Synergy - Why we need zinc with Vitamins A & D

Written by
Tessa Jupp RN

Sometimes people say to me that they will try one nutrient that I am suggesting, to help with their health problems and if this works they will consider trying another one or two later.

The only thing wrong with this approach is that our bodies don't use nutrients by themselves - every process is a chemical equation that uses some main basic large ingredients plus a collection of smaller ones to be able to work.

I liken it to **"Ring-a-ring-a Rosie."** Every reaction in our bodies must "hold hands" with others or the circle is broken and we **"all fall down"**.

If we look at a this simple equation for muscle energy it shows the big items but not the enzymes.

glucose + oxygen = carbon dioxide + water + energy

ie $C_6H_{12}O_6 + 6\ O_2 = 6\ CO_2 + 6\ H_2O + 36$ ATP

And to enable this reaction to take place, for instance via the Krebs Cycle, every single step would require **enzyme reactions** that **need** either **magnesium**, **manganese, B1, B2, B3, B5, B6, biotin, iron, Q10, glutamine** or **vitamin C** to work!

So it is important we have all of these in sufficient amounts ready in our bodies. Generally we are able to get them from the foods we eat but sometimes for various reasons we don't have enough of something and our bodies struggle to work properly and so we end up with what doctors call "diseases".

A multivitamin is not the answer. The best source is food where they are present synergistically or supplement the necessary items only and at the required dose. There are common indicator signs for each nutrient that help us to work out what we do need to take. As we catch up we may be able to reduce the dose or stop until we are running low again - or we may need that dose to maintain our levels anyway. **Listen to your own body.**

NUTRIENTS THAT "hold hands"

An analogy I have seen for this gave calcium and magnesium as an example. Magnesium is used to transport calcium to the bones. If you needed to cross a river but had no boat, getting more people to wait on the shore with you still won't get you a boat. Just as taking extra calcium won't help without having the magnesium (& Vit D, K etc) to transport it.

Each element has its own role to play. **Calcium** is present within muscle cells as well, playing its role in muscle contraction. However, without **magnesium** and energy (ATP) there to reverse the action of calcium, the muscle can't relax ready for the next calcium to come and re-work it and so we end up with cramps, tight muscles and muscle aches.

Zinc is another mineral that is part of enzymatic action enabling the absorption of **Vit A and D** through the gut wall with production of a **zinc-binding protein carrier** and also to make the carrier to transport A & D in the blood stream to their destinations. The A and D receptors on the cells also only function correctly when zinc is present. Other nutrients needed for absorption of A and D include **magnesium** and **Vit K_2**. They are all part of the "Ring-a Rosie" team.

As these are all **fat-soluble vitamins**, they need saturated fat (as in butter and coconut oil) to be absorbed. Polyunsaturated fats (margarines and plant oils) actually destroy fat-soluble vitamins - A, D, E, K

Vitamin K1 is found in leafy green veg and is part of the **clotting factor**, but **Vit K2 is found in animal fats** and fermented foods. **K2 works** with calcium and Vit D in maintaining **healthy bones and teeth**.

OTHER MAJOR SYNERGISTIC COMBINATIONS INCLUDE:

Chromium and **biotin** together for **regulating blood sugar levels.** Vit C is part of that ring too.

Magnesium, Vit C, potassium and fish oils work together to **reduce blood pressure.**

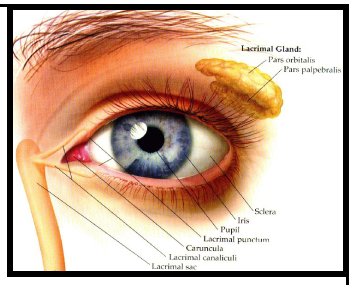
Taurine and **choline** act together to c**lean out the liver and lower cholesterol.**

Vit C plus bioflavonoids together **with B5** are the main ingredients in **cortisone production** so help with allergies. Magnesium and fish oil are part of this too. B2 helps too by reducing engorged blood vessels.

Carnitine and **glutamine** are often needed together. Glutamine is the main **neurotransmitter** for the brain but can be turned into glucose to **burn for energy** if carnitine being low is reducing available fat-based energy production.

Lemon juice assists the **absorption** of many minerals, including **magnesium** and also **B12** by stimulating the release of **Intrinsic Factor** in the stomach and **bile** and **pancreatic** function in the gut.

Why is Vitamin A so important?



Of course that is not the end of the story. Vitamin A is essential for sight and vision; and all body linings, including skin, nerves, muscles and tendons.

For polio survivors, balance is connected to eyesight. We have found that particularly for polios, if asked to stand with eyes closed, it is very hard to keep your balance. Part of that is the **need to have a "horizon"** to help you know where you are in space. (So do have a light to see your way to the toilet at night.) This may also be due to polio nerve damage in the brainstem that is getting weaker with LEOP or simply deteriorating vision that can be connected to nutritional deficiencies.

Just going back to **polio's effects on the brainstem** -

Dr Richard Bruno reports in his article on *Polio-encephalitis and Fatigue* - **"Post-mortem histopathology performed fifty years ago demonstrated the consistent presence of poliovirus lesions in specific brain areas. Brain stem centres were found to be involved in even mild cases of polio."**

When we look further at the areas controlled by the brainstem, which is the gateway and regulator between the brain and the spinal column, the brainstem involves nerve pathways for respiratory, motor and cardiac functions, as well as reflex activities such as visual, blinking, hearing, coughing, swallowing, vomiting.

So problems that can arise from dysfunction of these brain pathways are listed below - Sound familiar? These are many of the problems polios are having.

Problems with balance	**Fatigue**
Poor coordination of movements	**Hypertension**
Poor memory or "brain fog"	**Increased heart rate /palpitations**
Difficulty concentrating	**Headaches / Migraines**
Hip, knee, ankle and foot pain	**Anxiety / Depression**
Chronic low back and neck pain	**Insomnia**
Shoulder and rotator cuff pain	**Forgetting where you put things**
Discs - bulge, herniate, degenerate	**Difficulty saying what you want to**
Early onset arthritis and joint pain	**Inability to stay focused on tasks**
Poor circulation to hands and feet	**Loss of motivation and drive**
Digestion problems; reflux, IBS,	**Dry skin, dry eyes or dry mouth**
Blood sugar problems	**Bladder or urinary tract problems**

We know that nutritional support is helping with a lot of these problems. What if additional nerve support is needed for nerve function not only at spinal column level but also brainstem nerves? Will this help too?

Synergy in getting these nutrients in and around the body becomes even more important for polios.

Vitamin A is required for normal development of the **brainstem** according to research from Wisconsin Uni

In **stroke victims**, those with high levels of vitamin A are more likely to recover without brain damage. (*The Lancet*, Mar 25, 1998)

Brainstem health also needs Vitamins C, E, B6, B12, folic acid, Q10, omega 3 (fish oils) and saturated fats - (which we get from meat and coconut oil).

Genes: Vitamins A and D regulate gene expression (ie as in stem cells) but magnesium is essential for this. Vit A and D also work together to prevent infection.

Immune System: People who are only mildly deficient in vitamin A have a higher incidence of respiratory disease and diarrhoea as well as a higher death rate from infectious disease

Skin and Body Linings: The skin and the lining that covers the digestive, respiratory and urinary tracts are important components of the immune system. They are your body's first barrier against infection. The retinol form of vitamin A is responsible for maintaining the function of the cells that make up these barriers.

Red and White Blood Cells: Vitamin A is also needed for the formation and activation of white blood cells which are our immune function cells. All blood cells are developed from stem cells. Vitamin A facilitates the specialisation of stem cells into red blood cells. Vitamin A also allows iron to be incorporated into haemoglobin – the oxygen carrying component of red blood cells.

Anaemia: The combination of supplemental vitamin A and iron seems to reduce anaemia more effectively than either supplemental iron or vitamin A alone.

Hearing Loss: Chronic vitamin-A deficiency causes degeneration of the structures of the ear. Decreased auditory function in humans is associated with low vitamin-A levels. (*Arch Otorhinolaryngol* 1982;

Leg Ulcers: Elderly persons who consume adequate vitamin A are less prone to leg ulcers. (*Veris Newsletter* Dec 1999.)

Sources of Vitamin A

As kids we were given **cod liver oil** to get Vitamins A and D. This is still the best source of Vit A. An easier way to take it is in capsule form these days - still works as well. Make sure you take zinc at the same time - so best taken before going to bed.

Dietary: Liver, fish eyes, butter, eggs, leafy green veg.

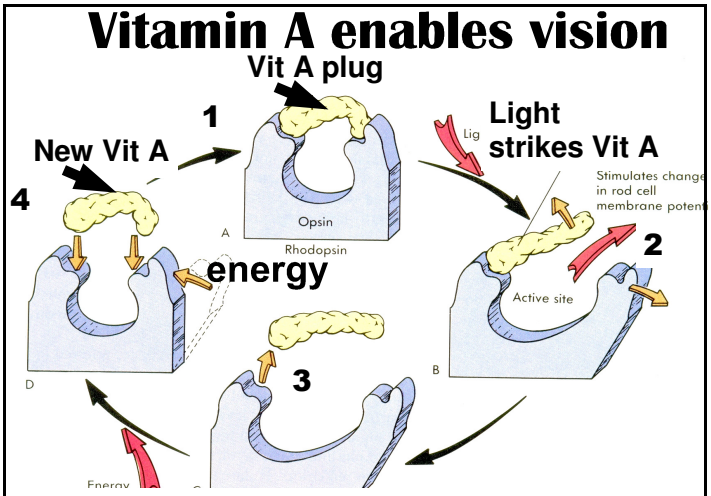
Nutrients needed for eyesight

Written by
Tessa Jupp RN

Vitamin A helps the retina function properly, which is essential for good vision and the prevention of night-blindness. It also lessens the risk of age-related macular degeneration and cataracts.

Zinc deficiency can interfere with vitamin A metabolism in several ways:
(1) Zinc deficiency results in decreased synthesis of retinol-binding protein which transports retinol through the circulation to tissues (eg the retina) and also protects against potential toxicity of retinol;
(2) Zinc deficiency results in decreased activity of the enzyme that releases retinol from its storage form, retinyl palmitate, in the liver;
(3) Zinc is required for the enzyme that converts retinol into retinal, as needed for sight.

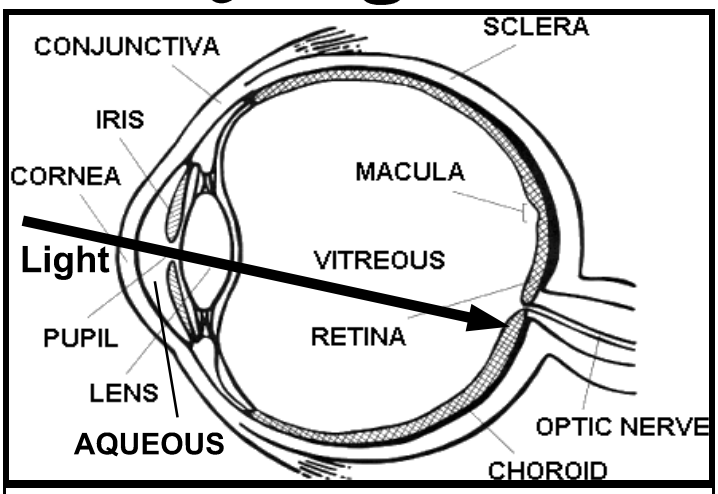
The retina is composed of cones for blue, green and red perception and rods for dim light at night (black and white vision); also blood vessels to nourish and nerves to transmit what we see to the visual cortex of the brain. Many nutrients are required to keep all the parts of the eyes in good working order. Below is a diagram showing how essential Vit A is for sending the message to the brain. Without Vit A we are blind.



1. Modified Vit A (retinal) plug closes the gap on rods and cones in the retina.
2. Light strikes plug springing it open changing shape of rod/cone which send sight signal to brain.
3. Used plug floats away leaving gap (can't see).
4. New Vit A plug needed plus energy to reshape gap to grasp new plug ready to go again. You see.

The cornea, the outer lining, also needs Vit A to keep its cells healthy. **Lack of Vit A causes dryness,** ulceration, scarring to the cornea and **eventually blindness.** So dry eyes and dryness to any body linings (dry mouth, dry skin etc) are all due to lack of Vit A. Without Vit A, mucous-forming cells in the cornea deteriorate. The eye can no longer produce enough tears or mucous needed to lubricate the eye and wash away bacteria.

Cataracts are caused by clumping of the protein in the lens, clouding vision. **Vit C** helps maintain transparency and clarity. For **retinal cells** to function properly they need to be 'bathed' in **high doses of Vit C,** inside and out, in the vitreous fluid. Vitamin C helps protect peripheral retinal nerves in **glaucoma** by lowering the intraocular pressure in the eyeball.



We see because light penetrates the cornea, enters through the pupil, passes through the lens and vitreous fluid to strike the retina at the back of the eye. The message is sent to the brain via the optic nerve.

The **aqueous humor** is the watery fluid that fills the space between the cornea and the iris. It nourishes and protects the cornea and lens and gives the eye its shape. The aqueous has even higher levels of **Vit C** than our blood. Vit C in the aqueous is essential to nourish eyes and protect them from oxidative stress.

Present in orange and leafy green vegetables, **lutein and zeaxanthin** are found in the lens and retina to protects the eye from oxidization and light damage. They also protect the macula (responsible for central vision) by filtering blue light.

Taurine and **Vit E** protect the eye by breaking down fats. Nerve cells in the eye need Omega-3 fats but trans-fats and polyunsaturates in margarines and vegetable oils destroy the retinal nerves, causing **macula degeneration. Taurine** also inhibits damage to the lens by excess glucose, as in diabetes.

In 2001, researchers at Sydney Uni found **Vit B12** strongly protective against **cortical cataracts.** These grow outward from the centre of the lens and are **common in diabetics**.

Vitamins B12, B6 and B1 are also essential for maintaining the rods and cones, and the **optic nerve**.

The retina has a great matrix of **blood vessels** supplying the cells and nerves with nutrients and energy. When our eyes become **red, itchy, gritty, bloodshot**, those blood vessels inside, and outside on the cornea have become engorged and fragile, needing **Vit B2** to reduce them back to normal size. So there are many synergistic nutrients in eye health.