Food, Supplements and Healthy Lifestyles in Slowing and Preventing Macular Degeneration

Julie Mares, Professor
For the Nutrition and Eye Health Research Team

http://nutritionforeyes.ophth.wisc.edu
Preserving Vision

• **Things We Cannot Control:**
  – Our genes

• **Things We Can Do For Ourselves:**
  – Get medical treatment
  – Avoid excessive sunlight
  – Don’t smoke
  – Eat well
  – Be active
  – Consider supplements
Based on research conducted by many and supported by taxpayers and participants

...and Collaborators at 8 Universities
The Evidence: Nutrition Matters

- Clinical trials prove nutritional interventions:
  - Slow the progression of age-related macular degeneration (AMD)
  - Improve vision (New, early research)

- Population studies suggest that healthy diets:
  - Lower chances of having early AMD (2 fold lowering)
  - Work synergistically with physical activity and not smoking (3 fold lowering)
What’s New

• Lutein and Zeaxanthin: More evidence about plant pigments that protect eye health
• Healthy diets and lifestyles, and adequate vitamin D status, appear to lower the risk for having AMD that is associated with high risk genes
• Breast feeding might influence eye health in middle and older age
Lutein and Zeaxanthin
Comprise “Macular Pigment”

Viewed in white and blue light:

- Absorb 40 to 90% of visible light
- Quench reactive chemicals (free radicals)
- Lower inflammation

© Max Snodderly, 2002
Lutein/zeaxanthin enhance vision --in people with and without AMD--

- **Strongest evidence:**
  - Visual acuity
  - Ability to see contrasts
  - Vision with distraction of bright lights
- **Caveats:** trials are small and short-term and the effect size is modest, to date

- **Under investigation:**
  - Adapting to seeing under dim lighting
  - Speed of sending information to brain (and processing within brain?)
Newly ‘National Eye Institute’ Recommended AREDS 2 Supplement Contains:

- **Lutein (10 mg) and Zeaxanthin (2 mg)** (replaces beta-carotene)
- Vitamin C: 500 mg
- Vitamin E: 400 IU
- Zinc: 80 mg (with 2 mg copper)

• Talk with your doctor about whether this supplement or alternatives might be best for you.
  - **Omega-3** did not slow progression
Macular Pigment (Lutein/Zeaxanthin Density in the Macula) Can Be Estimated Simply and Non-Invasively
The density of lutein pigments in the macula varies 10-fold!

Mares JA et al. *Am J Clin Nutr.* 2006;84:1107
Clues: About Enhancing Macular Lutein Pigment Levels

**Genes:**
Encoding proteins which help absorb, carry and stabilize lutein in the eye

**Foods or Supplements:**
- Dark leafy greens, fruits, vegetables
  » For lutein, zeaxanthin and fiber
- Some fat: oils, nuts, avocados, eggs, fish or fish oil

**Lifestyles** that control blood sugar, lipids and abdominal fat and might set the conditions for maximal uptake: Physical activity

Mares JA et al. *Am J Clin Nutr.* 2006;84:1
Fish and Seafood

- May enhance uptake of lutein
- May prevent or slow AMD
- Provide more than long chain omega-3 fatty acids
  - Vitamin D
  - Vitamin B₁₂
  - Selenium
  - Zinc (shellfish)
Physical Activity

– Several studies suggest benefit
– Activity outside, also provides:
  • The sunshine vitamin (vitamin D)
  • A trigger to retinal cells, important for a good nights sleep

“A Walk in Nature Never Fails to Deliver More Than I Expect”  
Aldo Leopold
There is no evidence that supplements will lower our chances of developing age-related macular degeneration.
Healthy diets and lifestyles lowered estimated risk from having high risk genes *more than two fold*

Getting antioxidants from fruits and vegetables appear to also feed the healthy bacteria that live in our gut

https://hemtecks.wordpress.com/2016/01/17/gut-microbiota/
Supplements Which *Might* Help
-Whether you have AMD or a Family History-

• **Vitamin D**
  - Adequate vitamin D could lower odds of having AMD, *especially if you have certain high risk genes* *

• **Vitamin B$_{12}$**
  - Part of a supplement which lowered risk for macular degeneration
  - Getting the daily requirement is especially important:
    - If eating a vegan diet (no milk, eggs, fish, poultry or dairy)
    - In people who have low absorption from foods (10-30% of people over 50 years)

Avoid Excess

• High dose supplements
  – Are medicines, not foods
  – May benefit or pose risks to some people more than others

• Some evidence of potential harm exists:
  Vitamin E, zinc, beta-carotene, vitamin A, selenium, vitamin C, folate, iron, calcium

• Discuss your decision about whether to supplement with your doctor
Healthy Diets: Plant Food-Rich, Balanced and Varied

US Dietary Guidelines

https://www.choosemyplate.gov/MyPlate

Mediterranean Diet

Dietary Approach to Stopping Hypertension (DASH) Diet


https://www.nhlbi.nih.gov/health/health-topics/topics/dash/followdash

http://oldwayspt.org/traditional-diets/mediterranean-diet
A Day That Fosters Eye Health
How Early Does Nutrition Influence Eye Health in Middle and Old Age?

Preliminary Data:
…Possibly In First Year of Life:

- **Breast milk:**
  - Enriched with lutein/zeaxanthin

- **Infant Formula:**
  - Lutein not routinely added
  - Is less bioavailable

![Density of Lutein Pigment in the Macula](image)
Bottom Line
Preserving Eye Health

– **Enjoy** real food (All types; mostly plants)
– Move and enjoy the outdoors
– Start with simple changes
– Supplements might help
– Pass it on