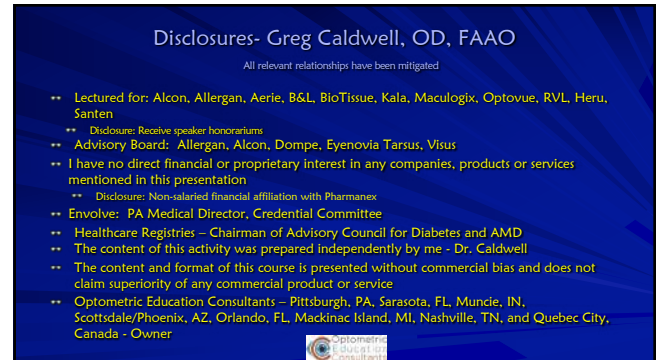
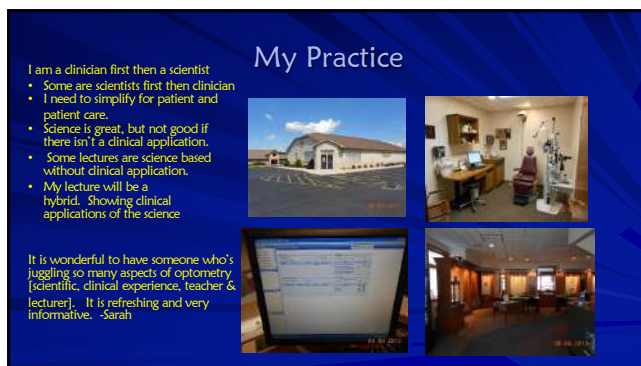


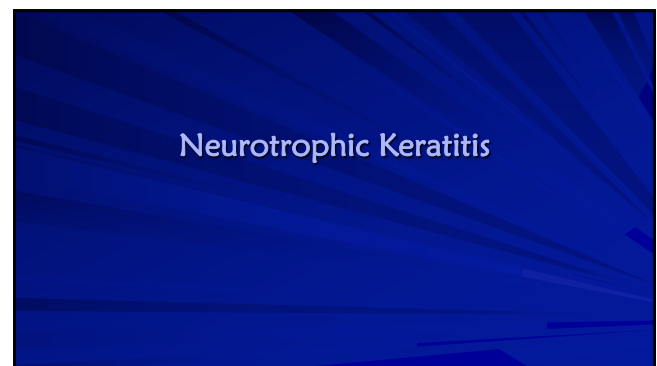
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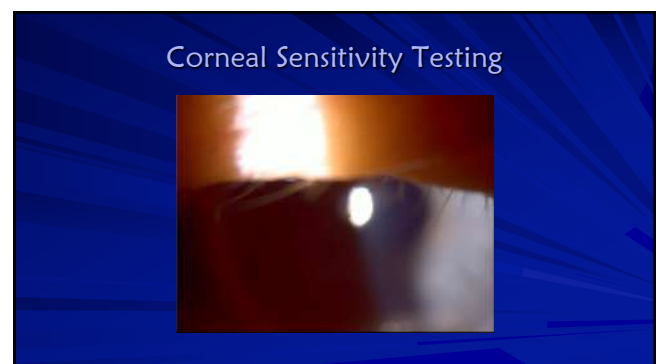
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### Cornea Sensitive Testing – Another Patient



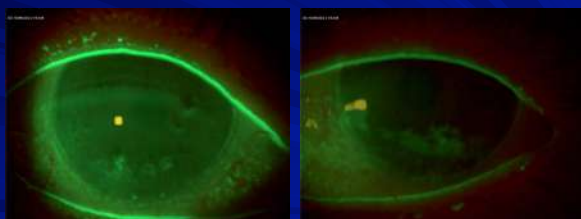
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### Cornea Sensitive Testing – Yet Another Patient



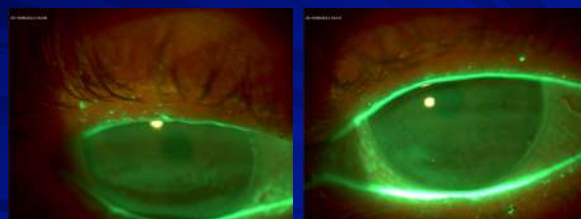
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### Before Oxervate™ (cenegermin-bkbj) Treatment



10

### After Oxervate™ (cenegermin-bkbj) Treatment



11

### Oxervate™ (cenegermin-bkbj)

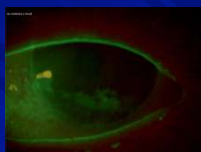
#### Grading corneal sensitivity: (Cotton Tip)

- ★ Normal
- ★ Reduced
- ★ Absent

- ★ Reduced in all quadrants and centrally
- ★ Absent inferior quadrant, reduced everywhere else

#### Neurotrophic Keratitis: (Staining)

- ★ Mild – Stage 1
- ★ Moderate – Stage 2
- ★ Severe – Stage 3



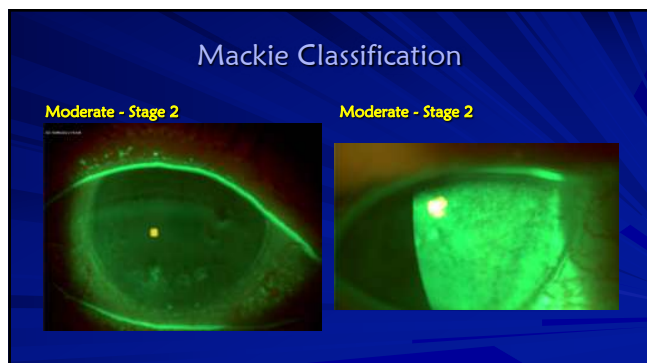
12

### Neurotrophic Keratitis is a Degenerative Disease

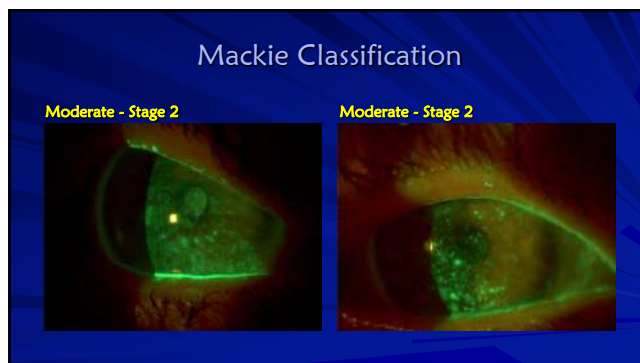
The Mackie classification represents one way to assess or grade NK – stage or progression



13



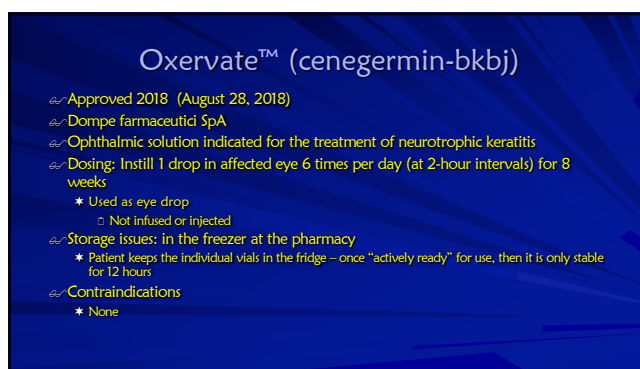
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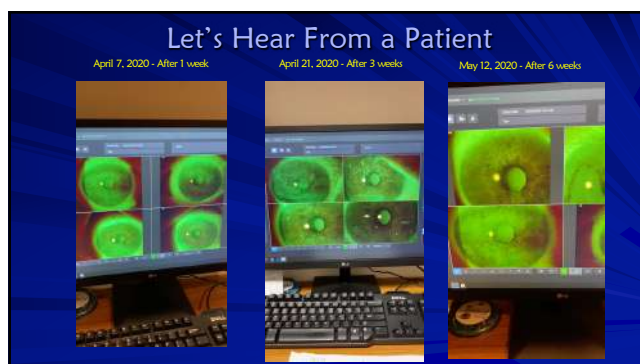
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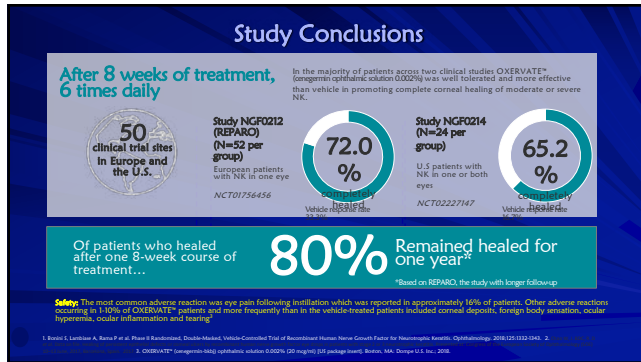
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20

### OXERVATE™ (cenegermin-bkbj)

- Adverse reactions: very well tolerated
- The most common adverse reaction in clinical trials
  - eye pain, corneal deposits, foreign body sensation in the eye, ocular hyperemia, swelling of the eye, and increase in tears
- Contact lenses (therapeutic or corrective) should be removed before applying cenegermin
  - presence of a contact lens may limit the distribution of cenegermin-bkbj onto the corneal lesion
  - Lenses may be reinserted 15 minutes after administration.

21

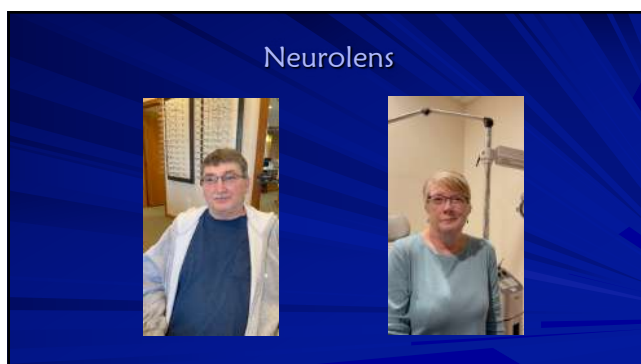
### Misalignment

- Many people experience the symptoms of eye misalignment
  - Headaches, eyestrain, dry eye sensation, neck pain, eye fatigue, motion sickness
- That number grows as we shift to remote working and learning
- Small misalignments can cause painful symptoms
- Small prism corrections can provide dramatic relief

22



23



24



25





26

### A Wearable Technology

- Born out of the University of Miami's Bascom Palmer Eye Institute
- Their goal is to provide physicians and patients access to state-of-the-art, accurate, portable technology through real-time wearable diagnostics
- re:Vive™ by Heru™** is the modern, gamified diagnostic solution using a **lightweight, wearable headset** to aid doctors in diagnosis
- Future developments include vision augmentation applications utilizing AI algorithms to personalize vision enhancement.

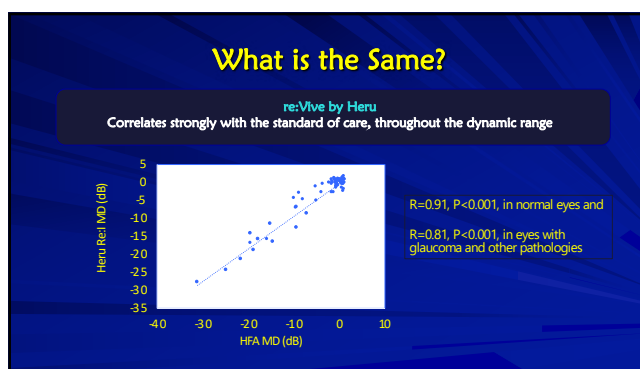
27

### A Decade of Research, Innovation and Clinical Validation

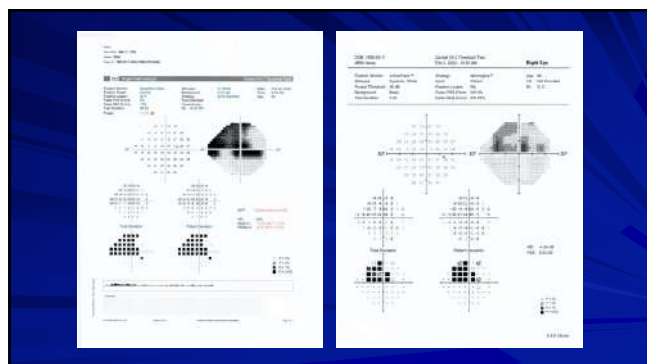
Artificial Intelligence (AI) driven diagnostics and vision augmentation platform is backed by ten years of research and clinical validation at the University of Miami's Bascom Palmer Eye Institute where it is continuously developed.

- 10** Years of Clinical and Scientific Research
- 40** U.S. and International Patents to Date
- 1,000+** Patients in Clinical Trials
- 450** Million Patients with Visual Field Defects

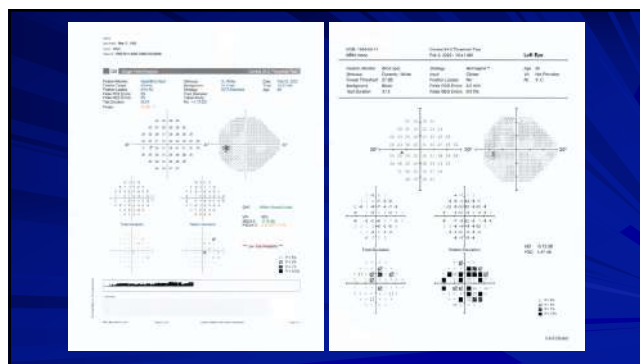
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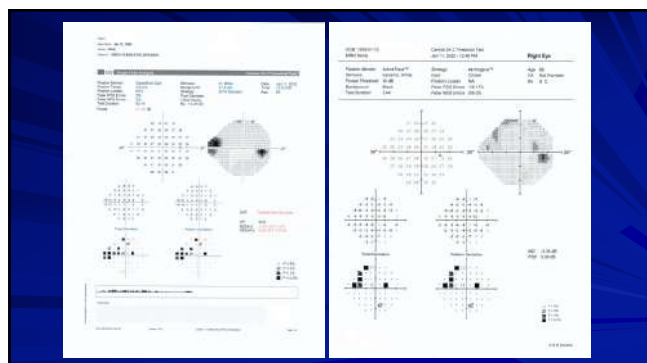
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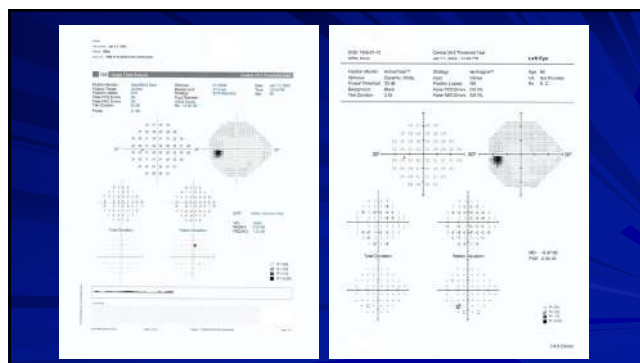
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34



35

### re:Vive 2.0 – Color Vision

- **Ishihara Color Vision Screening**
  - Ishihara color vision testing is a commonly used rapid, color vision screening modality.
  - This test can be completed in under 2 minutes.
  - 3 or more Ishihara plates incorrect will trigger the D-15 extended vision test using AutoWorkflow.
- **Farnsworth D-15 Extended Color Vision Test**
  - D-15 color vision testing is a commonly used color vision diagnostic modality
  - D-15 test is a **reimbursable** service. **CPT Code 92283**
  - **Average national reimbursement is \$56.16**.
  - This is more advanced than any color vision testing currently being offered by competitor goggle companies.

**Technician and/or clinician not required to administer exam.**

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### re:Vive 2.0 - Contrast Sensitivity

- Embracing the science connecting contrast sensitivity with detecting early AMD, re:Vive provides the most efficient way to document and monitor the functional macular health in conjunction with supplementation.
- We are reporting the change over time from the last visit. The doctor can use this change to communicate the benefits of lifestyle modifications, smoking cessation.
- Moves test out of the exam lane with the screening being performed in full room lighting.
- Contrast Sensitivity (and Dark Adaptation) are part of a broader AMD screening and diagnostic portfolio.

TEST RESULTS			
Right Eye	Left Eye	Right Eye	Left Eye
1.85	1.85	0.60	0.60
10°	10°	85%	85%
4/100	4/100	4/100	4/100

**Technician and/or clinician not required to administer exam.**

37

## Corneal Hysteresis Ocular Response Analyzer G3

~ Evidence - Key findings from over 800 peer-reviewed publications  
~ Impact of corneal biomechanics on IOP



38

## Hysteresis

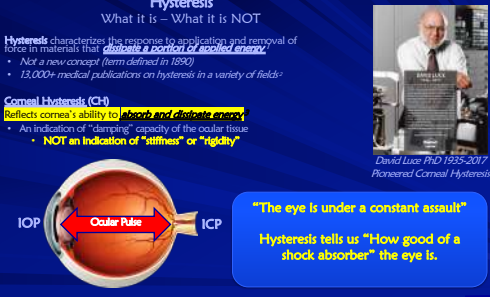
What it is - What it is NOT

**Hysteresis** characterizes the response to application and removal of force in materials that dissipate a portion of applied energy.

- Not a new concept (term defined in 1890)
- 13,000+ medical publications on hysteresis in a variety of fields

**Corneal Hysteresis (CH)**  
Reflects cornea's ability to absorb and dissipate energy


- An indication of "damping" capacity of the ocular tissue
- NOT** an indication of "stiffness" or "rigidity"



**"The eye is under a constant assault"**  
Hysteresis tells us "How good of a shock absorber" the eye is.

39

## Ocular Response Analyzer G3 Measurement Values, Range, and Interpretation

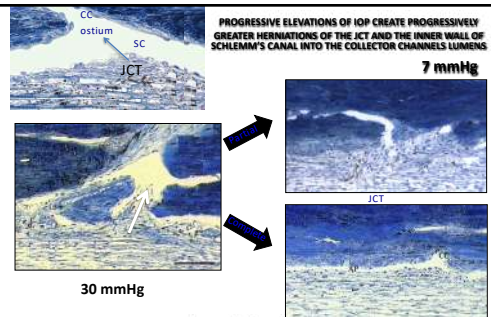


40

## Inflow versus Outflow

What is glaucoma?

41



**PROGRESSIVE ELEVATIONS OF IOP CREATE PROGRESSIVELY GREATER HERNIATIONS OF THE JCT AND THE INNER WALLS OF SCHLEMM'S CANAL INTO THE COLLECTOR CHANNELS LUMENS**

7 mmHg

30 mmHg

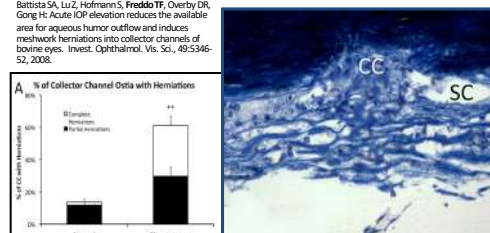
The pressure-induced herniations observed at 30 mmHg were either partially or completely reversible after the IOP was decreased to 7 mmHg in enucleated bovine eyes. So, in normal eyes, these herniations slide in and out with regular rise and fall of IOP.

42

Human eyes with POAG even at 0mmHg, exhibit herniations and many more than in age-matched normal eyes

A: Significantly more herniations of the TM into CC ostia were found in POAG eyes (33 of 54), than in normal eyes (7 of 51) (61% vs. 14%, p<0.0001). In normal eyes, herniations that were present were predominantly partial (86%) rather than complete (14%). In POAG eyes, over half of the larger total number of herniations were complete (52%).

Battista SA, Luz J, Hofmann S, Freddo TF, Overby DR, Gong H: Acute IOP elevation reduces the available area for aqueous humor outflow and induces meshwork herniations into collector channels of bovine eyes. Invest. Ophthalmol. Vis. Sci., 49:5346-52, 2008.




43

**PRINCIPAL NEW FINDING**

The presence of herniations, at 0 mm Hg, suggests they were permanent *in-vivo* obstructions in the ostia of CC, whether partial or complete. These are the only exits from Schlemm's canal. If enough of these 30 channels are fully or even partially blocked, IOP MUST go up.

This study is the first to document the existence of permanent herniations into CC ostia in POAG. Since resistances in series are additive, it could be that these previously unreported permanent herniations, which obstruct CC ostia, represent an additional source of resistance, distal to the trabecular meshwork, in POAG.




44

**Disease at the TM is responsible for elevated IOP in glaucoma<sup>1,2</sup>**

**Healthy TM Normal IOP** → **POAG TM Stiffness Elevated IOP**

Cellular Damage (eg. Oxidative Stress)



Scanning electron microscopy (SEM) was used to examine human TM under physiological conditions and in patients with POAG.  
POAG, primary open-angle glaucoma; TM, trabecular meshwork.  
1. Shih et al. Invest Ophthalmol Vis Sci. 2011;52(10):6147.  
2. Shih et al. Invest Ophthalmol Vis Sci. 2011;52(10):6147.

45

**Falck Medical Multi-Function Device™**

~ The First and Only Device Approved by the FDA for the Measurement of:

- ★ Aqueous Outflow
- ★ Ocular Perfusion Pressure
- ★ IOP Variation



46

**Tonometry**



~ Optical Applanation IOP Measurement

~ Compensates for Corneal Biomechanics

~ Serial Systolic and Diastolic IOP

~ Ocular Pulse Amplitude

~ Disposable Prism Blocks Infection

47

**Ophthalmodynamometry**



~ Central Retinal Artery Pressure

~ Intraocular Pressure

~ Ocular Perfusion Pressure

~ Vascular Disease Risk Assessment

~ Screen for Carotid Vascular Disease

48

**Tonography**



~ Optical Aqueous Outflow Measurement

~ Intraocular Pressure

~ Verify Outflow Therapy Interventions

~ Glaucoma Risk Determination

~ Glaucoma Management Tool

49



## Aqueous Humor Outflow, Tonography

- ~ IOP spikes are higher in an eye with impaired aqueous humor outflow
- ~ When aqueous humor production increases
  - ★ The impaired outflow system cannot accommodate the increased aqueous volume
- ~ Impaired aqueous humor outflow is the primary cause of glaucoma
- ~ Eyes with untreated glaucoma have abnormal aqueous humor outflow
- ~ Therapy should be directed at improving the rate of aqueous humor outflow



50

## Early Detection and Allopathic Treatments

Rabin Cone Contrast Test



ERG and VEP



51

## Early Detection

- ~ Patients are expecting it
- ~ Diagnostic equipment keeps evolving

- ~ Rabin Cone Contrast Test
- ~ Genetic Testing
- ~ Dark Adaptation
- ~ Preferential Hyperacuity Perimetry (PHP)
- ~ ERG/VEP testing

Greg's Something to Think About or Advise:

One better understand lifestyle changes, the immune system, and nutrition.

As we are now in areas where "there isn't a pill for that ill"

"Doctors better become more like a nutritionist, or the nutritionist will become more like doctors."

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## Key Tenants of Aging, Performance and Vitality

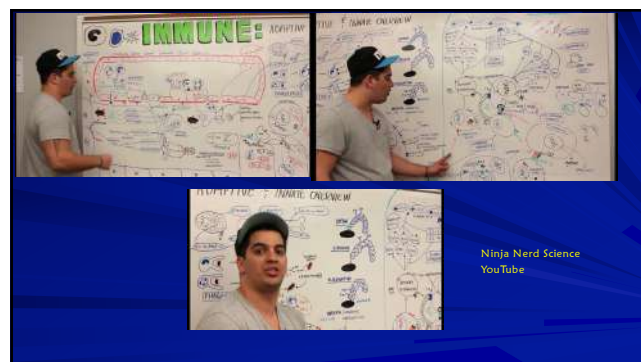
- Oxidative Stress / Inflammation
- Hormonal Balance
- Stress Hormones
- Glucose / Insulin Regulation
- GUT integrity and microbiome diversity
- Immune Balance
- Environmental Exposure/Burden
- Individuality

Credit to: James LaValle, RPh, CCN

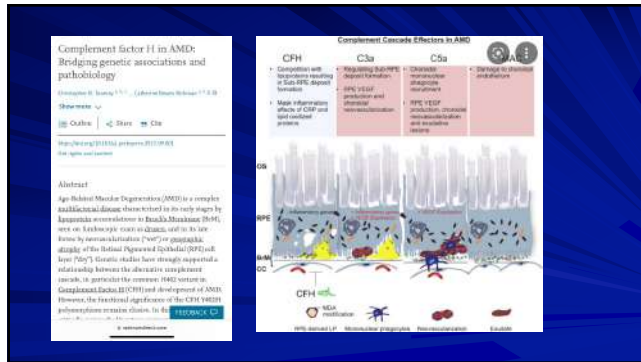
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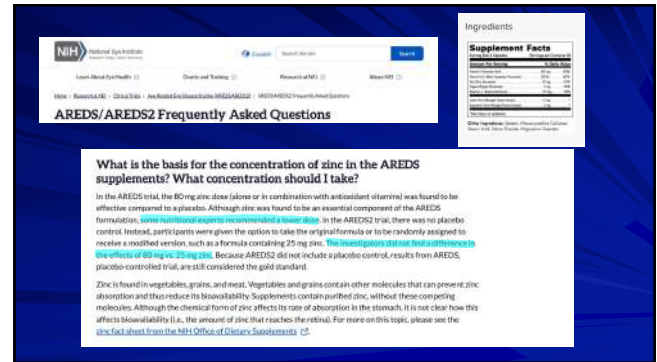
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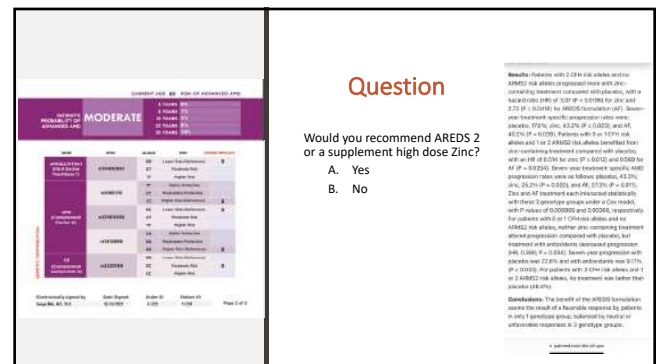
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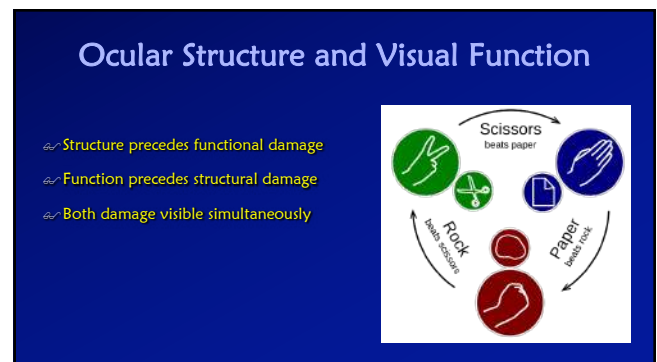
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### Value of Function *plus* Structure

- **Early Detection:** Function precedes structure in many conditions, highlighting problems before structural damage occurs
- **Progression:** Functional tests plays a critical role in detecting sub-clinical progression
- **Improvement:** Structural tests demonstrate stability; only functional tests can demonstrate improvement

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### Color vision

**Kollners rule:**  
Congenital is Red Green defects  
Acquired is Blue Yellow Defects

**WRONG!**

63

### Color Vision as a Biomarker of Disease

Loss of color vision is a major complaint in rapidly changing disorders

Color vision is also a biomarker of slow progressing diseases even though patients are unaware of color vision change

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### Rabin Cone Contrast Test

- Sensitive color contrasts testing
  - ★ There is difference between traditional color vision tests
- Rabin Cone Contrast Test can be used for early detection:
  - ★ Age related macular degeneration
  - ★ Diabetic retinopathy
  - ★ Glaucoma
  - ★ Retinal disease

65

### Rabin Cone Contrast Test

- Based in science
  - ★ Co-developed between Innova Systems and US Air Force
- Combines Cone Isolation technology and Contrast Sensitivity
- Color vision technology sensitive enough to detect subtle changes from disease
- Threshold test, similar to visual field
  - ★ But just faster...
  - ★ CPT 92283-\$57 national average

66

### Cone Contrast Test Results

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### Early Onset Pathogenesis

- ~ Drusen small or large are not makers for early stage AMD
  - \* Visible structural evidence of a pathological process
    - Underway for quite some time
- ~ Cholesterol deposits exist beneath the surface long before drusen form
  - \* Cannot be seen with structure-based methods
  - \* Cholesterol produced by RPE and deposits into Bruch's membrane
  - \* Continue to layer in Bruch's membrane
- ~ As this cholesterol accumulates the process unfolds with compromise to the outer retina
  - \* Inflammation
  - \* Oxidative stress
  - \* Disruption of oxygen and nutrients
  - \* Drusen formation
- ~ Impaired Vitamin A across Bruch's membrane
  - \* Functional impairment can occur to dark adaptation

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### Healthy choriocapillaris, Bruch's, RPE, and Photoreceptors



The diagram illustrates a healthy cross-section of the retina. At the top, the choriocapillaris is shown as a network of blood vessels. Below it is Bruch's membrane, followed by the retinal pigment epithelium (RPE) and the photoreceptors. The RPE is shown as a layer of cells that are actively secreting and absorbing material, maintaining the health of the photoreceptors.

75


### Cholesterol barrier deposited along Bruch's and RPE



The diagram shows the progression of AMD. Cholesterol deposits, represented as yellowish-orange granules, have begun to accumulate along Bruch's membrane and the RPE. This creates a barrier that disrupts the normal function of the RPE and the flow of nutrients and oxygen to the photoreceptors.

76

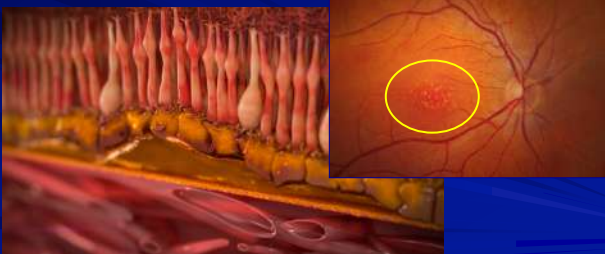
### RPE Secretes even more cholesterol and degenerates



The diagram shows a more advanced stage of AMD. The RPE is now secreting even more cholesterol, further thickening the barrier. The RPE cells themselves are beginning to degenerate, becoming more irregular and fragmented. This leads to further disruption of the outer retina.

77

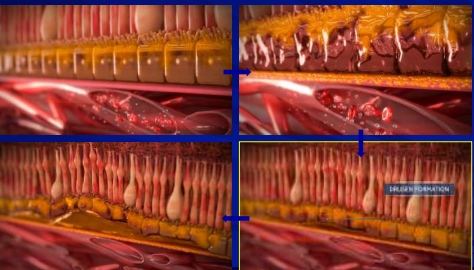
### Finally, visibly evident drusen on fundus evaluation



The diagram shows the final stage of early AMD. Drusen, which are visible as yellowish-orange deposits on the fundus, are now clearly evident. The fundus image shows a yellowish-orange spot, which is a sign of drusen. The diagram also shows the underlying structural changes in the retina, including the thickening of Bruch's membrane and the degeneration of the RPE.

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### AMD is a Disease Process that Starts Below the Surface




The diagram illustrates the progression of AMD from below the surface. It shows the choriocapillaris, Bruch's membrane, RPE, and photoreceptors. The RPE is shown secreting cholesterol, which accumulates in Bruch's membrane. This process leads to the formation of drusen, which are visible on the fundus. The diagram also shows the degeneration of the RPE and the disruption of the outer retina.

79

### Beckmann Committee Classification of AMD

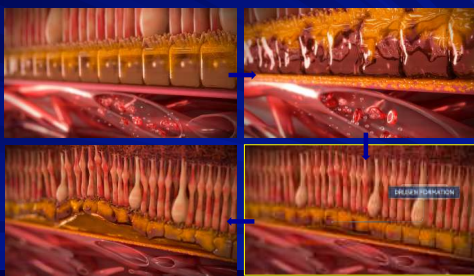
Based on presence of lesions within 2 DD of fovea in either eye

- ★ No AMD
  - None or few small drusen, < 63 microns
  - No AMD pigmentary abnormalities
- ★ Early AMD
  - Medium drusen, > 63 – <125 microns
  - No AMD pigmentary changes
- ★ Intermediate AMD
  - 1 large drusen, > 125 microns
  - Any AMD pigmentary changes
- ★ Advanced AMD
  - Any geographic atrophy
  - Choroidal neovascularization (CNV)







80

### AMD is a Disease Process that Starts Below the Surface



81


### Applying a Familiar Standard of Care: Two Multifactorial Diseases

	Glaucoma	AMD
<b>Structure</b>	 Cup-to-disc Ratio	 Drusen
<b>Function</b>	 Visual Field	 Dark Adaptation
<b>Risk</b>	Intraocular Pressure (IOP) Corneal Thickness Age/race Family history/etc. Health and Lifestyle (Diabetes)	Age Genetic Testing Health and Lifestyle (Smoking) Macular Pigment Optical Density (MPOD) Contrast Sensitivity

82


### Dark Adaptation in AMD Function Test

- Measures how long to recover from bright light to darkness
  - ★ Rod Intercept line (RI) time
- Functional test that can help overcome the challenges in diagnosing AMD
- Alabama Study on Early Age-Related Degeneration (ALSTAR)
  - ★ Able to detect subclinical 3 years before clinically visible
  - ★ 325 adults without clinically detectable AMD
- Rod deterioration happens in earliest stages of AMD
  - ★ Earlier detection before visual acuity
- Dark Adaptation 92284
  - ★ Sensitivity 90.6%
  - ★ Specificity 90.5%



83

### This Means We Now Have an *Early* Symptom We Can Use to Help Diagnose AMD



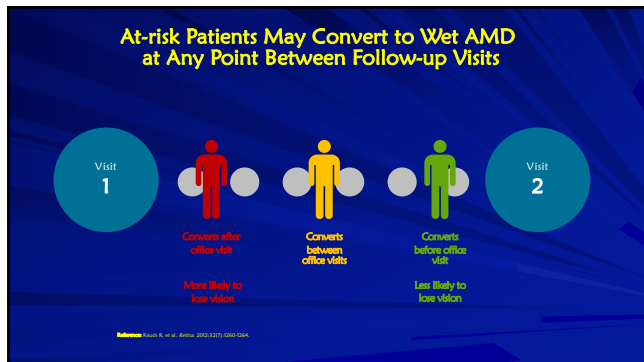
- Night vision impacted in early AMD: 30+ studies
- AMD patients often give up driving at night
- Night vision is impaired before day vision
- Typically ECP's chalk this complaint up to cataracts

**Ask Every Patient Over 50  
About Their Night Vision**

84

### Preferential Hyperacuity Perimetry (PHP)

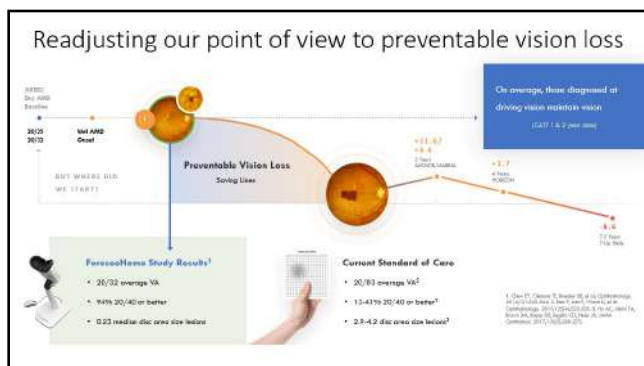
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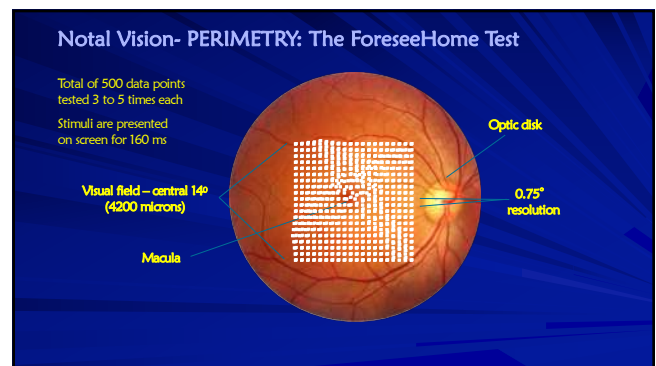
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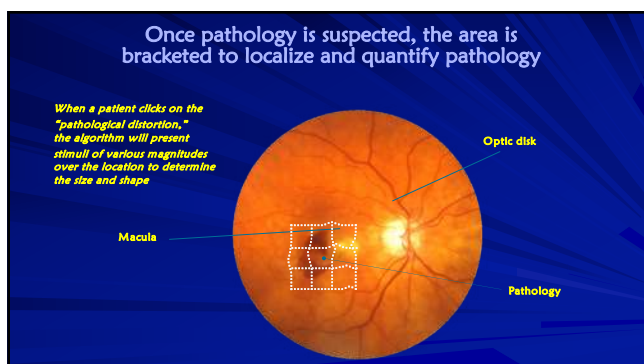
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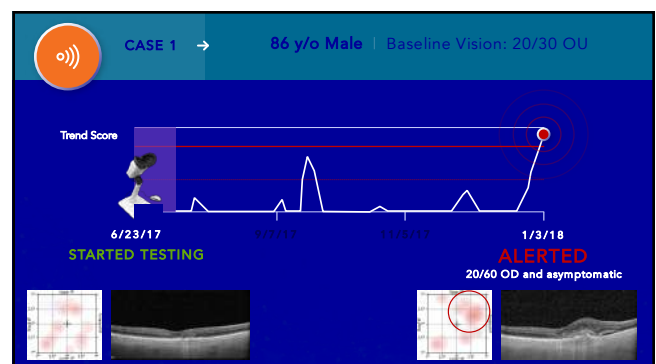
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### Question

During the AREDS2 Study – were patients allowed to take a multivitamins?

- No – they were testing the efficacy of AREDS2
- Yes – 10 %
- Yes – 50%
- Yes – 90%

92

**Will taking the AREDS or AREDS2 supplements prevent AMD?**

Nutritional supplements cannot prevent AMD. However, the AREDS/AREDS2 supplements may delay progression of intermediate to advanced AMD and may help you keep your vision longer. The participants AREDS trial have now been followed for more than 10 years, and the benefits of the AREDS formulation have persisted over this time.

**Can I take a daily multivitamin if I am taking one of the AREDS/AREDS2 formulas?**

Yes. The AREDS and AREDS2 formulas do not substitute for multivitamins. In AREDS, two-thirds of the study participants took multivitamins along with the AREDS formulation. In AREDS2, almost nine of ten participants took multivitamins.

93

**Nutritional supplements**

- ★ Sub-clinical/sub-structural or early disease
  - Controversy flourishes
    - No definitive guideline exists
    - Despite consensus evidence suggests using supplements
- ★ Intermediate – advance disease
  - No controversy on advocating for supplements
- ★ AREDS 1
  - Contains Beta-carotene and no lutein or zeaxanthin, no longer recommended
  - Investigated early AMD, no statistically significant benefit
- ★ AREDS 2
  - Recommended for intermediate and advanced AMD, study protocol
- ★ The Practical Guide for the Treatment of AMD - 3 primary options
  - Macular pigment supplement
    - Carotenoids: lutein, zeaxanthin, meso-zeaxanthin
  - Carotenoids, antioxidants, zinc, and vitamins C & E
    - AREDS 2
  - Carotenoid macular supplement in subclinical and early AMD. Carotenoid and antioxidant is intermediate and AMD that is progressing

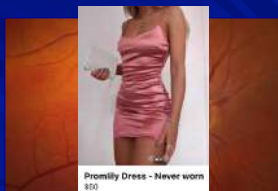
### Treatment for AMD

94

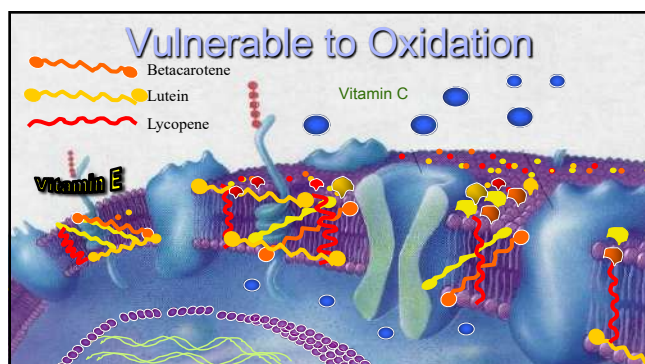
### Beckmann Committee Classification of AMD

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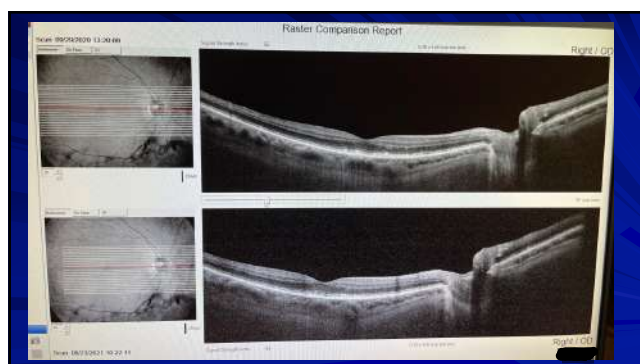
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  - 1 large drusen, > 125 microns
  - Any AMD pigmentary changes
- ★ Advanced AMD
  - Any geographic atrophy
  - Choroidal neovascularization (CNV)



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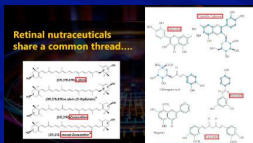
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103

-OH

~ -OH group donate an electron to mitigate the ROS and singlet oxygen generated from highly metabolic tissue

~ -OH group is found on all of them and it's what makes them such a fantastic antioxidant



Retinal nutraceuticals share a common thread...

104

**Polyphenols**  
**Flavonoids**  
**Quercetin**

Thank you, Dr. Chris Putnam,

**Quercetin inhibits choroidal and retinal angiogenesis *in vitro*.**  
*Graefes Arch Clin Exp Ophthalmol* (2008) 246:3373-378.

**Singlet oxygen quenching and chain-breaking antioxidant-properties of a quercetin dimer able to prevent AMD.**  
*Biophysical chemistry* 243 (2018): 17-23.

**Quercetin and cyanidin-3-glucoside protect against photooxidation and photodegradation of A2E in RPE cells.**  
*Experimental eye research* 160 (2017): 45-55.

**Neuroprotective effects of quercetin in diabetic rat retina.**  
*J Bio Sciences* (2017) 24(6):1186-1194.

**Protective effect of quercetin and chlorogenic acid, two polyphenols widely present in edible plant varieties, on visible light-induced retinal degeneration *in vivo*.**  
*J Func Foods* (2017) 33: 103-111.

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**Polyphenols**  
**Flavonoids**  
**Anthocyanins**

Thank you, Dr. Chris Putnam,

**Antioxidant and anti-inflammatory effects of blueberry anthocyanins on high glucose-induced human retinal capillary endothelial cells.**  
*Oxidative medicine and cellular longevity* (2018)

**Protective effects of blueberry anthocyanins against H<sub>2</sub>O<sub>2</sub>-induced oxidative injuries in human retinal pigment epithelial cells.**  
*J Agricultural Food Chem* (2018) 66(7):1638-1648.

**Protective effect of anthocyanins and xanthophylls on UVB-induced damage in retinal pigment epithelial cells.**  
*Food and Function* (2015) 7(2):1067-1076.

**Effects of blueberry anthocyanins on retinal oxidative stress and inflammation in diabetes through Nrf2/HO-1 signaling.**  
*J Neuroimmunology* (2016) 301:1-6.

**Identification of anthocyanins in the liver, eye and brain of blueberry-fed pigs**  
*J Agric Food Chem* (2008) 56:3:705-712

106

**Polyphenols**  
**Non-Flavonoids**  
**Curcumin**

Thank you, Dr. Chris Putnam,

**Therapeutic potential of curcumin in major retinal pathologies.**  
*Int ophth* (2019) 39:3:725-734.

**Vascular endothelial growth factor: An important molecular target of curcumin.**  
*Crit Review Food Sci Nutrition* (2019) 59:2:299-312.

**Retinal protection and distribution of curcumin *in vitro* and *in vivo*.**  
*Frontiers in pharmacology* 9 (2018) 670.

**Curcumin acts to regress macular drusen volume in dry AMD.**  
*Invest Ophth Vis Sci* (2020) 61:7:1036-1036.

**Curcumin-Based Treatment for Macular Edema from Uncommon Etiologies: Efficacy and Safety Assessment.**  
*Journal of Medicinal Food* (2020) 23:8.

107

**Polyphenols**  
**Non-Flavonoids**  
**Resveratrol**

Thank you, Dr. Chris Putnam,

**Resveratrol based oral nutritional supplement produces long-term beneficial effects on structure and visual function in human patients.**  
*Nutrients* (2014). 6:10:4404-4420.

**Resveratrol suppresses expression of VEGF by human retinal pigment epithelial cells: potential nutraceutical for age-related macular degeneration.**  
*Aging and disease* (2014) 5:2:88.

**SIRT1 mediated inhibition of VEGF/VEGFR2 signaling by Resveratrol and its relevance to choroidal neovascularization.**  
*Cytokine* 76:2 (2015):549-552.

**Anti-oxidant, anti-inflammatory and anti-angiogenic properties of resveratrol in ocular diseases.**  
*Molecules* 21:3 (2016):304.

**Toxic effects of A2E in human ARPE-19 cells were prevented by resveratrol: A potential nutritional bioactive for age-related macular degeneration treatment.**  
*Archives of Toxicology* 94:2 (2020): 553-572.


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Measuring Macular Pigment

~ Retina macula biopsy

~ Clinical Imaging

- \* Subjective
  - o ZeaVision MPSII
  - o Guardian Mapcat SF
- \* Clinical
  - o ZeaVision MPR
  - o Zeiss Visucam 200
  - o Spectralis HRA+OCT
  - o Spectralis MPOV



Thank you Dr. Chris Putnam

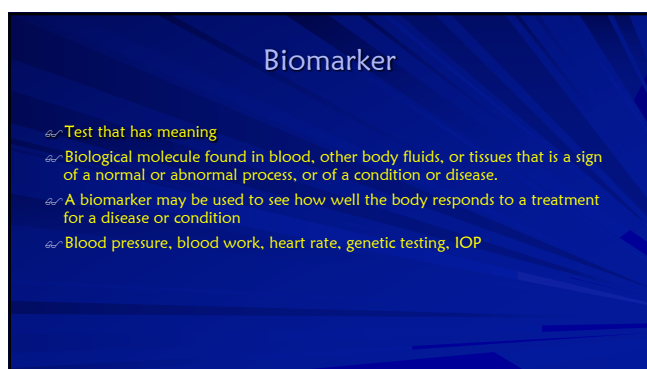
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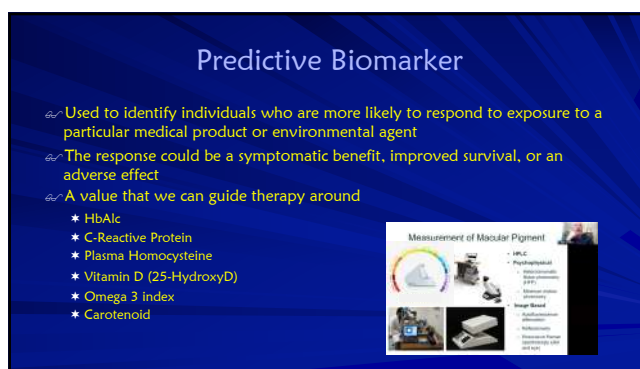
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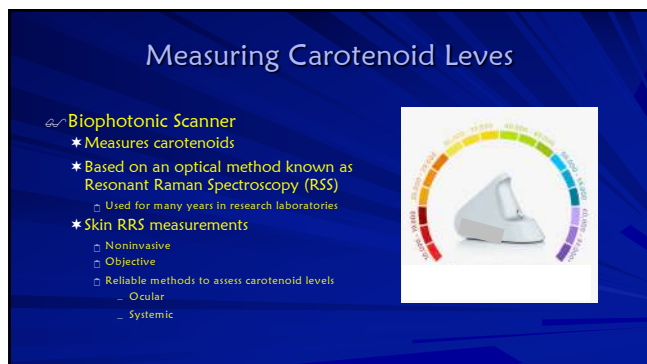
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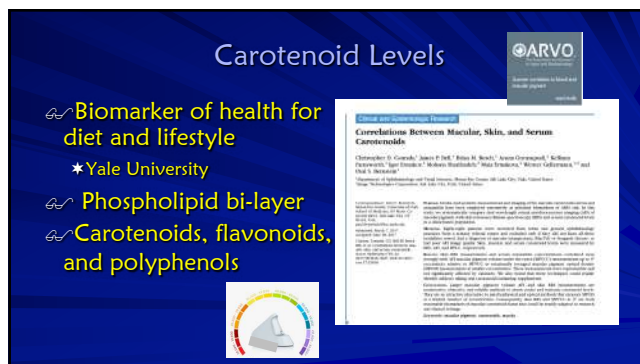
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## Carotenoid Levels




**NIH** National Institutes of Health  
Turning Discovery Into Health

- Quick Test (approx. 30 sec)
- Portable
- Cost Effective
- Remeasure in 60 days
- Reassurance to you and patient

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## Raman Spectroscopy



478nm PHOTONS ARE EMITTED FROM THE SCANNER

AS 478nm PHOTONS STRIKE CAROTENOID MOLECULES, SOME ARE SCATTERED BACK AS 478nm PHOTONS

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## Resonance Raman spectroscopic evaluation of skin carotenoids as a biomarker of carotenoid status for human studies

Susan T. Mayne<sup>1,2</sup>, Brenda Cartmel<sup>3</sup>, Stephanie Scarino<sup>4,5</sup>, Lisa Jahns<sup>6</sup>, Igor V. Ermakov<sup>4</sup>, Werner Gellermann<sup>4</sup>

**90 STUDIES**

\*Arch Biochem Biophys. PMC 2014 Nov 15.

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## An Evening with Dr. Paul Bernstein

### Measurement of Macular Pigment



- HPLC
- Psychophysical
  - Heterochromatic flicker photometry (HFP)
  - Minimum motion photometry
- Image Based
  - Autofluorescence attenuation
  - Reflectometry
  - Resonance Raman spectroscopy (skin and eye)

### High Performance Liquid Chromatography



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## ARVO STUDY

Interrelationships between Macula, Skin and Serum Carotenoids- Paul Bernstein, Werner Gellerman et al  
ARVO May 2016

**Conclusions:**

"Our results emphasize the importance of measuring the total amount of carotenoids in the macula region using an objective image based modality such as AFI or Spectralis rather than subjective MPD."

Skin resonance Raman spectroscopy of skin carotenoids is a reasonable biomarker of macula carotenoid status, and correlates better than subjective MPD tests.




The objective, hand scanner is better than the subjective Macuscope, QuantBEYE, and Densitometer for estimating macula pigment.

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## An Evening with Dr. Paul Bernstein

### The Lutein and Zeaxanthin in Pregnancy Study: The L-ZIP Study

- With addition of L and Z to standard-of-care prenatal vitamins combat maternal carotenoid depletion and improve maternal and infant ocular health?
- Randomized, controlled trial of 10 mg/L and 2 mg/Z v no L/Z
- Low-risk pregnancies
- Outcomes
  - Skin carotenoids by RRS in mother and infant
  - Maternal macular pigment by Spectralis AFI
  - Infant macular pigment and foveal structure by RetCam and Bioptigen OCT
  - Fully enrolled
  - NIH funded



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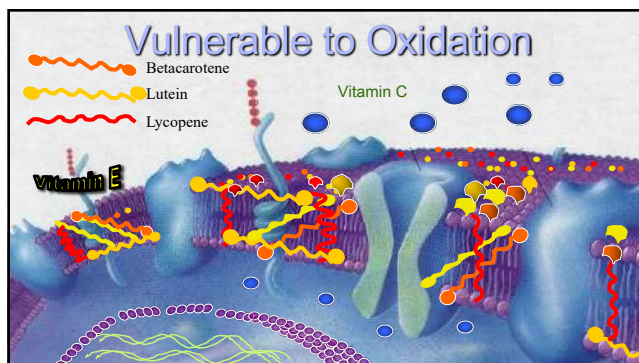


### An Evening with Dr. Paul Bernstein

**The Moran AMD Genetic Testing Assessment Study: The Magenta Study**

- Will knowledge of AMD genetic risk lead to quantifiable, sustained healthy changes in lifestyle?
- Randomized, controlled trial of pre-symptomatic genetic risk testing and counseling
- Immediate versus deferred disclosure
- 18-64-year-old (no AMD)
- Outcomes:
  - Skin carotenoids by RRS and R9
  - Macular pigment by Spectralis AFD
  - Lifestyle surveys
  - Assessing NEI funding

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### 53-year-old man

- ~ Family history of AMD
  - ★ Dad with 43 injections for AMD
- ~ Pre-diabetic with borderline HbA1c
- ~ Vision 20/20 OU
- ~ DFE- retina clear
- ~ OCT normal
- ~ Passes dark adaptation

**CONGRATULATIONS ON TAKING THE FIRST STEPS TOWARDS OPTIMIZING YOUR SCS**

Recently, on 1/17/2023, you met with me and scanned the palm of your hand with the BioPhotonic Scanner. Your score improved a Skin Carotenoid Score (SCS) of 2680.

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### Ingredients

Ingredients	Amount	% Daily Value
<b>Serving Size: 1 Packet</b>		
Vitamin A (BETA as Beta Carotene 1875 mcg 3000 IU from Marubio response, and Vitamin A palmitate 275 mcg 500 IU)	2250 mcg 450%	250%
Vitamin C (as Calcium Ascorbate)	250 mg	25%
Vitamin D (as Cholecalciferol)	25 mcg 500 IU	50%
Vitamin E (as D-Alpha-Tocopheryl Acetate, D-Alpha Tocopheryl, Tocopherols)	56.3 mg	113%
Vitamin K (as Phylloquinone)	20 mcg	20%
Vitamin (as Vitamin Manganese)	2.75 mg	27.5%
Chromium (as Chromium)	17.5 mcg	17.5%
Magnesium (as Magnesium)	25 mg	25%
Calcium (as Calcium Carbonate, D-Calcium Malate, Calcium Ascorbate)	250 mg	25%

OTHER INGREDIENTS: Gelatin, Glycerin, Stearic Acid, Croscarmellose, Sodium, Silicon Dioxide, Titanium Dioxide, Croscarmellose, Sodium, Silicon Dioxide, Titanium Dioxide, Croscarmellose, Sodium, Silicon Dioxide, Titanium Dioxide.

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### SUPPLEMENT FACTS

**Supplement Facts**

Serving Size: 1 Packet (Standardized for 100% Daily Value)

Supplement	Amount	% Daily Value
Vitamin A (BETA as Beta Carotene 1875 mcg 3000 IU from Marubio response, and Vitamin A palmitate 275 mcg 500 IU)	2250 mcg	450%
Vitamin C (as Calcium Ascorbate)	250 mg	25%
Vitamin D (as Cholecalciferol)	25 mcg 500 IU	50%
Vitamin E (as D-Alpha-Tocopheryl Acetate, D-Alpha Tocopheryl, Tocopherols)	56.3 mg	113%
Vitamin K (as Phylloquinone)	20 mcg	20%
Vitamin (as Vitamin Manganese)	2.75 mg	27.5%
Chromium (as Chromium)	17.5 mcg	17.5%
Magnesium (as Magnesium)	25 mg	25%
Calcium (as Calcium Carbonate, D-Calcium Malate, Calcium Ascorbate)	250 mg	25%

OTHER INGREDIENTS: Gelatin, Glycerin, Stearic Acid, Croscarmellose, Sodium, Silicon Dioxide, Titanium Dioxide, Croscarmellose, Sodium, Silicon Dioxide, Titanium Dioxide, Croscarmellose, Sodium, Silicon Dioxide, Titanium Dioxide.

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### 53-year-old man

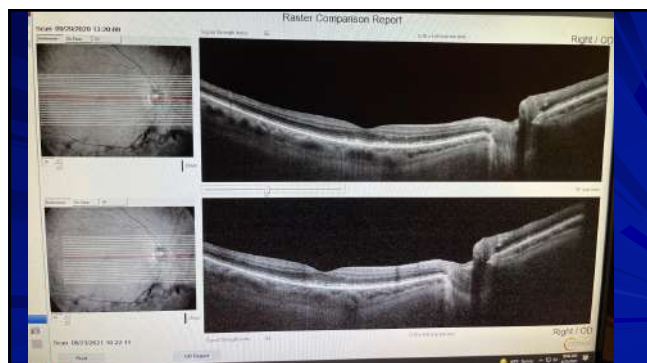
**CONGRATULATIONS ON TAKING THE FIRST STEPS TOWARDS OPTIMIZING YOUR SCS**

Recently, on 1/17/2023, you met with me and scanned the palm of your hand with the BioPhotonic Scanner. Your score improved a Skin Carotenoid Score (SCS) of 2680.

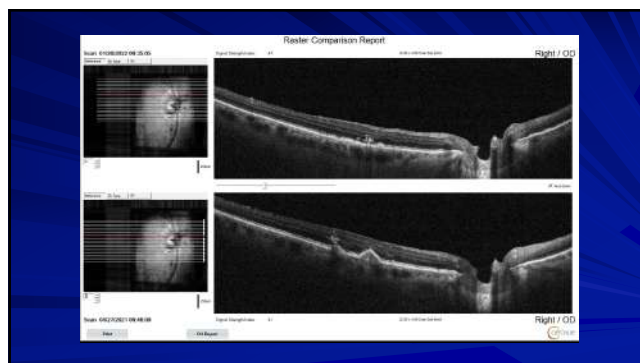
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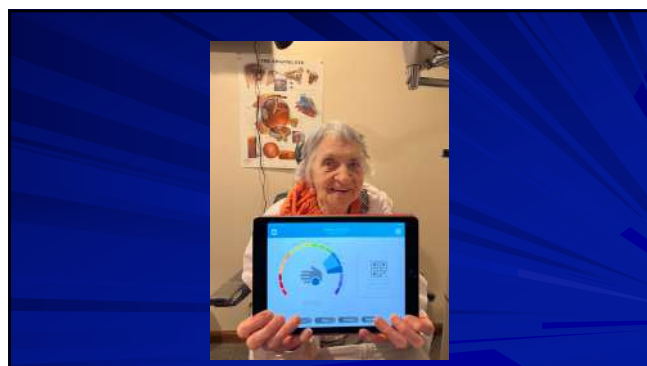
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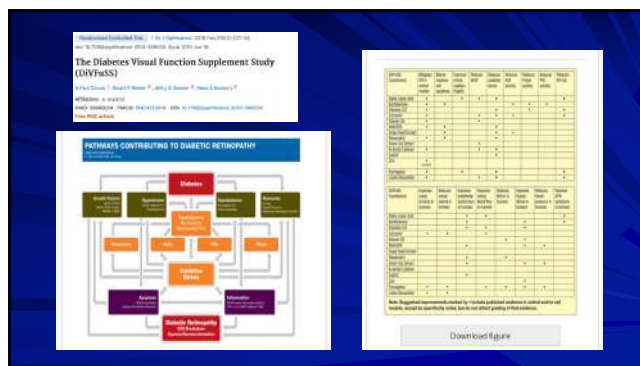
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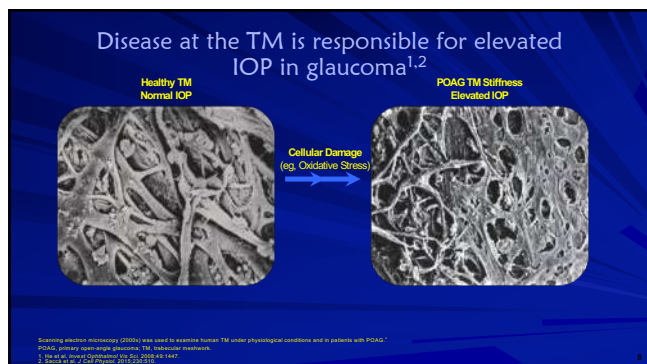
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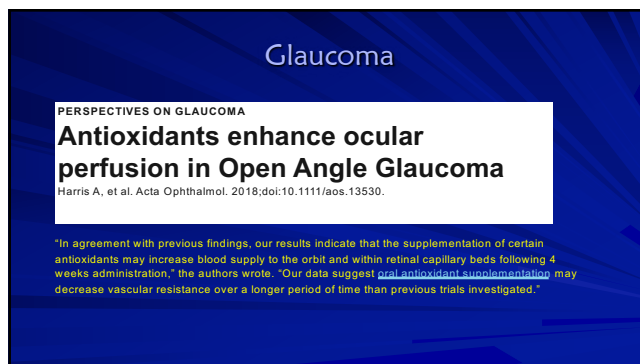
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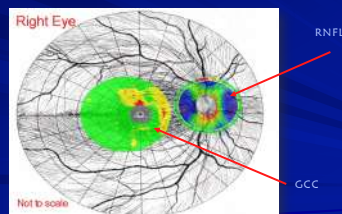


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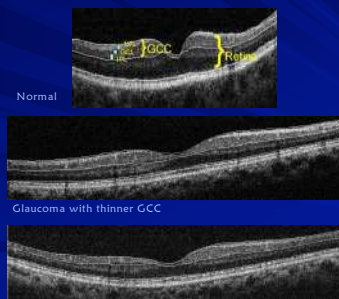
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### Overlay of the RNFL and GCC

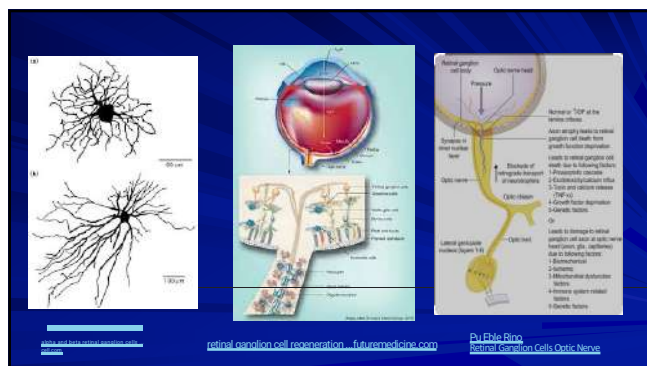


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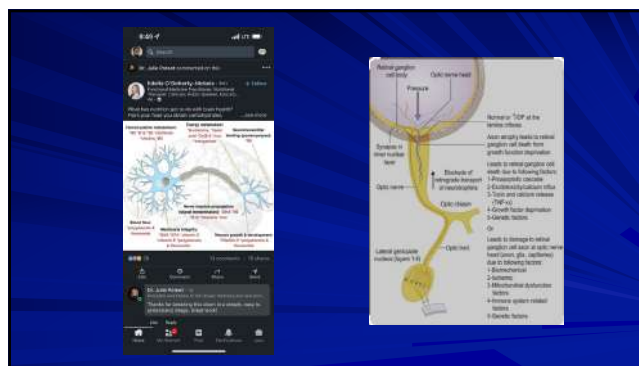
### GCC Thinning in Glaucoma



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### Who Here Prescribe Fatty Acids?

EPA/DHA

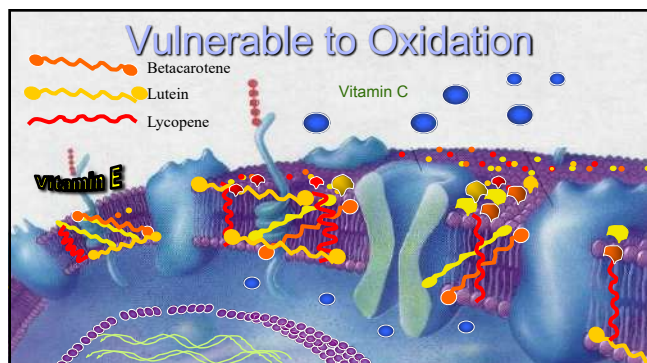
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### EPA/DHA

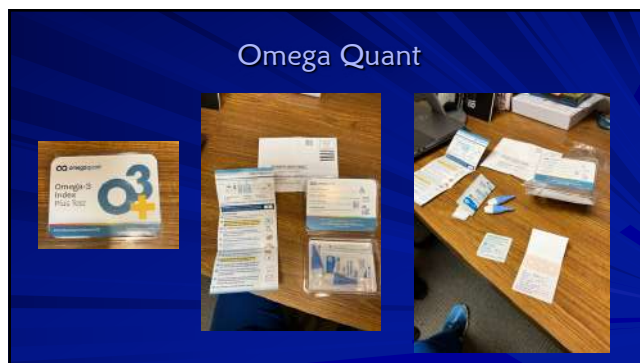


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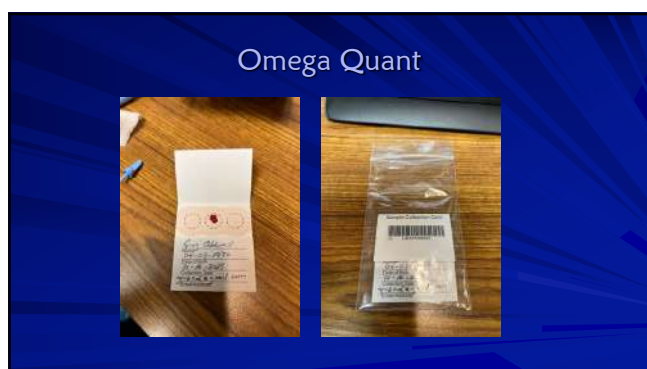




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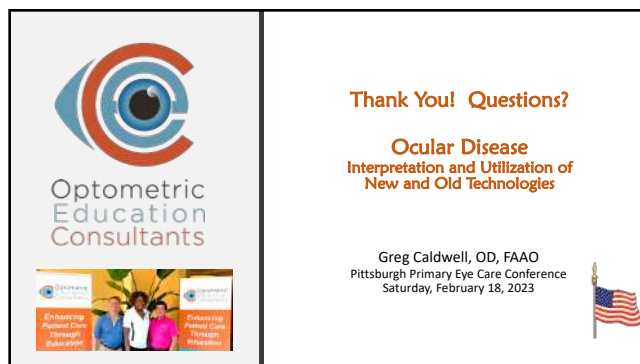
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