Visions2015

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Retina Nutrition

- Everyone needs a balanced diet with the minimum Reference Daily Intake (RDI) for nutrients, as determined by the USDA.
    - The RDI is the daily dietary intake level of a nutrient considered sufficient to meet the requirements of nearly 98% of healthy individuals in each decade and gender group. The RDI is used to determine the Recommended Daily Value (RDV) which is printed on food labels.
    - for more information: http://www.health.gov/dietaryguidelines/2015-scientific-report/

- Everyone should eat healthy foods that might be good for your eyes. In fact, many of the nutritional recommendations are similar to those recommended to protect your cardiovascular system.
    - In general "what's good for your heart, is good for your eyes."
- Basically:
    - 1) eat fruits, greens & vegetables;
    - 2) eat healthy oils;
    - 3) eat fish (or another source of omega-3 fatty acid) at least once or twice a week;
    - 4) a balanced diet is the key (everything in moderation).
- Need to BALANCE omega-3 (anti-inflammatory) and omega-6 (pro-inflammatory) fatty acids in our diets and our bodies.
    - A Dietary balance is up to you.
    - Red blood cell fatty acid profiles are used as an index for the body's fatty acid status.
- BALANCE omega-3 and omega-6 fatty acids in diet, particularly in cooking oils (see attached document)

- Make additional lifestyle changes like wearing sunglasses and stopping smoking.
- Before making any changes to your nutritional habits or lifestyle, talk with your primary care physician or ophthalmologist, so that you can decide together what would be the right course for you, with your particular disease and unique health requirements.

Nutriceuticals (supplements):

- Some individuals with retinal degenerative disease may benefit from high doses of some nutritional supplements, due to the nature of their specific disease (they may be lacking in one or more nutritional requirements).
- Not all high-dose nutritional supplements are safe for every retinal degenerative disease. What might be good for one disease may be dangerous for another. For example, supplementation with Vitamin E is recommended for individuals with AMD but is not recommended for individuals with RP.
- Biological variability…different disease severity within family members with same gene mutation
    - Gene modifiers?
    - Diet?
    - Environment (e.g., smoking, sunlight)?

Should I take a Nutritional Supplement?

Decision-making Criteria

- Anecdotal "My cousin's husband's sister says it works!"
- "I read it on the Internet"
    - Trustworthy Web sites: .org, .gov, .edu
- "It works in animal models"
- Peer-reviewed literature suggests that it works
- A randomized, controlled clinical trial shows significant benefit
- My health-care-giver (physician) has explained the risks and benefits to me

Nutritional & Nutriceutical recommendations for people with RDDs

RP

- RP: Supplementation of 15,000 IU/day Vitamin A palmitate, in combination with dietary intake of 1-2 servings of omega-3 fatty acid-rich fish per week (such as salmon, tuna, mackerel, halibut, herring, or sardines, which contain among other constituents considerable DHA), slowed vision loss/visual field sensitivity. DHA supplementation at 200 mg/day.
- Mandatory yearly liver tests due to potential build-up and damage by Vitamin A
- RP: High-dose supplementation of Vitamin E (400 IU/day) is of no benefit, and in fact potentially harmful. (Not the case for AMD nutrition)

Stargardt's disease and Vitamin A

- Stargardt's disease due to mutations in the ABCA4 gene – there is some evidence that people who have this mutation should avoid Vitamin A supplementation, based upon a build-up of a toxic, damaging by-product called A2E.
- It is important for people who have clinical characteristics of Stargardt's have their genotype checked before taking Vitamin A supplementation.
- Best Disease, Cone-Rod Dystrophy (?)

AMD

- The Age-Related Eye Disease Studies (AREDS I & II), have shown that supplementation with a regimen of antioxidants and minerals could slow progression of AMD.
- AREDS II
    - Antioxidants
        - 500 mg Vitamin C,
        - 400 IU Vitamin E,

        - 10 mg Lutein,
        - 2 mg Zeaxanthin
    - Minerals
        - 80 mg Zinc Oxide,
        - 2mg Cupric Oxide)

- Vitamin E nutritional supplementation is beneficial for AMD, but not for RP. Always first consult with your doctor.
- Beta-carotene has been removed from the formulation due to the increased risk of lung cancer for smokers.
- Lutein and zeaxanthin are nutrients that collect in the macula [the center of the retina that is mainly responsible for viewing fine detail like driving or reading & color and day vision].
    - It's thought that the potent antioxidant properties of these yellow/orange pigments help to protect the retina from potentially harmful light.
    - Many individuals with AMD have lower levels of lutein and zeaxanthin in the macula, thus, increasing their intake in the diet may help reduce the risk of AMD or slow disease progression.

- Patients with AMD should avoid **trans fats**, since a diet high in these artificially processed fats may increase an individual's risk of disease progression.
    - Trans fats are used to increase the shelf-life of foods (normally found in baked or packaged goods).
    - If the food contains "hydrogenated" or "partially hydrogenated" fats or oils, it has trans fatty acids.
    - The FDA now requires trans fats be eliminated from all processed foods within the next 3 years.

Natural sources of some nutrients:

Vitamin A: Sweet potatoes, carrots, dark leafy greens squash, apricots, cantaloupe, bell peppers, fish liver (cod liver oil).

Lutein and Zeaxanthin are found together in many food sources.

- Dark green leafy vegetables (kale, spinach, turnip & collard greens)
- In lesser amounts in colorful fruits and vegetables, corn, peas, orange & green pepper, persimmons, tangerines, oranges & orange juice, green beans, broccoli, brussels sprouts, zucchini squash, pumpkin, cucumber, red and green grapes, apples, mangos, kiwis, honeydew melons, peaches, nectarine.
- Egg Yolk…a very high non-fruit/vegetable source.

Omega-3 Fatty Acids:

- Alpha-Linolenic acid (ALA) is an ESSENTIAL FATTY ACID as the body cannot make the omega-3 bond. Only about 1% of ALA is converted to long-chain omega-3 fatty acids eicosapentaenoic (EPA) and docosahexaenoic (DHA).
- ALA is commonly found in soybean oil, canola oil, walnuts, flaxseeds, and flaxseed oil.
- EPA and DHA are enriched in fatty fish such as salmon, white tuna, mackerel, rainbow trout, herring, halibut, and sardines.
- Fish consume algae that make omega-3 fatty acids.
- DHA is highly enriched our brain and retina and thus the impetus to consider its importance in visual function.
- DHA in Foods (see attached PDF)

Should I take DHA supplements?

The average dietary intake of DHA in U.S. is 70 mg per day

DHA Recommendations of Expert Panels

For healthy adults:

- 250 mg DHA/day WHO & EFSA (Deckelbaum Am J Clin Nutr 2008)
- 500 mg DHA/day Academy of Nutrition & Dietetics & ISSFAL
    - Also see attached PDF “Dietary Fatty Acid Recommendations- Academy of Nutrition & Dietetics - 2014”

Recommendations for Fish Consumption

- 2 fish meals per week (preferably fatty fish) to potentially achieve an intake of 500 mg DHA+EPA per day
  - (http://www.ajcn.org/cgi/reprint/83/6/S1526.pdf)
- Mercury in Fish (see attached PDF)
- Microwave heating hardly modified the fatty acid profiles of both chicken and beef patties, whereas frying decreased linoleic acid (omega-6) and DHA (omega-3). Cooked meat (grilled, roasted) also reduces content of these fatty acids.

- **Farmed vs Wild Salmon: Nutritional Value**
  - Farmed salmon has more omega-3 but also more fat including saturated fat. Wild salmon has fewer calories. Toss up.
  - Farmed salmon more organic pollutants such as polychlorinated biphenyls (PCBs) although wild may have more mercury. Chose wild.
  - Farmed salmon comes with uncertainty about antibiotic use. Wild salmon does not. Chose wild.
  - Best bet to get the many health benefits of fish, chose wild.

Recommendations for ALA intake

1.1 g ALA/day for women and 1.6 g ALA/day for men (US Dietary Reference Intake)

- (for example: English walnuts, ~½ oz/d; Black walnuts, ~8 oz/d; flaxseed oil, ~¼ tablespoon/d; olive oil, ~6 oz/day)

Results of DHA supplementation trial in X-linked RP

Other Potential Neuroprotective Candidates

N-Acetyl Cysteine Amide (NACA)

- potent antioxidant, anti-inflammatory, anti-apoptosis (cell death)

Bilberry
Curcumin (turmeric; spice of the ginger family)
Saffron (2105 ARVO presentation)
Grape extract (2105 ARVO presentation)

For further, detailed/scientific reading, visit these websites:

USDA Reference Dietary Intakes (RDI):
http://fnic.nal.usda.gov/dietary-guidance/dietary-reference-intakes
http://www.health.gov/dietaryguidelines/2015-scientific-report/06-chapter-1/d1-2.asp

Vitamin A, Foundation Fighting Blindness Packet:
http://www.blindness.org/blog/index.php/what-everyone-with-a-retinal-disease-should-know-about-vitamin-a/

Lutein and Zeaxanthin – American Optometric Association:
http://www.aoa.org/patients-and-public/caring-for-your-vision/diet-and-nutrition/lutein?sso=y

Omega-3 Fatty Acids:
http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=308
http://arthritis-research.com/content/8/1/202

- Omega-3 & Prostate cancer:
  https://www.drfuhrman.com/library/omega-3-fatty-acids-prostate-cancer.aspx

Antioxidants in 3100 Foods (M Carlsen et al 2010)

- ARTICLE:
  http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2841576/
- TABLE: http://www.nutritionj.com/content/supplementary/1475-2891-9-3-s1.pdf

AREDS II: http://www.amd.org/areds-2-results/

Macular Disease: https://www.macular.org/good-habits