



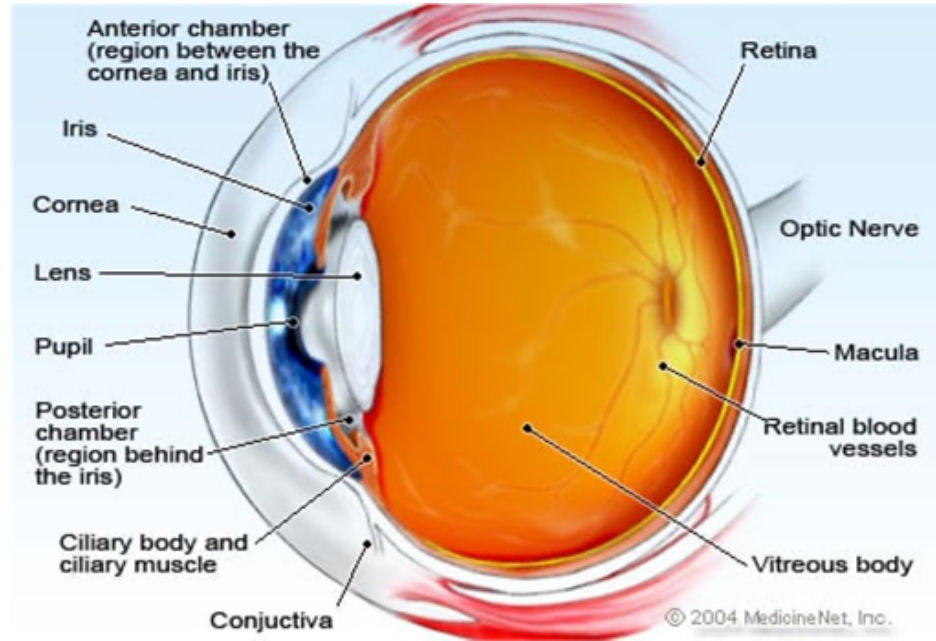


Age?-Related Macular Degeneration:

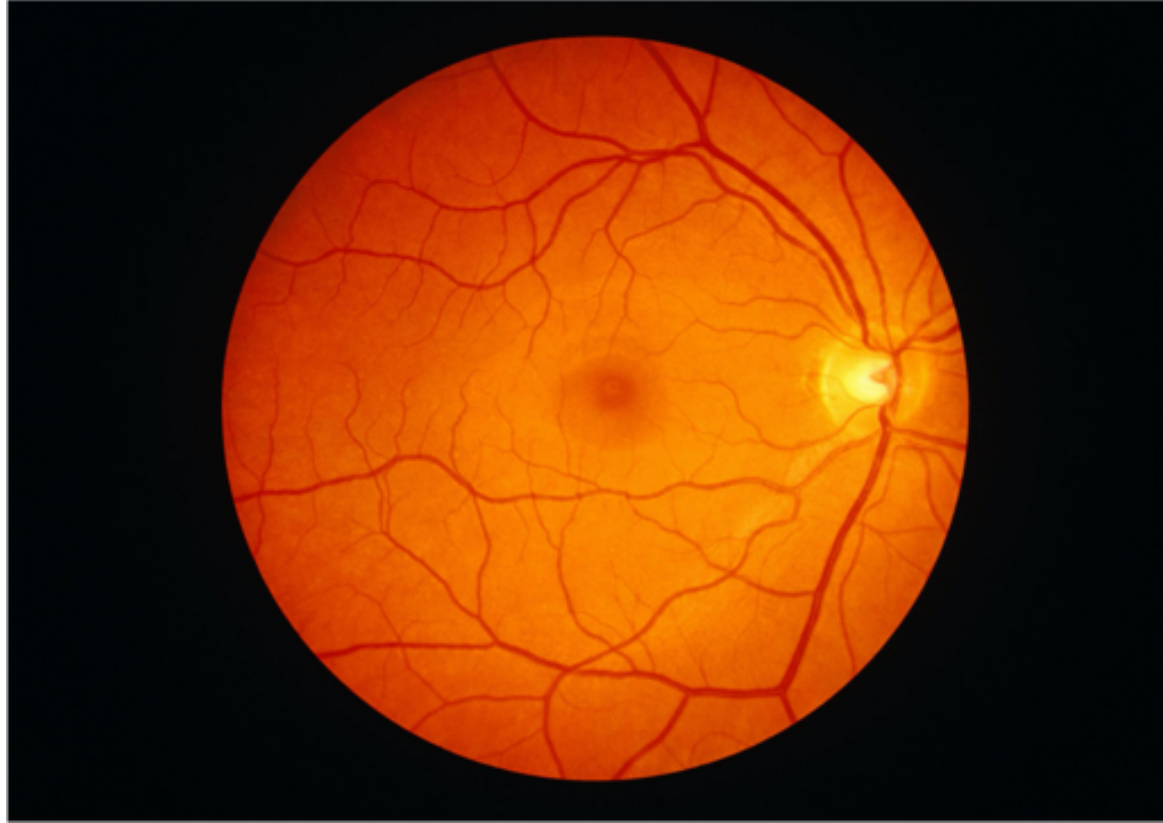
Part 1 - A Primer
Julian J. Nussbaum, M.D.
September 19, 2021



But First A Little Anatomy Lesson



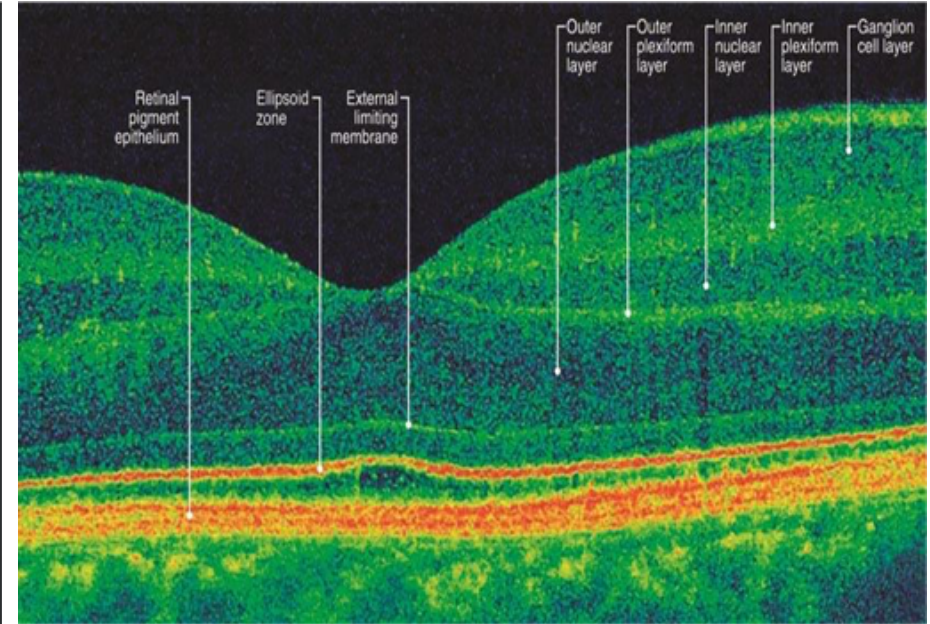
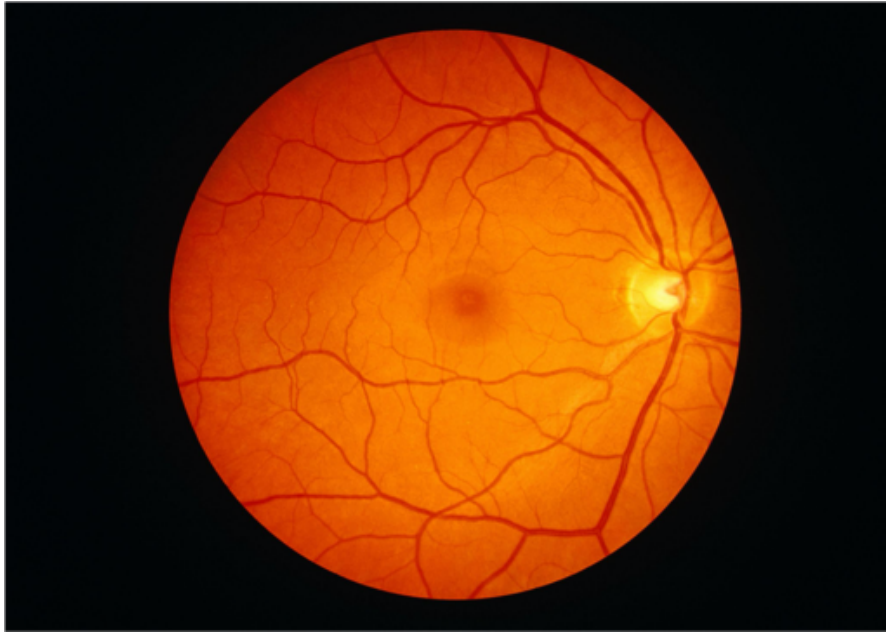
The Macula



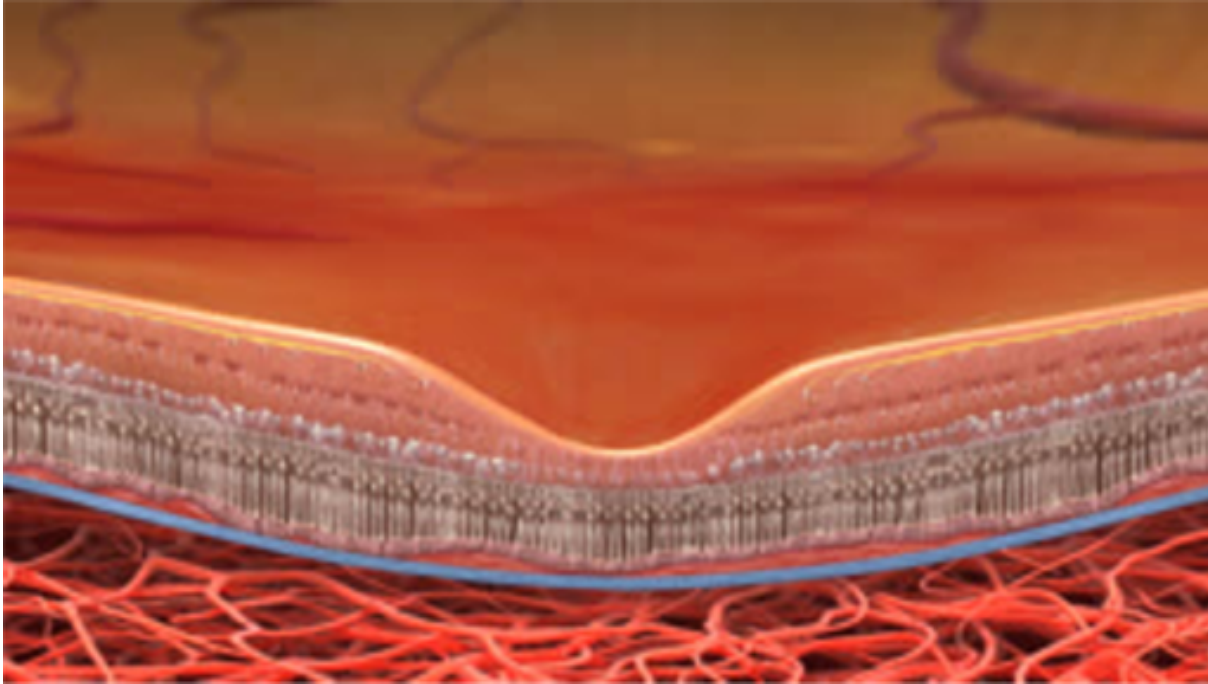
Focused Light



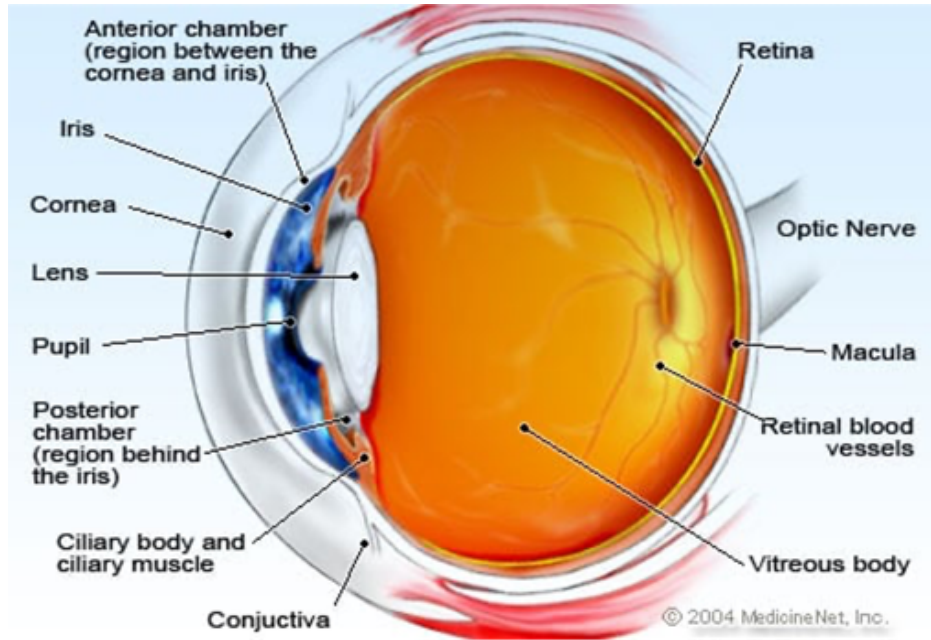
The Macula.....Again



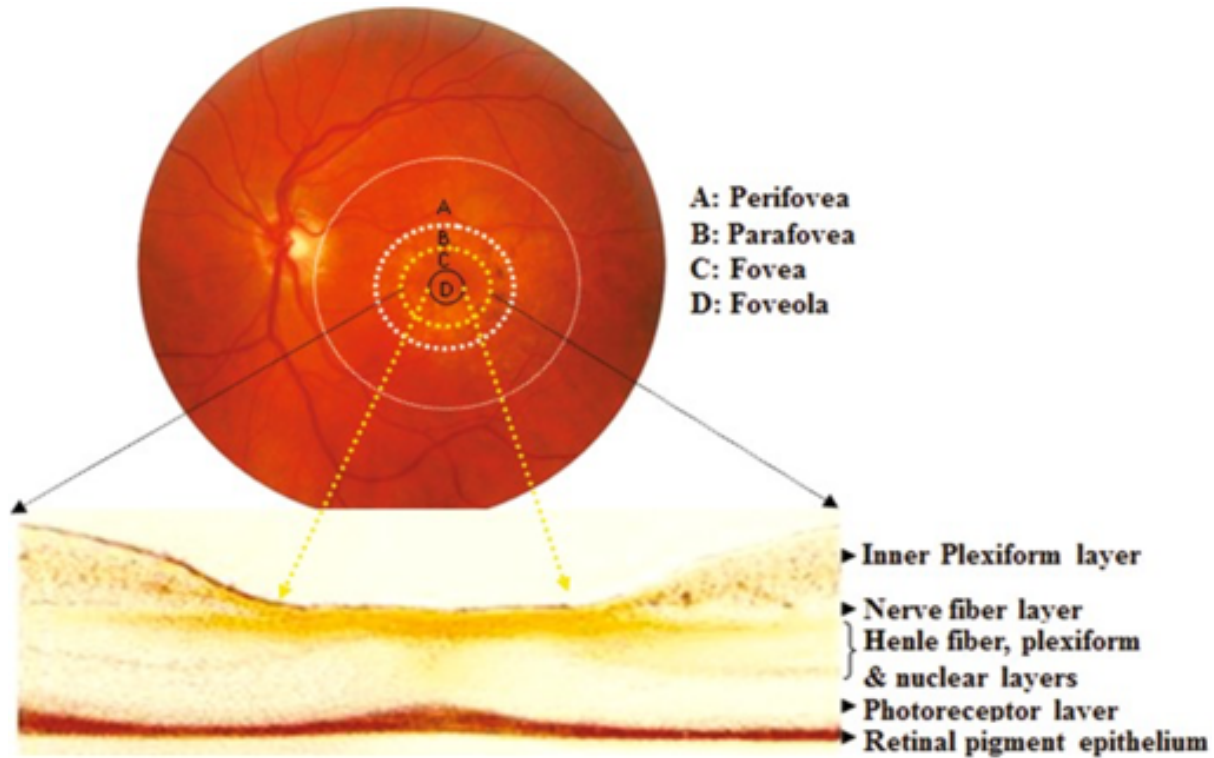
Temperature Regulation



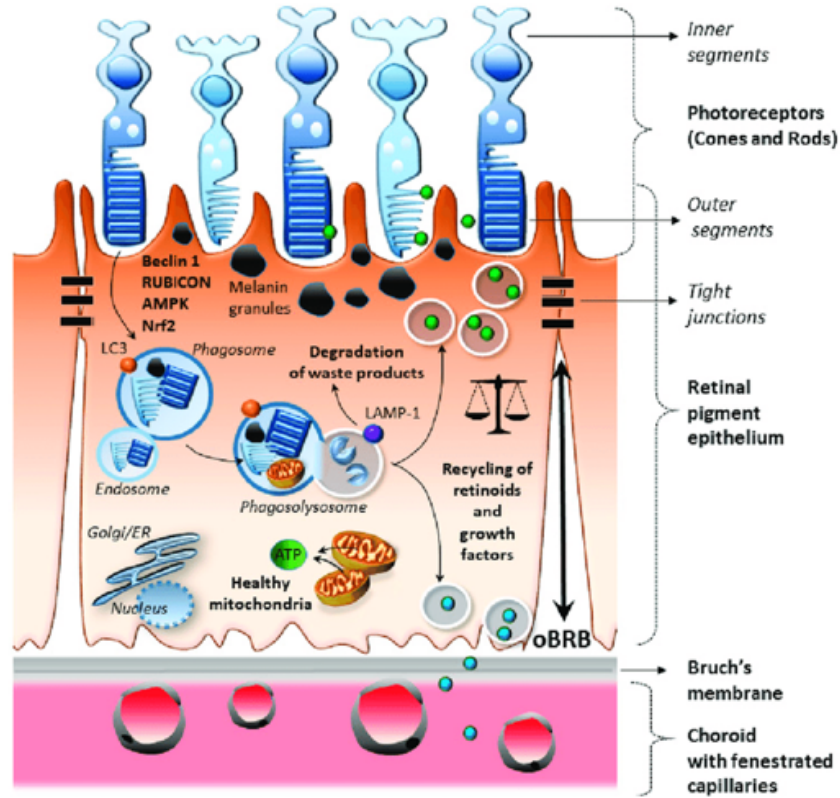
Our Natural Filters - 1



Our Natural Filters - 2



The Waste Disposal System



What Goes Wrong?



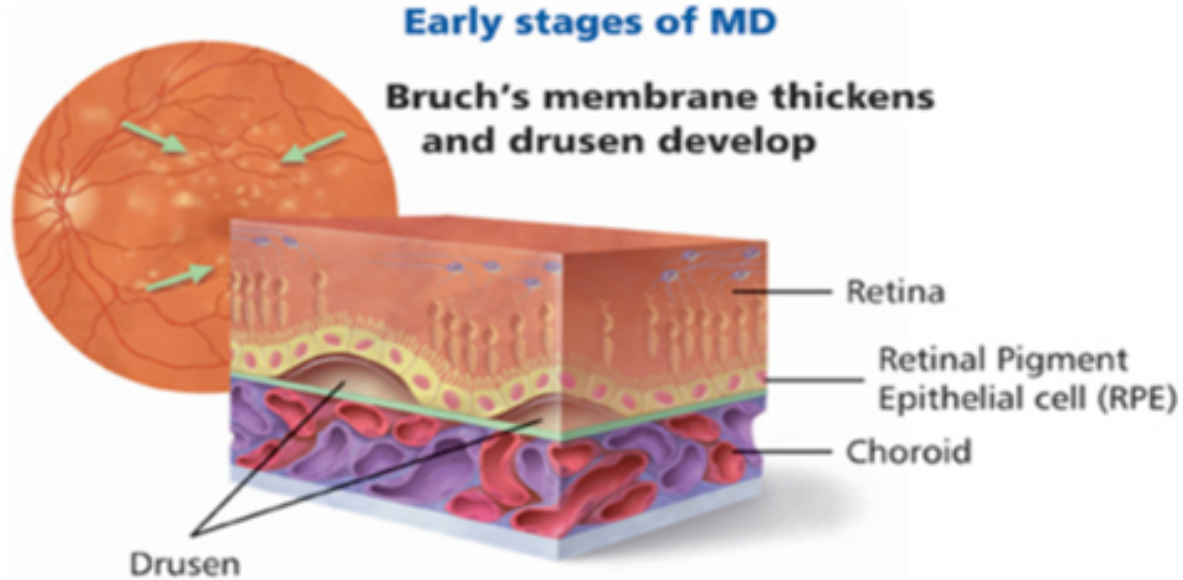
[dreamstime.com](https://www.dreamstime.com)



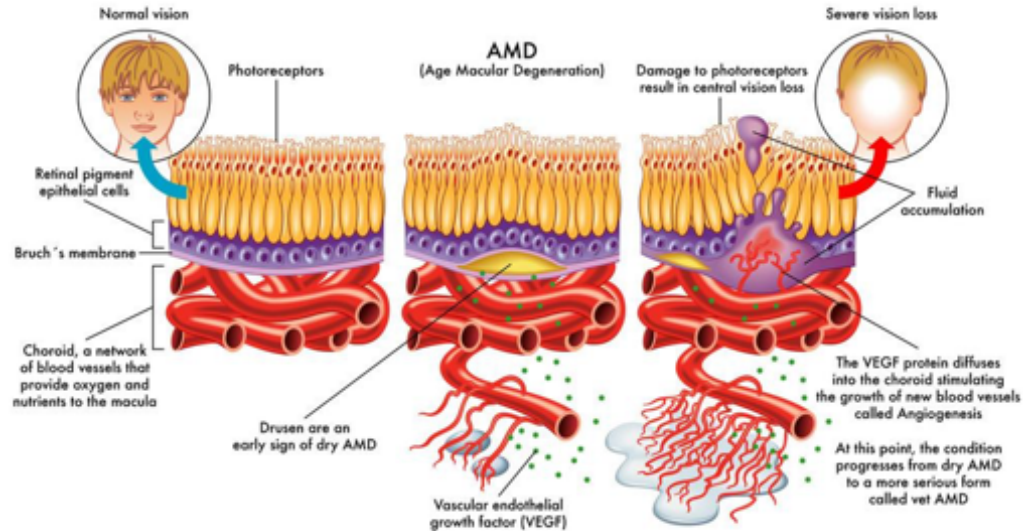
[dreamstime.com](https://www.dreamstime.com)

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Dry (Atrophic Macular Degeneration)



Wet (Exudative Macular Degeneration)



Wet (Exudative Macular Degeneration)



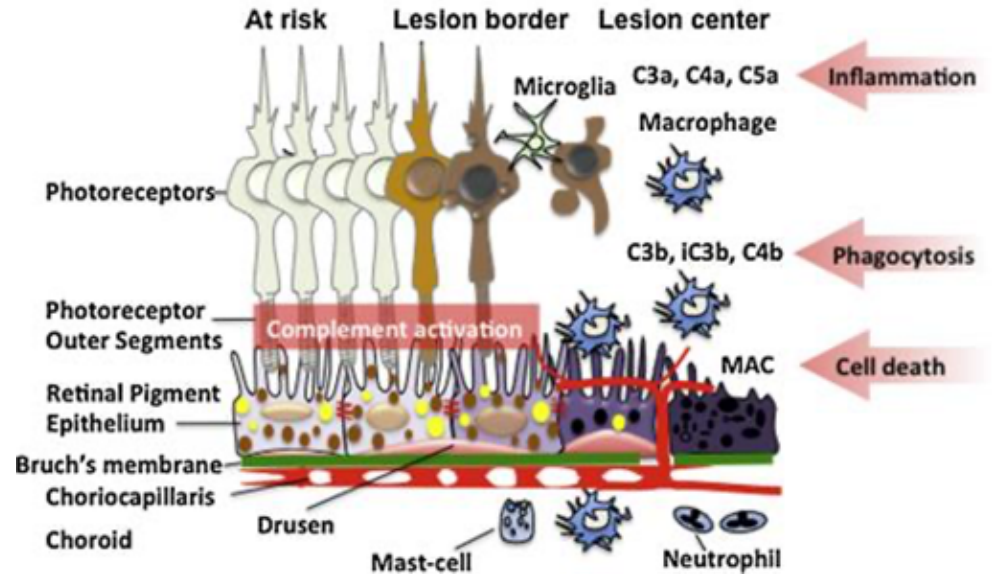
Is It Really AGE - Related Degeneration?

- 4 Key Concepts
 - Filters
 - Circulation
 - Inflammation
 - Genetics

Genetics



Complement activation in Geographic Atrophy



Some Known Associations

- 1) Diet
- 2) Exercise
- 3) Smoking
- 4) Alcohol Consumption
- 5) Hypertension
- 6) Serum Lipids
- 7) The Gut Microbiome*

AREDS 1

In 2001, the landmark Age-Related Eye Disease Study (AREDS), conducted by the National Eye Institute, provided evidence that supplementation with a formulation of dietary antioxidants and zinc, which included vitamin C 500mg, vitamin E 400 IU, β -carotene 15mg, zinc 80mg and copper 2mg, but which was devoid of the macular carotenoids, was associated with a 27% risk reduction for visual loss and a 25% risk reduction for disease progression in patients with at least intermediate AMD.

AREDS 2

Age-Related Eye Disease Study 2 (AREDS2) assessed the value of substituting lutein/zeaxanthin in the AREDS formulation because of the demonstrated risk of lung cancer from beta-carotene in smokers and former smokers.

AREDS2 participants taking lutein/zeaxanthin with or without omega-3 long-chain polyunsaturated fatty 3 acids had a lower progression rate to late AMD than participants not taking lutein/zeaxanthin.

Supplement Facts

Serving Size: 1 Soft Gel

	Per Serving		Per Day	
	Amount	%DV [†]	Amount	%DV [†]
Calories	< 5		10	
Calories from Fat	< 5		5	
Total Fat	< 0.5 g	0%	0.5 g	1%
Vitamin C	250 mg	420%	500 mg	840%
Vitamin E	200 IU	670%	400 IU	1340%
Zinc	40 mg	270%	80 mg	540%
Copper	1 mg	50%	2 mg	100%
Lutein	5 mg	**	10 mg	**
Zeaxanthin [§]	1 mg	**	2 mg	**

[†]Percent Daily Values (DV) are based on a 2,000 calorie diet. ^{**}Daily Value (DV) not established

Thank you!