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Vitamin A and Thyroid Hormone Are Crucial for Good Eyesight

Analysis by Dr. Joseph Mercola | April 22, 2026

STORY AT-A-GLANCE

- Vitamin A and thyroid hormone work together during eye development to build the tiny region of your retina responsible for your sharpest vision
- The center of your retina contains a dense cluster of specialized cone cells that allow you to read fine print, recognize faces, and see detail clearly, even though this area makes up only a small portion of the eye
- Researchers found that early blue-detecting cone cells transform into red and green cones as the eye develops, a process driven by vitamin A metabolism and thyroid hormone signaling
- Nutrients from your diet — including vitamins A, C, and E along with carotenoids like lutein and zeaxanthin — help protect retinal tissue from oxidative damage that contributes to vision decline
- Supporting eye health through nutrient-dense foods, stable metabolism, regular movement and healthy sleep habits strengthens the biological systems that protect your eyesight as you age

The tiny patch of retina that lets you read these words, recognize a loved one's face across a room, or thread a needle is smaller than the head of a pin — yet it generates roughly half of everything you see. New research from Johns Hopkins University reveals that vitamin A and thyroid hormone work together to build this remarkable structure.

The study, published in the Proceedings of the National Academy of Sciences, used lab-grown retinal tissue to overturn a long-held assumption about how the eye organizes its light-sensing cells and opens a new path toward understanding why central vision is so vulnerable to disease.[1] Separately, eye specialists at Johns Hopkins Medicine emphasize that the nutrients you consume directly shape the long-term health and resilience of your eyes.

Vitamins, carotenoids and protective minerals all defend retinal tissue from the oxidative damage that drives age-related vision loss. Together, these insights reinforce a straightforward idea: your food choices influence not only how well your eyes age but how they were built in the first place.

Scientists Discover How Vitamin A and Thyroid Hormone Help Create Sharp Vision

For the PNAS study, researchers used lab-grown pieces of retinal tissue called organoids to observe how the eye develops over time.[2] These tiny lab-grown models let the team observe, in real time, how light-sensing cells sort themselves into position at the center of the retina. Their focus was the foveola — the spot that lets you read fine print, recognize faces, and see detail. Even though this area makes up only about 2% of your retina, it produces about 50% of what you see.

- **Sharp vision forms when certain eye cells change into more precise ones —** Early in development, the center of the retina contains a mix of cone cells, including some that detect blue light. As the eye matures, that area ends up filled almost entirely with red- and green-detecting cones, which provide the sharpest vision. The researchers discovered that these blue cones don't move away as scientists once believed.

  Instead, many of them gradually change into red and green cones. This overturns an assumption that shaped eye research for nearly three decades — that blue cones physically migrated out of the foveola rather than transforming in place.[3] The

results show that the retina actively reshapes itself during development to produce clearer vision.

- **Vitamin A helps control which types of light-sensing cells form —** One important step in this process involves a substance made from vitamin A called retinoic acid. In the developing retina, a special enzyme breaks down retinoic acid in the center of the eye.

  Think of it like a sculptor removing material to reveal a shape — the retina clears away retinoic acid in precisely the right spot so that red and green cones, rather than blue ones, fill the center of your vision. This step matters because retinoic acid encourages the formation of blue cones. When the retina reduces this chemical, fewer blue cones appear and more red and green cones develop instead.

  The study showed that when researchers increased retinoic acid levels in their lab-grown retinal tissue, blue cones increased while red and green cones decreased. In simple terms, too much of this vitamin A compound pushes the retina toward the wrong cell types for clear central vision.

- **Thyroid hormone finishes the job by converting the remaining cells —** The second signal in this process involves thyroid hormone activity inside the retina. The scientists identified strong activity of an enzyme that increases thyroid hormone signaling in the center of the eye.

  This signal encourages the remaining blue cones to switch into red and green cones. The researchers reported that sustained thyroid hormone activity helped generate the cone cells responsible for high-resolution vision. Thyroid hormone helps turn less useful cone cells into the ones needed for sharp eyesight.

- **Your retina behaves like brain tissue —** Your retina is actually part of your central nervous system, along with your brain and spinal cord. Tissues in this system require large amounts of cellular energy to function properly.

In fact, the retina is one of the most metabolically active tissues in your body, consuming oxygen at a rate comparable to your brain. Because thyroid hormones regulate metabolism and energy production, strong thyroid function supports the demanding energy needs of retinal cells.

Bioenergetic researcher Georgi Dinkov points out that this classification helps explain why thyroid activity has such a direct influence on vision quality — the retina simply can't maintain normal function without robust energy production.[4] Physiologist Ray Peat similarly recommended vitamin A and thyroid support for people with poor eyesight, especially older adults, because both sustain the metabolic processes that keep retinal cells healthy.

How Vitamin A and Thyroid Hormone Shape the Center of Your Vision

Together, these signals build the part of your eye responsible for clear sight. The developing retina uses a two-step system to shape the foveola. Vitamin A metabolism limits the formation of blue cones in the center of your retina.

Thyroid hormone then converts the remaining cells into red and green cones. The result is a dense cluster of highly specialized photoreceptors that produce extremely sharp vision. Without this coordinated process, the center of the retina would contain the wrong mix of cells and visual clarity would decline.

- **This also explains why the center of vision is vulnerable to disease —** Researchers emphasize that the foveola is often the first region damaged in **macular degeneration**. This condition gradually destroys central vision, making it difficult to read, drive, or recognize faces. Because the foveola relies on a very precise arrangement of cone cells, even small disruptions lead to noticeable vision loss. Understanding how these cells form gives scientists new insight into how vision problems develop.

- **This discovery could lead to treatments that restore vision —** The researchers view this work as an early step toward repairing damaged retinal tissue. Study leader Robert L. Johnston Jr. described the discovery as "a key step toward understanding the inner workings of the center of the retina."[5] By recreating the same biological signals in laboratory models, researchers hope to produce healthy photoreceptor cells that could replace damaged ones.

- **The long-term goal is to rebuild the eye's most important vision cells —** Scientists involved in the project envision producing carefully designed populations of photoreceptors that could be transplanted into the eye. These cells would integrate with the existing retina and restore lost visual function.

  Although this work is still in early stages, identifying how vitamin A signaling and thyroid hormone shape cone cells gives researchers a blueprint for developing future therapies aimed at restoring eyesight.

Nutrition Supplies the Protective Compounds That Defend Your Eyesight

The same retinal cells that vitamin A and thyroid hormone helped build during development still depend on a steady nutrient supply throughout your life. Once those cells are in place, your daily food choices determine how well they hold up.

Guidance from Johns Hopkins Medicine highlights how daily food choices shape the health of your retina and other delicate eye structures.[6] Ophthalmologist Dr. Mona Kaleem, from the Wilmer Eye Institute at Johns Hopkins Medicine, explains that many people focus on diet only for weight control or **heart health**, yet the same nutrients influence visual performance across your lifespan.

The nutrients required for healthy vision come directly from the foods you eat. Vitamins, carotenoids, flavonoids and minerals all work together to protect eye structures and support visual function. Building meals around nutrient-dense foods increases the supply of these protective compounds.

Certain nutrients help preserve vision quality and defend the eyes from age-related decline. Diet provides compounds that protect eye tissue from damage and deterioration caused by oxidative stress — the gradual cellular wear created by normal metabolism and environmental exposure. These protective compounds help maintain the structures that allow you to read, drive and recognize faces as you age.

- **Antioxidants act as a protective shield for the delicate cells inside your eyes —** Antioxidants play a major role in protecting the eye from damage caused by unstable molecules called oxidizing agents. These unstable molecules damage cells over time and contribute to aging in many organs, including the eye.

  By neutralizing these harmful molecules, antioxidants slow the processes that lead to cellular damage and tissue breakdown. This protective effect supports the health of the retina, lens and other structures required for clear vision. Maintaining a steady supply of antioxidant nutrients through diet therefore supports the long-term durability of your eyesight.

- **Several vitamins work together to maintain healthy eye tissue —** Three antioxidant vitamins play especially important roles in eye health: vitamins A, C, and E. Each one protects eye structures through different biological actions. Vitamin C accumulates in the aqueous humor — the clear fluid located in front of the eye lens — where it serves as a protective antioxidant and helps prevent age-related cataracts.

  Cataracts occur when the normally clear lens of the eye becomes cloudy, leading to blurred vision, glare sensitivity and difficulty seeing at night. By helping neutralize oxidative damage in eye tissues, vitamin C supports the clarity of the structures that focus light.

- **Plant pigments help filter damaging light and support retinal health —** Another important group of compounds includes carotenoids. These natural pigments give many fruits and vegetables their vibrant colors. Two carotenoids stand out for eye

health: **lutein and zeaxanthin**. These compounds accumulate directly in the light-sensitive tissue at the back of the eye.

Their presence inside retinal tissue supports visual function and protects cells exposed to constant light. Foods such as leafy greens, berries and certain fruits supply these compounds. By regularly eating foods rich in these pigments, you reinforce the protective systems that help your retina handle daily exposure to light and oxidative stress.

- **Certain plant compounds strengthen the nerve pathways that carry visual signals —** Flavonoids are another group of plant compounds linked to eye health. Flavonoids appear in many foods including berries, citrus fruits, tea, and dark chocolate. These compounds influence the function of retinal ganglion cells — specialized nerve cells that carry visual information from your eye to your brain.

  When these cells work efficiently, signals from your retina travel more effectively through the optic nerve and reach your brain's visual processing centers. This biological connection highlights how plant compounds contribute not only to eye structure but also to the communication pathways required for vision.

- **Mineral nutrients also protect your eyes from degenerative diseases —** In addition to vitamins and plant compounds, selenium is an important mineral involved in eye protection. **Selenium** functions as a preventive antioxidant and plays a role in defending the eye against degenerative conditions.

  Selenium deficiency has been associated with thyroid eye disease, a condition that affects the tissues around the eyes and can cause swelling, discomfort, and visual disturbances. Adequate selenium intake therefore supports both antioxidant defenses and normal thyroid-related eye function.

How to Support the Nutrients and Signals That Protect Your Eyesight

Your eyesight depends on the health of your retina and the light-sensing cells that allow you to read, recognize faces, and see fine detail. When your retina lacks the nutrients and metabolic signals required for healthy photoreceptors, vision declines over time. Focus first on restoring the biological foundations that support retinal cells — nutrient status, **cellular energy production** and metabolic health.

When you strengthen those foundations, the structures responsible for sharp vision remain resilient as you age. The following steps address the root causes that influence retinal health and the development of the photoreceptor cells discussed earlier. Adopted consistently, these habits reinforce the same biological systems that built your retina's sharpest vision cells in the first place.

1. **Build your diet around foods that supply vitamin A and retinal nutrients —** Vitamin A supports the pigments inside photoreceptor cells that allow your eyes to detect light. Prioritize whole food sources because they provide the nutrient in its natural form alongside supporting compounds. Focus on foods such as pastured egg yolks, grass fed liver, dairy products, and dark leafy greens, along with vegetables like carrots and spinach.

   These foods also provide important carotenoids such as lutein and zeaxanthin, which concentrate in the retina and help protect the light-sensitive tissue at the back of your eye. If you already eat these foods regularly, you're providing your retina with the raw materials needed to support healthy photoreceptors and maintain strong night vision.

2. **Eat a variety of colorful plant foods that protect retinal tissue —** Antioxidant nutrients defend eye cells from oxidative stress that damages delicate retinal structures over time. Use color as a simple guide — the more variety on your plate, the broader the range of protective compounds reaching your retina.

   Aim to include several brightly colored fruits and vegetables each day — berries, citrus and peppers are excellent examples. These foods supply carotenoids, flavonoids and vitamin C that support retinal function and the nerve cells that carry

visual signals from your eyes to your brain.

3. **Protect mitochondrial energy production in your retinal cells —** Your retina demands enormous amounts of cellular energy to convert light into visual signals. Protecting mitochondrial function is key because energy production drives every process inside your photoreceptor cells.

   Replace seed oils — including soybean, canola, corn and sunflower — with heat-stable fats like grass fed butter, ghee or tallow. These seed oils are high in **linoleic acid** (LA), a polyunsaturated fat that, in excess, damages the mitochondria your retinal cells depend on for energy.

4. **Protect your eyes and sleep by managing nighttime light exposure** Artificial light from phones, computers and indoor lighting exposes your eyes to large amounts of blue wavelengths late at night. This light signals your brain to stay awake and suppresses melatonin production in the brain, which disrupts sleep cycles.

   Limit screen exposure in the evening and reduce bright artificial lighting after sunset whenever possible. If you spend long hours on digital devices, blue-blocking glasses in the evening help support healthy circadian rhythms and better sleep, which also supports overall metabolic health.

   While limiting artificial blue light at night protects your circadian rhythm, getting natural sunlight exposure during the day is equally important — sunlight stimulates dopamine production in your retina, which helps **protect against myopia**, and supports healthy vitamin D levels that benefit overall metabolic function.

5. **Strengthen blood flow to your retina through regular movement —** Your retina depends on a network of extremely small blood vessels that deliver oxygen and nutrients. High blood pressure damages those vessels and restricts circulation to the eye. Daily movement is important because exercise lowers blood pressure and improves circulation. Regular physical activity also helps balance insulin and leptin levels, both of which influence metabolic health and retinal function.

6. **Support thyroid function and metabolic balance to protect your retina —** Your retina belongs to your central nervous system and requires significant cellular energy. Thyroid hormone regulates the metabolic rate that produces that energy, which explains why thyroid activity influences vision. If thyroid function slows, retinal cells struggle to maintain the energy required for clear sight.

   Support thyroid function by maintaining strong metabolic health. This starts with eating adequate carbohydrates and balanced protein so your body produces enough cellular energy. Most adults function best with roughly 250 grams of carbohydrates daily and about 0.8 grams of protein per pound of lean body mass (or about 1.76 grams per kilogram), with about one-third of that protein coming from collagen-rich sources like **bone broth**.

   Selenium also plays a direct role here — as noted earlier, this mineral supports both antioxidant defenses in the eye and healthy thyroid function. Good sources include pasture-raised eggs, grass fed beef, organ meats and wild-caught seafood like sardines. When your metabolism runs efficiently, the retinal cells responsible for sharp vision receive the energy they need to function properly.

   Optimizing thyroid health requires a holistic approach that includes dietary adjustments, lifestyle changes and careful consideration before relying on hormone therapies. For a deeper look at how to support your thyroid naturally, see my past interview with Dr. Alan Christianson, a leading expert in thyroid disorders, in "**Unraveling the Mysteries of Thyroid Health**."

FAQs About Vitamin A and Thyroid Hormone for Eyesight

Q: Why are vitamin A and thyroid hormone important for eyesight?

A: Vitamin A and thyroid hormone work together to shape the part of your eye responsible for sharp central vision. During development, vitamin A signaling helps control which types of light-sensing cells form in the retina, while thyroid hormone

converts remaining cells into the red and green cones that produce the highest visual resolution. This coordinated process builds the foveola — the small region that allows you to read fine print, recognize faces, and see detail clearly.

Q: What's the foveola and why does it matter for vision?

A: The foveola is a tiny area in the center of your retina that produces the sharpest vision. Even though it makes up only about 2% of the retina, it accounts for roughly half of your visual perception. This region contains a dense cluster of specialized cone cells that detect color and fine detail, making it essential for tasks like reading, driving, and recognizing faces.

Q: How does nutrition influence the long-term health of your eyes?

A: Nutrients from your diet help protect the delicate tissues inside your eyes from damage caused by oxidative stress and aging. Vitamins A, C, and E support different protective systems in the eye, while plant pigments such as lutein and zeaxanthin accumulate in the retina and help shield it from light-related stress. Minerals like selenium also support antioxidant defenses and healthy thyroid-related eye function.

Q: Which foods support healthy retinal cells and vision?

A: Foods rich in vitamin A and protective carotenoids help supply the raw materials needed for healthy photoreceptors. Examples include pastured egg yolks, grass fed liver, dairy products, leafy greens, carrots, and spinach. Colorful fruits and vegetables such as berries, citrus, and peppers provide additional antioxidants and plant compounds that support retinal tissue and the nerve pathways involved in vision.

Q: What lifestyle habits help protect eyesight as you age?

A: Several everyday habits support long-term eye health. Eating nutrient-dense whole foods, avoiding seed oils, maintaining stable blood sugar levels and getting regular physical activity all help protect the retina. Managing nighttime light exposure to support healthy sleep cycles and maintaining strong thyroid and metabolic health also help ensure retinal cells receive the energy and nutrients they need to function properly.

Sources and References

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- [4] To Extract Knowledge from Matter February 18, 2026
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