

# A Review - Eye Diseases and its Treatment by Various Nutrients

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## ABSTRACT

The importance of excellent nutrition will increase for a number of reasons. The human body needs more vitamins and nutrients to keep it working properly, and it has a harder time digesting and processing the vitamins that we eat in our regular diets. Since the eyes are in all probability the most important organ connected to the senses, certain vitamins and nutrients will facilitate protect the attention. The aim of this review is to identify different nutritional supplement used to treat or prevent ocular disorders. There are various nutritional supplement suitable for those with family history of glaucoma, cataract, or age related macular diseases or life styles factors predisposing onset of these conditions, such as smoking, poor nutritional status or high levels of sunlight exposure. Antioxidants and other important nutrients reduced the risk of cataract and macular regeneration. Healthy lifestyle habits, such as a wholesome diet and regular exercise, may help prevent many chronic diseases including eye conditions.

**KEYWORDS:** Eye vision, Eye disorders, ARMD, RDA

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## INTRODUCTION

### NUTRIENTS:

### ANATOMY AND PHYSIOLOGY OF EYE:

#### ANATOMY OF THE EYE

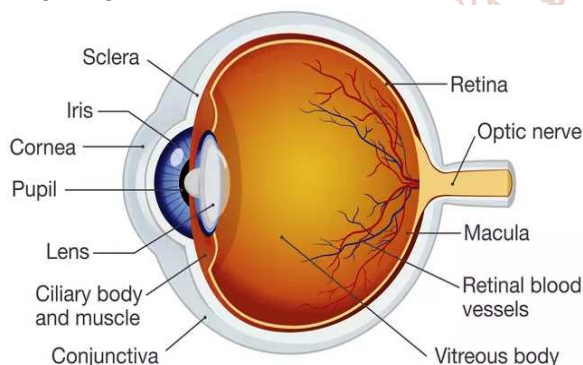


Fig.1 Human eye

**Choroid:** Layer containing blood vessels that lines the rear of the attention and is found between the tissue layer (the inner sensitive layer) and also the albuginea (the outer white eye wall).

**Ciliary Body:** Structure containing muscle and is found behind the iris that focuses the lens.

**Cornea:** The clear front window of the attention that transmits and focuses (i.e., sharpness or clarity) light into the eye. Corrective laser surgery reshapes the cornea, changing the focus.

**Fovea:** the middle of the macula that provides the sharp vision.

**Iris:** The colored part of the eye which helps regulates the amount of light entering the eye. When there's bright lightweight, the iris closes the pupil to let in less light. And once there's low lightweight, the iris opens up the pupil to let in more light.

**Lens:** Focuses light rays onto the retina. The lens is clear, and can be replaced if necessary. Our lens deteriorates as we have a tendency to age, resulting in the need for reading glasses. Intraocular lenses are used to replace lenses clouded by cataracts.

**Macula:** the world within the tissue layer that contains special sensitive cells. In the macula these sensitive cells permit North American nation to ascertain fine details clearly within the center of our field of regard. The deterioration of the macula may be a common condition as we have a tendency to become older (age connected degeneration or ARMD).

**Optic Nerve:** A bundle of quite 1,000,000 nerve fibers carrying visual messages from the tissue layer to the brain. (In order to see, we must have light and our eyes must be connected to the brain.) Your brain actually controls what

you see, since it combines images. The tissue layer sees pictures the wrong way up however the brain turns pictures right aspect up. This reversal of the photographs that we have a tendency to see is way sort of a mirror in a very camera. Glaucoma is one amongst the foremost common eye conditions associated with cranial nerve injury.

**Pupil:** The dark center gap within the middle of the iris. The pupil changes size to regulate for the number light-weight of sunshine} on the market (smaller for bright light and bigger for low light). This gap and shutting light-weight of sunshine} into the attention is way just like the aperture in most thirty five millimeter cameras that allows additional or less light relying upon the conditions.

**Retina:** The nerve layer lining the rear of the attention. The tissue layer senses light-weight and creates electrical impulses that area unit sent through the cranial nerve to the brain.

**Sclera:** The white outer coat of the attention, encompassing the iris.

**Vitreous Humor:** The, clear, gelatin like substance filling the central cavity of the attention [2].

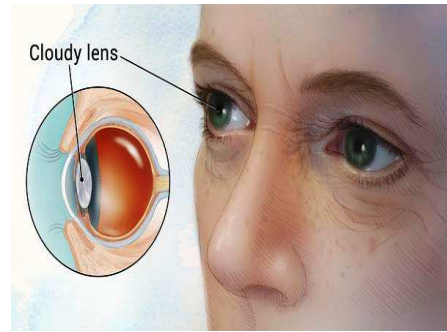
**FUNCTION OF EYE**

1. Light enters the eye through the cornea, the clear front surface of the eye, which acts like a camera lens.
2. The iris works much like the diaphragm of a camera controlling how much light reaches the back of the eye. It does this by automatically adjusting the size of the pupil which, in this scenario, functions like a camera's aperture.
3. The eye's crystalline lens sits just behind the pupil and acts like autofocus camera lens, focusing on close and approaching objects.
4. Focused by the cornea and the crystalline lens, the light makes its way to the retina. This is the light-sensitive lining in the back of the eye. Think of the retina as the electronic image sensor of a digital camera. Its job is to convert images into electronic signals and send them to the optic nerve.
5. The optic nerve then transmits these signals to the visual cortex of the brain which creates our sense of sight.

**EYE PROBLEMS**

**Eye Diseases**

**Cataracts:** Cataracts, or clouded lenses, have an effect on vision and area unit quite common in older folks. Cataracts have an effect on over four-hundredth of people between ages fifty and sixty five years, over hr of individuals > age sixty six, and up to ninetieth of individuals >90 years. Common symptoms of cataracts embrace muzzy vision, colours that appear light, glare, poor visual sense, visual defect, and frequent changes in prescriptions for eyeglasses (Fig.1. Cataracts) [1, 2]. The chance of developing cataracts can be greatly reduced by taking certain vitamins before the cataracts start to appear. However, in most cases surgery is associate possibility that involves removing a cloudy lens and substitution it with a man-made lens [3].



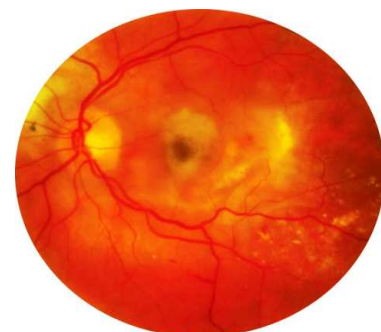
**Fig.1. Cataracts**

**Glaucoma:** Glaucoma damages the eye's optic nerve and is an age-related eye disease that affects about 1 in every 200 people. The optic nerve damage is the result of increased intraocular pressure in and around the eye. Glaucoma has no early symptoms and usually goes undetected until it is fairly advanced. Loss of a minimum of some vision is nearly warranted if preventive measures don't seem to be taken and comprehensive eye examinations not done. Glaucoma could be a leading reason for visual defect among African Americans and Hispanics. African Americans expertise this disease at a rate 3 times that of whites [3].



**Fig.2. Glaucoma**

**Age-related macular degeneration:** This unwellness affects regarding nine million individuals within the us alone. It is an unwellness that destroys the sharp vision required to visualize objects clearly. It affects all daily activities including reading, driving, and watching television. ARMD is a disease in which certain deposits or blood vessels under the macula can damage the eye rods and cause cells in the macula to die. In some cases, ARMD advances so slowly that people do not notice major vision problems [4, 7].

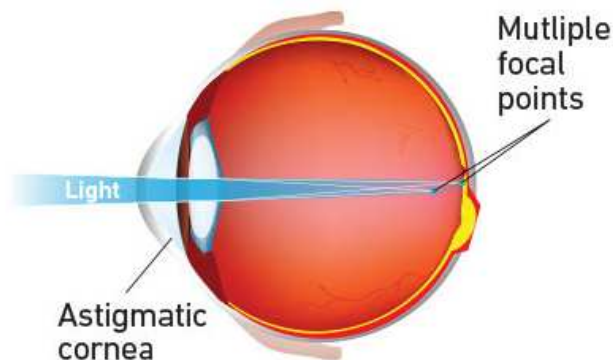


**Fig.3. Age-related macular degeneration**

**Diabetic retinopathy:** Diabetic retinopathy is that the results of polygenic disease and is another major age-related disease touching the tissue layer, the photosensitive tissue at the rear of the eye; it causes most cases of blindness in U.S. adults and is treated with surgery or laser surgery. With adequate control of blood glucose, blood pressure, and cholesterol levels, and with regular follow-up care, blindness from diabetes can be prevented [3].



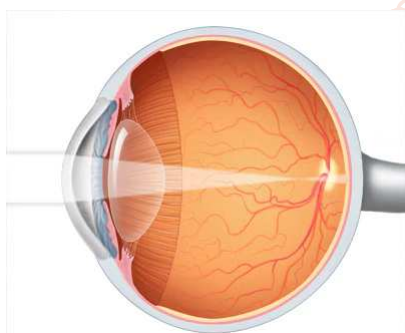
**Fig.4. Diabetic Retinopathy**



**Fig.7. Astigmatism**

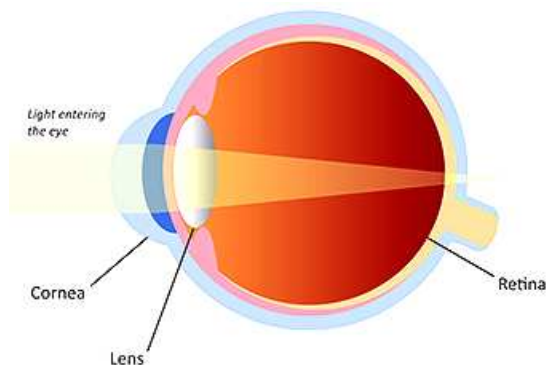
**Vision Focus**

**Nearsightedness (myopia):** Nearsightedness results in blurred vision when the visual image is focused in front of the retina, rather than directly on it. It usually occurs when the cornea or lens is not evenly and smoothly curved. For this reason, in children with nearsightedness light rays are not refracted properly. Nearsightedness often develops in the rapidly growing school-aged child or teenager and progresses during the growth years, requiring frequent changes in glasses or contact lenses [3].



**Fig.5. Nearsightedness (myopia)**

**Farsightedness (hyperopia):** Farsightedness results when the visual image is focused behind the retina rather than directly on it. Hyperopia may occur if the eyeball is too small or the focusing power is too weak. Farsightedness is frequently present from birth, but children can often tolerate moderate degrees of it without difficulty and most outgrow the condition [1, 4].



**Fig.6. Farsighted Eye**

**Astigmatism:** In astigmatism, the membrane is a lot of oval than spherical. This prevents the eye from allow focusing clearly. This condition is accompanied by near- and farsightedness. Current treatments adjust the cornea's uneven curvature through corrective lenses or refractive surgery [4].

**Computer Vision Syndrome**

Computer vision syndrome, or digital eyestrain, describes a problem that results from prolonged computer, tablet, e-reader, and cell phone use. Many people expertise eye discomfort and vision issues once viewing digital screens for long periods of your time. The level of discomfort seems to extend with the quantity of digital screen use.

Uncorrected vision problems-farsightedness and astigmatism or eye-coordination difficulties-and aging will all contribute to the event of visual symptoms once employing a laptop or digital screen device. High visual demands of laptop and digital screen viewing create several people at risk of the event of vision-related symptoms.4

Solutions to digital screen-related vision problems are varied. In some cases, individuals who do not require the use of eyeglasses for other daily activities may benefit from lenses prescribed specifically for computer use. In addition, persons already wearing glasses may find their current prescription does not provide optimal vision for viewing a computer.

Many laptop users' expertise issues with eye focusing or eye coordination that can't be properly corrected with eyeglasses or contact lenses. A program of vision coaching is also required to treat these specific issues. This program trains the eyes and brain to work together more effectively. These eye exercises facilitate eye movement, eye focusing, and eye teaming and reinforce the eye-brain affiliation [5].

**Dry-Eye Syndrome**

Dry-eye syndrome, conjointly called inflammation sicca, is an eye fixed condition within which tear film evaporation is high or tear production is low. This will cause the eyes to dry out and become inflamed [6].

The eyes are manufacturing tears all the time, not simply once individuals express feelings or have AN emotional expertise. Healthy eyes ar lined with a liquid tear film that is meant to stay stable between every blink. This tear film prevents the eyes from changing into dry and keeps them clear and cozy. If the tear glands manufacture a lower amount of tears, the tear film will become destabilized. It will break down quickly, making dry spots on the surface of the eyes. Dry-eye syndrome is a lot of common with older age, once the individual produces fewer tears, however it will occur at any age. In some elements of the globe, wherever deficiency disease leads to vitamin A deficiency, dry-eye syndrome is far a lot of common.

Symptoms of dry eye embody stinging and burning sensations within the eyes, a sense of waterlessness within the eyes, eye sensitivity to smoke, eye fatigue even after reading for a relatively short amount, sensitivity to lightweight, blurred vision, and sticking together of the eyelids upon waking up. Other complications are eye redness, painful eyes, and eyesight deterioration.



**Fig.8. Dry eye syndrome**

**THE EYE AND NUTRITION [9-15].**

Incorporating the following foods in your diet will help you get the Recommended Dietary Allowance (RDA) of these important eye nutrients. Established by the Institute of Medicine (National Academy of Sciences), the RDA is the average daily dietary intake level of a nutrient sufficient to meet the requirements of nearly all healthy individuals in a specific life stage and gender group.

While the RDA is a useful reference, some eye care practitioners recommend higher daily intakes of certain nutrients for people at risk for eye problems. (In the following list, mg = milligram; mcg = microgram (1/1000 of a mg) and IU = International Unit.)

**Beta-carotene**

Eye benefits of beta-carotene: When taken in combination with zinc and vitamins C and E, beta-carotene may reduce the progression of macular degeneration.

Food sources: Carrots, sweet potatoes, spinach, kale, butternut squash.

RDA: None (most supplements contain 5,000 to 25,000 IU).

**Bioflavonoids (Flavonoids)**

Eye benefits of bioflavonoid: May protect against cataracts and macular degeneration.

Food sources: Tea, red wine, citrus fruits, bilberries, blueberries, cherries, legumes, soy products.

RDA: None.

**Lutein and Zeaxanthin**

Eye benefits of Lutein and Zeaxanthin: May prevent cataracts and macular degeneration.

Food sources: Spinach, kale, turnip greens, collard greens, squash.

RDA: None.

**Omega-3 Fatty Acids**

Eye benefits of omega-3 fatty acids: May help prevent macular degeneration (AMD) and dry eyes.

Food sources: Cold-water fish such as salmon, mackerel and herring; fish oil supplements, freshly ground flaxseeds, walnuts.

RDA: None; but for cardiovascular benefits, the American Heart Association recommends approximately 1,000 mg daily.

**Selenium**

Eye benefits of selenium: When combined with carotenoids and vitamins C and E, may reduce risk of advanced AMD.

Food sources: Seafood (shrimp, crab, salmon, halibut), Brazil nuts, enriched noodles, brown rice.

RDA: 55 mcg for teens and adults (60 mcg for women during pregnancy and 70 mcg when breast-feeding).

**Vitamin A**

Eye benefits of vitamin A: May protect against night blindness and dry eyes.

Food sources: Beef or chicken liver; eggs, butter, milk.

RDA: 3,000 IU for men; 2,333 IU for women (2,567 IU during pregnancy and 4,333 IU when breast-feeding).

**Vitamin C**

Eye benefits of vitamin C: May reduce the risk of cataracts and macular degeneration.

Food sources: Sweet peppers (red or green), kale, strawberries, broccoli, oranges, cantaloupe.

RDA: 90 mg for men; 70 mg for women (85 mg during pregnancy and 120 mg when breast-feeding).

**Vitamin D**

Eye benefits of vitamin D: May reduce the risk of macular degeneration.

Food sources: Salmon, sardines, mackerel, milk; orange juice fortified with vitamin D.

RDA: None, but the American Academy of Pediatrics recommends 400 IU per day for infants, children and adolescents, and many experts recommend higher daily intakes for adults.

The best source of vitamin D is exposure to sunlight. Ultraviolet radiation from the sun stimulates production of vitamin D in human skin, and just a few minutes of exposure to sunlight each day (without sunscreen) will insure your body is producing adequate amounts of vitamin D.

**Vitamin E**

Eye benefits of vitamin E: When combined with carotenoids and vitamin C, may reduce the risk of advanced AMD.

Food sources: Almonds, sunflower seeds, hazelnuts.

RDA: 15 mg for teens and adults (15 mg for women during pregnancy and 19 mg when breast-feeding).

### Zinc

Eye benefits of zinc: Helps vitamin A reduce the risk of night blindness; may play a role in reducing risk of advanced AMD.

Food sources: Oysters, beef, Dungeness crab, turkey (dark meat).

RDA: 11 mg for men; 8 mg for women (11 mg during pregnancy and 12 mg when breast-feeding).

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