtium seeds germinate within two weeks and can be started in a greenhouse as early as March. Wait until after the last frost to plant Nasturtiums directly outdoors.

**Brassicas Should Be Eaten in Moderation**

Kale, turnip greens, collards, broccoli, brussels sprouts and Nasturtium are members of the Brassica family of vegetables that researchers have recently discovered have potent anti-viral, anti-bacterial and anti-cancer properties. Even though this is true, brassicas are also one of two general categories of foods that have been associated with disrupted thyroid hormone production in humans. These foods contain goitrogens, or substances that suppress the function of the thyroid gland. The categories include:
• Cruciferous vegetables
  Note: Other cruciferous vegetables besides those already mentioned that contain lutein and zeaxanthin include Chinese broccoli (gai laan), cabbage, kohlrabi, bok choy, rutabaga, canola/rape greens, brown mustard seeds, white mustard seeds, brown; greens, mustard seeds, radish, daiko, horseradish, Japanese horseradish (wasabi), arugula (rocket), watercress and cress.

• Soybean-related foods
  There are a few other foods that also contain goitrogens that are known to disrupt thyroid hormone production:
  • peaches
  • strawberries
  • millet

Notes:

• Cooking destroys most of the goitrogenic compounds present in brassica vegetables.

• The next edition of this book will contain details about an author named Sandor Katz who writes about lacto-fermentation, a process that can be used to preserve vegetables that are high in protective carotenoids. Although fermentation does
not destroy the goitrogenic compounds present in brassica vegetables, small amounts of fermented vegetables may be eaten a few times a week without a concern about adverse affects on the thyroid.

Sources For Organic Nasturtium Seeds

Flowers from organic seeds are the best quality and may be obtained from local nurseries or through sources on the Web. Sources include:

**Botanical Interests, Inc.**
660 Compton Street, Broomfield, Colorado 80020
800-486-2647
303-464-6464
www.botanicalinterests.com
inform@botanicalinterests.com

A small, family-owned company, that has over 400 varieties of organically certified seeds. Packets contain useful information about organic pest control, disease control, weed control and fertilization.

Botanical Interests has identified a market, comprised of 20 to 60 year-olds, who, even though interested in growing from seeds, never learned to garden from their parents. Realizing that this group needs more information
than an average gardener, each packet has more information on the front, back, and inside of the packet than do most books. Their Web site also contains a wealth of helpful information. Recently, Botanical Interests announced that they recently signed a Safe Seed Pledge:

*We do not knowingly buy or sell genetically engineered seeds or plants*

**Seeds of Change**
Santa Fe, New Mexico
www.seedsofchange.com
888-762-4240 (toll-free ordering, 24 hours a day)

Established in 1989, Seeds of Change sought to cultivate an extensive range of open-pollinated, organically grown, heirloom and traditional vegetable, flower and herb seeds. The company sells traditional seeds from the Americas and heirloom seeds from abroad (many of which are in danger of being lost, due to the rapid consolidation within the seed industry and the decline of indigenous agriculture and seed-saving knowledge).

**FYI...**

Do not eat flowers from nurseries or garden centers. Eat only flowers that have been grown organically.
Lutein and Zeaxanthin Supplements

Supplement manufacturers often use dangerous chemicals to pull nutrients from foods that they then sell as extracts. If you feel you can’t get enough lutein and zeaxanthin from food, it is best to take supplements that are made from whole food complexes.

Facts About Lutein and Zeaxanthin Supplements

Research on lutein and zeaxanthin supplements revealed some startling information:

- The extraction process used to pull out oil-based lutein and zeaxanthin involves hexane, a dangerous solvent that is a constituent of gasoline.

- Several well-known supplement manufacturers are selling lutein and zeaxanthin in soft gels that contain corn oil. Corn oil contains trans fat that is thought to cause macular degeneration.

Best Bets...

New Chapter, Inc., in Brattleboro, Vermont, makes supplements from whole food complexes. The company’s Lycopom contains marigold and the top food constituents in their Berry Green are blueberries, spinach and kale (Note: New Chapter tries to use as much organic food as possible).
Additional Resources

Cookbook
Nourishing Traditions
Sally Fallon
Sally is the president of the Weston A. Price Foundation (www.westonaprice.org). Her cookbook contains valuable information about traditional food preparation.

Book
Eat Fat Lose Fat
Sally Fallon
Sally and her co-author Mary Enig present scientific studies that explain the benefits of unprocessed coconut oil.

Book
Desperation Medicine
Ritchie C. Shoemaker, M.D.
Remember Hollywood’s 1995 movie Outbreak about the emergence of a new virus and the attempts of the authorities to deal with it—starring Dustin Hoffman, Renee Russo, Donald Sutherland and Morgan Freeman? Ritchie Shoemaker’s story about the disease patterns that emerged near the small town of Pocomoke City, Maryland, has many parallels—only the story is real! As thousands of dead fish appeared in streams and rivers near the Chesapeake Bay, debilitating symptoms began to show up in his patients. As a trained molecular biologist and toxicologist, Ritchie identified a toxin-related illness that he saw was linked to
Pfiesteria and environmental damage—something that public health officials wished to keep covered up. His book is an account of his fight with federal, state and local bureaucrats who refused to acknowledge the effects of pollution. To care for his patients on his own, Ritchie pioneered the use of the Visual Contrast Sensitivity test as a method for diagnosis of neurotoxic illness, and the use of a cholesterol lowering drug, called Cholestyramine, to trap biotoxins and prevents them from re-circulating through the body’s biliary tree and bile.

See: https://www.chronicneurotoxins.com

Book

The Detoxx Book:

Detoxification in Chronic Neurotoxic Syndromes

Doctors John Foster, M.D., Patricia Kane, Ph.D. and Neal Speight, M.D.,

Although this book is described as a book written by doctors for doctors, it is a rather technical, but useful tool for anyone who would like to learn about lipids, eicosanoids, trans fats, dietary fats, phosphatidylserine, and phosphatidylcholine. The book is particularly valuable for doctors who wish to help their patients detoxify their bodies.

See: http://www.detoxxbook.com
Hobday's book explains how light and heat from the sun are indispensable to all of nature—including humanity. It provides a historical record of how sunlight has been used to prevent and cure diseases in the past, and how the concepts relate to our life in the present.

David L. Watts is the founder of Trace Elements, Inc (TEI), a hair mineral analysis lab in Dallas, Texas.

See: http://www.traceelements.com

Dr. Huggins is considered to be the most controversial dentist who has spoken out against mercury, and he courageously tells the truth whenever he's interviewed. When asked why dentists continue to use mercury if the dangers have been known for over a hundred years, Huggins...
explains that mercury toxicity is a very sensitive subject due to the liability implications on the part of large corporations and regulatory agencies. Dentists who speak out against mercury face the threat of losing their license. In each state, dental licenses are controlled by a dental board or a political organization that has ties to the American Dental Association. Huggins says, If a dentist advertises that he/she is a mercury-free dentist, they will put themselves in the crosshairs. In Steve Prussack's radio show interview that's archived on the Web (address below), Huggins mentions that he's had threats on his life. Readers with a Web connection may be interested in hearing Hal Huggins tell his own story in a very provocative talk-show interview. Even though Hal's interviewed on Raw Vegan Radio, he explains how important it is to eat animal protein and fat to heal the body after mercury is removed.

http://rawveganradio.podomatic.com/enclosure/2006-09-10T15_46_57-07_00.mp3

Book
*Amalgam Illness: Diagnosis and Treatment*
Dr. Andy Cutler
Web Site: www.noamalgam.com
A book on chronic mercury poisoning and how to cure it.
Book

*Hair Test Interpretation: Finding Hidden Toxicities*
Dr. Andy Cutler

Andrew’s book is a helpful guide in the confusing world of heavy metal poisoning diagnosis and treatment.

Magazine

*Acres USA*

Founder: Charles Walters
Editor and Publisher: Fred Walters

*Acres U.S.A.* is North America’s largest magazine covering commercial-scale organic and sustainable farming. The magazine’s annual conference, held in December each year, is also a meeting place for alternative healthcare professionals.

Web Site

Subject: The dangers of mercury
Source: Web videos
Location: The International Academy of Oral Medicine & Toxicology
Web Address: www.iaomt.org

Look for links to *The Smoking Teeth* and *How Mercury Causes Brain Neuron Degeneration.*
Web Articles
Subject: Fats
Articles: “Know Your Fats”
Weston A. Price Foundation
http://www.westonaprice.org/knowyourfats
The Weston A. Price Foundation web site contains numerous important articles about fat in a section called, “Know Your Fats.”

A particularly valuable article that is related to the information on canola oil in this book is Sally Fallon’s and Dr. Mary Enig’s article titled, “The Great Con-ola.”

See: www.westonaprice.org/knowyourfats/conola.html
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