MODIFYING LIFESTYLE TO PREVENT THE AGE-RELATED MACULAR DEGENERATIONS

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COPE # 78420-PH

Abstract

- In 1984 we published our findings (a) “Dry” AMD can be prevented by lifestyle reducing sunlight exposure when deficient in Zn/Cu Superoxide Dismutase and (b) “Wet” AMD can be prevented by lifestyle avoiding excessive denatured protein when deficient in pyridoxine and other nutrients essential for remodeling of Bruchs Membrane protein.

Current AMD Medical Advice

- We acknowledge that intravitreal injections can be effective in slowing the progression of the “wet form” of macular degeneration (AMD) and even reversing some effects of AMD and that specific nutrients and nutriceuticals can slow or halt or even reverse the “dry type” of AMD.
- But these methods do not address or communicate what is causing the AMD and they provide inadequate insight as to real preventive strategies.

Thanks to Biochemists, Microbiologists, Eye-Disease Epidemiology, Nutritional Ophthalmology/Optometry

Thanks to studies in eye-disease epidemiology and nutritional ophthalmology/optometry we have evidence as to specific anti-AMD diets and behaviors that prevent the different forms of AMD, as well as related phenomena—epiretinal membranes, cellophane maculopathy, macular pucker, & hemorrhagic separation of the macular RPE layer.

Nutritional Optometry Institute Research

- In 1984 this researcher (BCL) published,* but did not patent, our findings that showed powerfully increased risk for “dry” atrophic form of Age-Related Macular Degeneration (AMD) in patients with either copper or zinc or both deficient and this was highly associated with depressed concentrations of zinc-copper-dependent erythrocyte superoxide dismutase (ESOD). /*43-page chapter in *1984—85 Yearbook of Nutritional Medicine,* J Bland, ed.Keats Publ., NewCanaan, CT.

SuperOxide Dismutase (SOD)

- SOD is the first line of defense in appropriate eye tissues against oxygen radicals triggered by exposure to excessive light.
- SOD is the most plentiful enzyme in the human body and is required by every cell that utilizes oxygen.
- We measured our patients' SOD concentrations in their erythrocytes (RBC), specifically as ESOD.

Effect of too much *denatured* Protein

- This researcher (BCL) reported at ARVO and ACN and in the *1984-85 Yearbook of Nutritional Medicine,* p 274, that persons with leaking "wet" AMD and/or soft, **confluent** drusen are likely to average more than twice the protein RDA consumption—mostly <u>well-cooked</u> *denatured* protein which has lost its vitamin B6 – measured by elevated Erythrocyte Glutamic Oxaloacetic Transaminase (EGOT).

Pyridoxine (Vitamin B6)

- Pyridoxine (Vitamin B6) is required to potentiate the transaminase enzymes in the *ileum* of the small intestines to enable synthesis of unique amino acids not in the diet, by synthesizing from the essential amino acids if present in the diet as “essential amino-acids.” Vit B6 is tremendously reduced by cooking more than rare internal temperature (about 140 deg F).
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Vitamin B6 and Remodeling

- If Vit B6 is deficient for many years, the effect appears as if “age-related” because normal **remodeling** of tight junctions in Bruch’s Membrane cannot effectively be accomplished without B6.
- B6 is required to potentiate the synthesis of the unique tight-junction proteins not in the diet but required for Bruchs Membrane.
- the evidence comes from microbiology and nutrition science and our epidemiology.

Dr Lane and AREDS 1, Preservision

- In 1984 Dr Lane published his recommendation for THREE formulas that his research showed were indicated for treating **a**) the atrophic form of AMD, **b**) the exudative form using additional nutrients required for normal programmed protein remodeling of Bruch's Membrane, and **c)** geographic atrophy of the retina. (*1984-85 Yearbook of Nutritional Medicine,.*43-page chapter).
- Also in 1984, Dr Lane presented these formulas at major sessions at ARVO and the Academy of Optometry and at the Skeffington Symposium in Washington, and in Moscow in 1984 where Dr Lane represented the US in the huge "Moscow International Symposium on Metabolic Ophthalmology," approved by the US State Department, with the admonishment to check in at the US Embassy in Moscow for his protection.
- By 1988, Prof David Newsome published a fine study showing the importance of several nutrients Dr Lane had published in 1984. Dr. Lane encouraged Prof David Newsome to look at the role of Superoxide Dismutase (SOD) in AMD, and Newsome's lab produced an excellent confirmatory study. Using donated live retinal tissue from healthy young men killed in accidents .
- Starting in 1995, Dr Lane chaired a new special-interest group within ARVO, Nutritional Epidemiology Research In Vision and Ophthalmology (*NERVO* at *ARVO*). Ophthalmologists had been telling Dr Lane that his formula was about to be tested in a multimillion-dollar trial of the NEI. But several months before the start of the clinical trial Dr Lane was informed by his MD friends that one important ingredient was to be omitted. (Continued on next slide.)

How Dr Lane Intervened to improve AREDS 1 before the clinical trial.

- Dr Lane phoned **Prof Walter Willett**, Director of the Harvard School of Public Health, who **in 1995 had told Dr Lane that he could quote Dr Willett that their research teams at Harvard had confirmed the validity of Dr Lane's research related to AMD & most eye disorders included in Dr Lane's work,** and they also found the same essential eye nutrients were essential in preventing heart disease in men over age 40 if they continued on the diet and conservative supplementation modifications.
- **Dr Willett** advised Dr Lane to speak right away with **David Newhouse**. Dr Lane spoke with Prof Newhouse and Dr Newhouse agreed with the suggestion to include the important extra nutrient in the AREDS-ONE formula which became known as *Preservision* and licensed under other names as approved variations (including *AREDS 1* and *2).* Dr Lane has not patented nor manufactured any of his recommended formulas, such as *Macular Health Formula, Eye and body Complete, LumigA-Z* and many copy-cat sublicensees.

Avoid too much Vit A or too much even good supplements if unbalanced.

- Dr Lane in 1984 had noted the desirability of less supplementation of vitamin A and increase in moderate supplementation of Lutein and Zeaxanthan as accomplished in AREDS 2.
- Dr Lane's recommendations of his second formula, aimed at helping remodel Bruch's Membrane, have been included in a large number of formulas springing up all over the world, including Macular Health Formula, Macular Complete, Eye and Body Complete, LumigA-Z. These latter formulas go beyond AREDS 2.

Need to teach Food Selection/Preparation

- We need to teach:
- (1) Food selection and preparation for proper Bruch's remodeling. See handout: "Greens for the Eyes."
- (2.a) Restraint against consuming all the non-essential fats—quite leakable.

GREENS for the EYES

Dr. Lane's recommendations for salads at least one each day:

<Need to modify if on coumadin or other blood thinners or on thyroid therapy.>

1. Turnip Greens, preferably raw, may be incorporated in soup
2. Kale, also, Arugula, preferably raw, may be incorporated in soup
3. Collard Greens, preferably raw
4. Spinach, preferably raw
5. Lycium Barbarum ("Go-ji Berry," "Wolfberry," "Fructus Lycii") + supplement depending on processing
6. Raw corn if excellent quality
7. Raw sweet potatoes or yams, may be half-baked, and ripe organic peaches
8. Raw broccoli and Broccoli Rabe
9. Colored fruits incl Watermelon for SOD
10. Supplement with Lutein, zeaxanthan, astaxanthan supplied by these veggies,fruit

Recommended conservative but effective B-complex when ingesting an excessively processed high-protein food.

Avoid excess Omega 6/Omega 3

- (2.b) Reynolds, Rosner and Seddon (2013), showed the value of Omega-3 fatty acids in the prevention of Geographic Atrophy AMD.
- 92.C) Excessive dietary butter or ghee may be a risk factor for geographic atrophy AMD.

Need to Teach Balance as to preventing too much blood thinning

- Need to teach:
- (3) caution in using important blood thinners –not to go overboard. Balance of Omega-3 and Omega-6 is a key. Too much Omega 3 promotes hyper-extravasation of RBC visible in macular area and can cause hemorrhaging. Too much Omega 6 inreases the risk for ischemic stroke.
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Need to teach strategies to Reduce too Much Eye exposure to Bright Light

- (4) How to entrain strategies for protection against excessive exposure to sunlight:
  - a. Photochromic lenses, *e.g*., Transitions 8 Brown
  - B. Brimmed hat, baseball cap, separate visor

Public Health Nutrition Missions/Strategies--

- 1. Support for Science & Scientific Method
- 2. Implementation of Preventive Strategies
- 3. Communication! But the preventive message has become diffused and deflected.
- 4. We'll now compare the conventional wisdom ***versus*** how we understand the issues through our own research and the accumulating science knowledge.

How & Why We See the Issues Differently--1

- 1. Reporters tend to talk of the so-called Age-Related Macular Degenerations (AMDs) ***as if they were one disorder*** that may change from one form (e.g., “Dry”, atrophic AAMD) to the next (e.g.,“Wet,” exudative EAMD).
- 2. We see the atrophic “dry” form (AAMD) as triggered by sun or other high-energy radiation damage resulting in discrete drusen.
- 3. We see the “wet” type (EAMD) as related to failure in remodeling Bruch’s Membrane (BM). A pre-leakage “wet” type may be characterized by soft, confluent drusen. We have shown that too much well-cooked protein prevents original-equipment “tight-junction” remodeling of BM.
- 4. The *promoting lifestyles, etiologies* and *remedies* are different, not necessarily consecutive or transitional.

Critiquing What Others are Communicating as to Age

- Bright Focus Fndn (BFF): Prevention & Risk Factors:
- 1. BFF: **Age** as the Number One Risk Factor!
- 2. We consider so-called **A**MD as ***not*** so-much an issue of ***age***, but rather a product of :
  - (**a**) excessive assault by solar or radiation factors in the face of **depleted protective enzymes (SOD) and lutein, zeaxanthan over time**;
  - (**b**) defective remodeling over time due especially to **deficiency of Pyridoxine (vitamin B6)** with **high intake of denatured (well-cooked) protein.**

Ratio of Denat'd Protein/Protein RDA

- Denatured Protein Intake in Ratio to Protein RDA Predicts Earlier Age of Onset of Exudative AMD.
- But heavy smoking habit also predicts earlier age of onset of Exudative AMD and Geographic Atrophy AMD.

BFF list: Prevention & Risk Factors--2:

- 3. BFF: **Smoking** as a factor! Our data is in agreement.
- 3. BFF: **Genetics** as a factor!
- 4. Yes, but our finding is that this is where environmental factors (protection from excessive solar exposure) and dietary enhancement can silence so-called “bad genes.”

BFF list: Prevention & Risk Factors--3:

- 5. BFF: As to **RACE**, Caucasians are more likely to develop AAMD (Atrophic AMD).
- 6. We note that this is not to be generalized for all AMDs. It applies to atrophic AMD related to solar exposure. Blacks and Chinese can be quite vulnerable to Exudative forms of AMD because of dietary styles.

BFF list: Prevention & Risk Factors--4:

- 7. BFF: **Prolonged sun exposure** increases the risk, “but the evidence is not conclusive.”
- 8. We agree that prolonged sun exposure is a major factor in AAMD, but not EAMD. The evidence is solid, except that persons enriched with dietary or supplemental lutein and able to maintain a high concentration of SuperOxide Dismutase as indexed in RBC (ESOD) are statistically less vulnerable.

BFF list: Prevention & Risk Factors--5:

- 9. BFF: “People with **light-colored eyes** are more likely to develop the dry type of AAMD.”
- 10. We agree with the above. But sun protection in glasses and/or with a brimmed hat help to prevent the degeneration.
- BFF notes that their list was developed from information gleaned from the NEI and the National Library of Medicine with the aid of Jeffrey Stern, MD, PhD and Susan Yanni. We selected their dialog for talking points because we believe it represents the conventional wisdom at its best today.

Major Life-Style Differences increasing risk for Atrophic (AAMD): Our data

- **1. XS sun exposure espec if less pigmented**
- **2. Inadequate Zn &/or Cu = Inad SOD.**
- **3. Inadequate dietary Lutein & Zeaxanthin**
- **4. Inadequate dietary antioxidants**
- **5. Low hyperopes not wearing glasses outdoors are more vulnerable.**

Metabolic Tests for AMD & IOP Risk Factors

T1. Toxic Metals & Essential Metals Hair sample for assessing reserves & exposures as inexpensive adjunct to blood testing. (Especially for Chromium reserves and mercury ingestion.)

- T2. EGOT. (Erythrocyte Glutamic Oxaloacetic Transaminase) for functional assessment of Vitamin B6. Answers: Is the B6 level adequate? Critical as to functionality of Bruch's Membrane and remodeling of special tissues throughout the body.
- T3. ESOD. (Ery. Superoxide Dismutase) Our first line of defense against superoxide radicals.
- T4. EGPx. (Ery, Glutathione Peroxidase) for adequacy of seleniun
- Lutein assessment & Omega 3/Omega 6 balance.
- Vitamin C (in White Blood cells)
- Resource Labs: Health Diagnostics & Research Inst, S Amboy, NJ
- Doctor's Data , W Chicago, Especially for hair analysis.

BFF list: Prevention & Risk Factors--5:

- 9. BFF: **Diet** as a risk factor: "People with diets high in fat, cholesterol and sugar and low both in antioxidants and green leafy vegetables intake, may be more likely to develop AMD."
- 10. Yes, and those with diets high in fat and cholesterol are more likely to leak through badly remodeled pores in BM as EAMD cases.

Some Implications of Pyridoxine (Vit B6) Deficiency

- 1. Proteins become denatured & foods lose Vit B6 due to excessive heat & cooking.
- 2. Lack of B6 in small intestines prevents transaminase enzyme activation in Brush Border of *ileum* of small intestines. RBC transaminases (EGOT, EGPT) increase.
- 3. Transamination failure reduces body's ability to convert dietary amino acids into unique amino acids needed for specific remodeling, *e.g.,* as in Bruch's Membrane.

More Vit B6 Deficiency Implications

- 4. Surrogate proteins replacing “original equipment” proteins in Bruch’s Membrane may remodel “tight” junctions to become “leaky.”
- 5. Excessive intake of aspirin, ginkgo, vit A, vit C & fats—even including olive oil—may influence development of RPE serous *vs* hemorrhagic RPE detachment as Bruch’s becomes leaky.
- 6. “Soft” confluent drusen are not simply enlarged “hard” drusen.
- 7. Soft drusen originate from the choriocapillaris, not from the RPE.

VITAMIN B6 DEFICIENCY AS A RISK FACTOR FOR SOFT DRUSEN AND EXUDATIVE AMD

(1) Exudative AMD Years-to-Onset Age is inversely indexed to ("Well-Cooked" Protein Intake)/(Protein DV) Ratio.

(2) High EGOT Transaminase indicates B6 deficiency and failure of transamination—failure to convert the amino acids in the diet to the precise amino acids required for remodeling specific tissues.

(3) This B6 replacement of tight-junction amino acids with leaky junctions and deficiency results in increasing leakiness of Bruch's Membrane.

(3)

(1)

Dr. Lane's "S" Mnemonic

- ***Stop**
- ***Supplemental (condiments added to foods)**
- ***Subversive (Tricks us into eating more than we need or want)**
- ***Signals (transplanted from whole foods that do contain Vitamin C and B complex)**
- **Seasonings**
- **Sauces**
- **Spices**
- **Salt – An essential food, but *added* to foods may encourage overconsumption.**
- **Sugar: Is Sugar Good, Bad, or Other? Depends on whether INTRINSIC or ADDED. But it acts as an excellent drug in turning around diabetic coma.**
- **Supplemental Sugar for Doctored Foods, unlike *Intrinsic Sugar. "It's lieing!"***
- ***See1937 Nobel Prize lecture comparing ascorbic acid (Vit C) and its analog sugars.***
- **Sucrose**
- **Saccharin**
- **Stevia**
- **Splenda**
- **Syrups**

Excerpt of Dr Lane's Essay in Defense of the "S" Syndrome

- "NUTRITION AND MORE THAN NUTRITION
  - TO TURN AROUND EYE PROBLEMS"

- For vision improvement, discipline to achieve diet and lifestyle modifications is more easily achieved when we understand appetite mechanisms.
- It may seem hard to believe, but almost all humans are endowed with a fantastic appetite mechanism that helps to program our intake of food so that we are encouraged to eat as much as we need, but no more than we need. But it only works for **natural foods that have not been doctored.**

Nutrition to Turn Around Eye Problems-2

- In nature, naturally sweet foods include fresh, ripe fruits and fresh sweet vegetables – foods that are naturally endowed with vitamin C in addition to B-complex.
- Our observation is that the natural sweetness in these foods acts as a **signal** to those very few animals – including humans – that cannot synthesize vitamin C. My cat synthesizes her own vitamin C and she finds nothing special in sweet foods containing natural vitamin C.

Nutrition to Turn Around Eye Problems - 3

- When we take the sugar from these fruits and veggies and add it to a junk food, our brains get a signal to keep eating, that there's likely to be vitamin C on board.
- And so, we re encouraged to keep eating, but we never get the signal that our nutritional needs are satisfied. And so, sweeteners added to nutrient-deficient foods **subversively** encourage us to eat more and more.

Nutrition to Turn Around Eye Problems - 4

- **Is it moral to make foods taste irresistible?** Translating to enhance the meaning:
- Is it health-giving to take a food that our appetite mechanism would otherwise reject, and adding a sweetener, we are tricked into eating a food we otherwise would not have eaten or not have eaten so much?

Nutrition and More Than Nutrition to Turn Around Eye Problems - 5

- The problem is **not just the calories associated with the supplemental sweetener.**
- **The problem is especially that we are encouraged to eat food we did *not* *need* to eat.**

How to Communicate with Dr Lane

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- Request list of references and the entire essay with an important comment from Prof Mark Tso at the plenary session of the World Congress of Ophthalmology, Sydney, Australia, 2002.