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Nutrition and Retinal Degeneration – Q&A
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The media and the internet are inundated with reports on nutrition to prevent, slow down and treat various retinal degenerations.

1. What are some sources for Vitamin A, omega 3's/DHA, antioxidants, etc:

- Vitamin A: green and yellow vegetables, liver, egg yolks, fish oil, and margarine
- Omega-3's
- DHA (docosahexaenoic acid): found in cold water oily fishes such as salmon, herring, mackerel, anchovies and sardines; DHA is also commercially manufactured from microalgae (Crypthecodinium cohnii and Schizochytrium).
- EPA (eicosapentanoic acid): same source as DHA.
- ALA (alpha-linolenic acid): from flaxseed oil, hempseed oil, chia seeds, kiwi, lingonberry.
- Omega-6's
- Arachidonic acid (AA): found in nuts, palm, soybean oil, rapeseed oil, sunflower oil, poultry, eggs, avocado, acai berry, pumpkin seed, and hempseed oil.
- Antioxidants
- Vitamin A: see above
- Vitamin C (ie, ascorbic acid): found in citrus fruits and vegetables.
- Vitamin E (ie, alpha-tocopherol): found in vegetable oil, nuts, sunflower, wheat, green leafy vegetables, and fish.
- Lycopene: found in red tomatoes and watermelons.
- Flavanoids (large family of antioxidants made by plants): found in tea, red wine, fruits, vegetables, and legumes.
- Anthocyanins (a type of flavanoid): found in berries (acai, cranberry, blueberries, saskatoon berries, bilberries).
- Polyphenols: found in green and black tea.
- Reservatrol: found in red wine.
- Lutein and zexanthin: found in green vegetables (Kale, collard greens, spinach, parsley, mustard greens, dill, celery, scallions leek, broccoli).
- Alpha lipoic acid: made by the body (found in every cell); also found in red meat, organ meats (such as liver), and yeast.
- Curcumin: the indian spice (yellow powder).
- Anthraquinones: found in chinese teas such as Rheum, Qinghai Wild Dahuang tea, Semen Cassiae.
- Reduced L-glutathione: found in fruits, vegetables, meat (destroyed by intense heat).
- Quercetin: found in red wine, grapefruit, onions, apples, and black tea. It is also found in lesser amounts in leafy green vegetables and beans.
- coQ-10: found in fresh sardines and mackerel, the heart, liver and meat of beef, lamb and pork along with eggs, spinach, broccoli, peanuts, wheat germ and whole grains.
- Lignan: found in oats, flax seeds, pumpkin seeds, sesame seeds, rye, soybeans, broccoli, beans, and some berries.

1b. How do vitamins or other nutrients help eyesight?

Vitamin A (retinol) is a precursor of the molecule (11 cis-retinaldehyde) that starts the process of transforming light into electrical changes in the eye (phototransduction); a balanced diet containing vitamin A leads to sufficient amounts of 11 cis-retinaldehyde. Vitamin A also acts as an antioxidant (see below for details).

DHA is an essential fatty acid (we need to get it directly from our diet), which represents close to 50% of all fatty acids essential for photoreceptor function. Byproducts of DHA (such as NPD1) have been shown to support the survival of photoreceptors; however, oxidation of DHA can lead to toxins (such as CEP). EPA is a precursor of very long chain n-3 fatty acids that are essential for photoreceptor function.

Antioxidants are required to prevent oxidative damage due to the naturally high oxygen levels in the outer part of the retina where photoreceptors are localized. Some antioxidants (lutein and zeaxanthin) also help reducing the damaging effect of intense blue-light on the retina. A balanced diet contains sufficient amounts of antioxidants; there are multiple types and equally multiple natural sources.

2. WHILE NUTRITIONAL THERAPIES COULD BENEFIT SOME PATIENTS, IT COULD ALSO HARM OTHERS.

2a. Can vitamin supplementation slow or stop the progression of RP (and related conditions, LCA, Stargardt's, cone-rod dystrophy, Usher's etc.)?

There are several reports on the beneficial effect of vitamin A, DHA and antioxidants (respectively) on RP. Very few, if none, have been replicated by multiple independent researchers. One issue is that a prerequisite of a controlled study, is to precisely "control" one variable (manipulate it, while all other variables such as other nutrients and disease stage are precisely the same). It is impractical to perfectly achieve this, and also not representative of reality: our diet consists of the simultaneous intake of many nutrients that are bound to have synergetic effects (greater effect when combined) and RP presents itself in many flavors and severity levels.

2b. Is it only beneficial to those with a certain amount of sight?

Vitamin A, at 15000 IU (3 times the recommended daily intake) has been reported to slow RP symptoms. This dose is in the toxic range. Being fatsoluble, vitamin A is stored to a variable degree in the body, making it more likely to cause toxicity when taken in excess amounts. Furthermore, excess in vitamin A intake has been shown to exacerbate the formation of lipofuscin (lipofuscin is associated with photoreceptor loss, a dramatic example is Stargardt). Individuals with abnormally high levels of lipofuscin (which can be determined by your ophthalmologist using "fundus autofluorescence") should avoid exceeding the recommended daily intake of 5000 IU.

2c. Which nutrients are beneficial for which types of RP? What evidence is there? Should patients take supplements?

DHA supplementation alone was not shown to have a protective effect on retina function in RP. This does not mean that it does not play a preventative role in RP progression. Data from our lab suggest that DHA supplementation in the diet can slow down the progression of Stargardt-like dystrophy, as well as slow down age-related changes in the retina (lower lipofuscin levels and preserved retina functiona as assessed with the electroretinogram).

2d. Is there any harm? i.e. overdosing, toxicity, interactions with other nutriceuticals or pharmaceuticals?

Supplementation with antioxidants has been shown to delay RP symptoms in animal models, where it is easier to control variables than in humans with RP.

2e. Who should know what supplements a patient is taking? (i.e. family doctor, pharmacist, retina specialist)

Lutein and zeaxanthin are macular pigments that may play a role in reducing the development and progression of age-related macular degeneration. Lutein and zeaxanthin intake leads to increased macular pigment density. There is some evidence that lutein supplementation might help preserve visual fields in RP.

3. SPECIAL GROUPS AND NUTRITION SUPPLEMENTATION

3a. Children, nutrition and retinal dystrophies – what vitamins, minerals, EFAs are recommended for children, IU levels, things parents (or caregivers) should be aware of, who should know about any supplementation a child is taking?

Because of the potential for side effects and interactions with medications, dietary supplements should be taken only under the supervision of a knowledgeable health care provider such as the family doctor and a nutritionist.

4. NUTRITIONAL SUPPLEMENTS BEING MARKETED FOR RP

4a. There are media reports about Retina Complex - What is it? Who is it for? Is there (enough) research to support its use and benefit? (Note: it's currently not available in Canada, and patients are ordering it from a website www.retinacomplex.com). Has it been approved as safe and effective in other countries? Will it be approved and made available in Canada? When?

Retina complex contains several antioxidants: Lutein and zexanthin, LGlutathione (GSH), Alpha-Lipoic Acid, Polysaccharides (from Lycium Barbarum Lynn = wolfberries).

There are many other commercially available formulas (Prigmeton, Pegmical, Metnofax, Dr. Balch complete formula for RP).

None offers a cure for RP. None was shown (using clinical trials) to effectively slow the progression of RP. All of the nutrients contained in these formulas can be obtained from a balanced diets, in non-toxic doses, and at a significantly lower cost.

4b. What other nutritional treatments available for patients? What about ““20/20 Vision Supplement”?

Eating a balanced diet can allow intake of all nutrients that are essential for eye function. Lack of any nutrients or imbalance (too much of one nutrient versus other nutrients) might exacerbate RP symptoms. We could take several nutrients together (vitamins, omega-3's, antioxidants) and make an expensive formula and sale it on the internet with a fancy name, but that would not surpass a diet that supplies all of these nutrients. Why? Getting these nutrients through food ensures proper dose, and balanced combination of multiple nutrients with complementary properties (synergy). Most nutrients sold as "magic formulas" consist of powerful antioxidants alone.