

Food as Medicine

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Osteopathic Approach to Healthcare

- Altered from the allopathic by A.T. Still
 - Function and structure go together
 - Somato-visceral connection
 - Viscero-Somato connection
 - Look beyond just the symptoms to the body's natural biochemistry/biophysics for the cause of the symptom or complaint
 - Look to correct the cause and the symptom disappears without the need for synthetic suppression.

Alopathic Approach to Healthcare

- Symptom - Drug/Surgical Suppression
 - Search and Destroy
 - There are times when this is needed - emergencies/combat
- Treatment is based upon a synthetic analog to treat a naturally functional biochemical system.
 - Kreb's Cycle relegated to 1st year med school and forgotten
 - Phase I, II, III liver detoxification are distant obscurities
 - Nutrition is the unwanted step child reduced to fats, proteins and carbohydrates
 - Based first on what's best for business and its perpetuation
 - Lends well to mid-level provider proliferation as it is protocol based over individuality
 - protocols are dictated by hospitals and the insurance companies and drug contracts

Consequences of Medicines

- What happens if I take a medicine I don't need such as a BP med, a diabetic med, a RA med, an NSAID, an antidepressant? Even if needed, many meds cause unacceptable side-effects, even death. (biologics)
 - Ill-health!
- What happens if I take food I don't need or is pro-inflammatory?
 - Ill-health!
- Its basic biochemistry: Krebs Cycle, Phase I, II, III Detox, Immune response

Evidence Based Medicine

- Harrison, Pam. “Half of NCI Cancer Center Directors Collect Industry Payments” Medscape. August 7, 2019.
- “...a 2003 [study](#) that showed that the odds of investigators reaching a pro-industry conclusion were over three times higher in industry-funded studies than in those not funded by industry.”
- “In another [study](#), authors who reviewed 30 trials came to the conclusion that "systematic bias favors products which are made by the company funding the research.”

Dietary Fad

- Atkins
- Keto
- Paleo
- South Beach
- The Zone

Most Diets are Driven by the Desire for Weight Loss

- “A vegan diet was associated with significantly greater weight loss than the NCEP (National Cholesterol Education Program) diet at 1 and 2 years. Both group support and meeting attendance were associated with significant weight loss at follow-up.”
- [Turner-McGrievy GM](#)₁, [Barnard ND](#), [Scialli AR](#). “A two-year randomized weight loss trial comparing a vegan diet to a more moderate low-fat diet.” Obesity (Silver Spring). 2007 Sep;15(9):2276-81.
- <https://www.ncbi.nlm.nih.gov/pubmed/17890496>

Diet and Weight Loss

- “Vegan diets may result in greater weight loss than more modest recommendations.”
- vega”n (n = 12), vegetarian (n = 13), pesco-vegetarian (n = 13), semi-vegetarian (n = 13), or omnivorous (n = 12). Fifty (79%) participants completed the study. In intention-to-treat analysis, the linear trend for weight loss across the five groups was significant at both 2 (P < 0.01) and 6 mo (P < 0.01). At 6 mo, the weight loss in the vegan group (-7.5% ± 4.5%) was significantly different from the omnivorous (-3.1% ± 3.6%; P = 0.03), semi-vegetarian (-3.2% ± 3.8%; P = 0.03), and pesco-vegetarian (-3.2% ± 3.4%; P = 0.03) groups. Vegan participants decreased their fat and saturated fat more than the pesco-vegetarian, semi-vegetarian, and omnivorous groups at both 2 and 6 mo (P < 0.05).”
- [Turner-McGrievy GM₁](#), [Davidson CR₂](#), [Wingard EE₃](#), [Wilcox S₃](#), [Frongillo EA₂](#).
“Comparative effectiveness of plant-based diets for weight loss: a randomized controlled trial of five different diets.” Nutrition. 2015 Feb;31(2):350-8. doi: 10.1016/j.nut.2014.09.002. Epub 2014 Oct 18.
- [xxhttps://www.ncbi.nlm.nih.gov/pubmed/25592014](https://www.ncbi.nlm.nih.gov/pubmed/25592014)

Keto Diet Myth or Truth

- Helge, Jorn Wulff. “Long-term fat diet adaptation effects on performance, training capacity, and fat utilization.” Med Sci Sports Exers. 34(
- “When exercise is increased there is an increased demand for need for carbohydrates.” ... “consumption of a fat-rich diet decreases the storage of glycogen in both muscle and liver.” This forces the increased conversion of fat to energy, e.g. fat oxidation. This leads to the assumption that there is a **net** fat mass reduction.
- Keto diets are higher in fat so there is an increase in fat consumption, consequently actually a net slowing of fat mass reduction.

The Keto Myth

- 17 obese men placed in a metabolic ward for 2 months; first month standard diet, 50% carb, 35% fat, 15% protein calorie sources; second month keto diet, 5% carb, 80% fat, 15% protein; same calorie totals.
- The isocaloric ketogenic diet actually slowed body fat loss and resulted in muscle mass reduction.
- Hall, Kevin D. et.al. “Energy expenditure and body composition changes after an isocaloric ketogenic diet in overweight and obese men.” Am J. Clin. Nutr. 10(2):324-33.

More than meets the 'scale'

- Hall, KD, et. al. Calorie for Calorie, Dietary Fat Restriction Results in More Body Fat Loss than Carbohydrate Restriction in People with Obesity.” Cell Metab. 2015 Sep 1;22(3):427-36. doi: 10.1016/j.cmet.2015.07.021. Epub 2015 Aug 13. <http://dx.doi.org/10.1016/j.cmet.2015.07.021>
- Initially, low carb diets cause more weight loss on the scale, but further analysis shows this is more lean mass loss and water loss via muscle glycogen mobilization than total fat loss.

Carb in, fat out

- “... our meta-analysis of 32 controlled feeding studies with isocaloric substitution of carbohydrates for fat found that both energy expenditure (26 kcal/d; $P < .0001$) and fat loss (16 g/d; $P < .0001$) were greater with lower fat diets.”
- Hall, KD, et. al. Calorie for Calorie, Dietary Fat Restriction Results in More Body Fat Loss than Carbohydrate Restriction in People with Obesity.” Cell Metab. 2015 Sep 1;22(3):427-36. doi: 10.1016/j.cmet.2015.07.021. Epub 2015 Aug 13.
<http://dx.doi.org/10.1016/j.cmet.2015.07.021>

Diets are either pro-inflammation or anti-inflammation, You choose!

- “Dietary patterns high in refined starches, sugar, and saturated and trans-fatty acids, poor in natural antioxidants and fiber from fruits, vegetables, and whole grains, and poor in omega-3 fatty acids may cause an activation of the innate immune system, most likely by an excessive production of proinflammatory cytokines associated with a reduced production of anti-inflammatory cytokines. The whole diet approach seems particularly promising to reduce the inflammation associated with the metabolic syndrome. The choice of healthy sources of carbohydrate, fat, and protein, associated with regular physical activity and avoidance of smoking, is critical to fighting the war against chronic disease. **Western dietary patterns warm up inflammation, while prudent dietary patterns cool it down.**”
- Giugliano MD, Dario, et. al. “The Effects of Diet on Inflammation: Emphasis on the Metabolic Syndrome.” [Journal of the American College of Cardiology. Volume 48, Issue 4](#), 15 August 2006, Pages 677-685

Physicians rarely practice what they preach!

- “According to the 2007 Physicians Health Study, 40% of the 19 000 doctors were overweight and 23% were obese.”
- “**Foods served at medical conferences and grand rounds are infamously unhealthy.** In a recent *JAMA* article, the authors painstakingly calculated the number of meals served to medical physicians in the course of 1 year (2010): 40 000 accredited continued medical education events in the United States (all serving food), 9000 residency programs that serve at least one “free lunch” per week, weekly medical student free pizza club meetings at 125 accredited medical schools, and lunches provided to more than 46 000 applicants to residency and fellowship each year.⁷ The same article goes on to argue that **foods served at medical meetings do not adhere to any nutritional guidelines**—a truth backed by further studies and one that many of us know all too well from seeking healthful food options at medical conferences. In a national survey of planners for medical conferences around the country, 92% cited cost as the driving factor for what goes into the meal, **100% responded that for each lunch and dinner, a dessert had been included and that all lunches offered included potato chips, snack mixes, or candy. One hundred percent of respondents offered soda at each break.**”
- Barnett KG. Physician obesity: the tipping point. *Glob Adv Health Med.* 2014;3(6):8–10. doi:10.7453/gahmj.2014.061

CAD and Lifestyle

J Family Med Prim Care. 2016 Apr-Jun; 5(2): 281–285.
doi: [10.4103/2249-4863.192355](https://doi.org/10.4103/2249-4863.192355)

PMCID: PMC5084548
PMID: [27843828](https://pubmed.ncbi.nlm.nih.gov/27843828/)

Lifestyle-associated risk for cardiovascular diseases among doctors and nurses working in a medical college hospital in Tamil Nadu, India

[Shailendra Kumar B. Hegde](#),¹ [G. Vijayakrishnan](#),¹ [Akshaya K. Sasankh](#),¹ [Sanjana Venkateswaran](#),¹ and [Ganeshkumar Parasuraman](#)²

CAD is Lifestyle Induced

- “Globally, about 17 million people die of cardiovascular diseases (CVDs) every year and a substantial number of these deaths are attributed to four major risk factors namely unhealthy diet, physical inactivity, tobacco consumption, and alcohol consumption. Doctors and nurses often have a sedentary lifestyle.”
- “Doctors are at a higher risk for CVDs as compared to nurses as well as the general population.”
- [Shailendra Kumar B. Hegde](#),¹ [G. Vijayakrishnan](#),¹ [Akshaya K. Sasankh](#),¹ [Sanjana Venkateswaran](#), and [Ganeshkumar Parasuraman](#) “Lifestyle-associated risk for cardiovascular diseases among doctors and nurses working in a medical college hospital in Tamil Nadu, India” [J Family Med Prim Care](#). 2016 Apr-Jun; 5(2): 281-285.doi: [10.4103/2249-4863.192355](#)

Vets are ahead of physicians

- We know that animal production of every kind is directly dependent upon the diet of the animal.

DM and Diet

JULY 22, 2019

Association Between Plant-Based Dietary Patterns and Risk of Type 2 Diabetes: A Systematic Review and Meta-analysis

Frank Qian, Gang Liu et al.

JAMA Intern Med. 2019 Jul 22 [Epub ahead of print]

Importance Accumulating epidemiologic evidence has suggested favorable associations between plant-based dietary patterns and risk of type 2 diabetes, although there is a lack of a quantitative summary of evidence substantiating this important association.

Objective To quantitatively synthesize available prospective observational evidence on the association between plant-based dietary patterns and risk of type 2 diabetes.

Data Sources A systematic search of PubMed and MEDLINE, Embase, Web of Science, and reference lists through February 15, 2019, was conducted. Data analysis was conducted between December 2018 and February 2019.

Study Selection All prospective observational studies that examined the association between adherence to plant-based dietary patterns and incidence of type 2 diabetes among adults 18 years or older were identified.

Data Extraction and Synthesis Meta-analysis of Observational Studies in Epidemiology guidelines for data abstraction and reporting were followed, and a National Heart, Lung, and Blood Institute assessment tool was used to evaluate study quality. Two authors independently conducted full-text assessments and data abstraction. Meta-analysis was conducted using the random-effects method to calculate the overall relative risk (RR) and 95% CI.

Main Outcomes and Measures Level of adherence to a plant-based diet and incidence of type 2 diabetes.

Results A total of 9 studies were identified, totaling 307 099 participants with 23 544 cases of incident type 2 diabetes. A significant inverse association was observed between higher adherence to a plant-based dietary pattern and risk of type 2 diabetes (RR, 0.77; 95% CI, 0.71-0.84) in comparison with poorer adherence, with modest heterogeneity across studies ($I^2 = 44.5\%$; $P = .07$ for heterogeneity). Similar findings were obtained when using the fixed-effects model (RR, 0.80; 95% CI, 0.75-0.84). Consistent associations were observed across predefined subgroups. This association was strengthened when healthy plant-based foods, such as fruits, vegetables, whole grains, legumes, and nuts, were included in the definition of plant-based patterns (RR, 0.70; 95% CI, 0.62-0.79). Most studies were deemed to have good quality in terms of dietary assessment, disease outcomes, and statistical adjustment for confounding factors. Using restricted cubic splines, a significant inverse linear dose-response association was identified between plant-based dietary indices and risk of type 2 diabetes.

Conclusions and Relevance **Plant-based dietary patterns, especially when they are enriched with healthful plant-based foods, may be beneficial for the primary prevention of type 2 diabetes.**

Maroon JC, Bost JW, Surg Neurol, 2006;65(4) 326-31.

Good Oils

60% overall pain decrease, 60% joint pain decrease, 59% discontinued NSAIDs after 2400mg/d fish oil X 2weeks then 1200mg/d for avg. of 75 days.

White matter in the brains of MS patients contains

Cause and Effect

- How many know the cause of soil compaction? Is it too much traffic? Why is the soil compactable?
- What is the cause of constipation? Drug deficiency?
- symptom v. cause

Symptom and Cause

- Soil is compactable primarily because of aggregation of the clay molecules, often because of excesses of magnesium. Flocculation is needed and achieved by calcium ions but if too much is applied then deflocculation occurs and complete restructuring occurs and again, compaction.
- Constipation is primarily due to lack of adequate peristalsis and low fiber diet. High meat and processed food diets are classic culprits including dairy, especially cheese.

Basic Science is True Everywhere

- Kreb's Cycle in the plant is the same Kreb's Cycle in the human and requires the same nutrients to function optimally.
- Do insects have the same digestive systems as so mammals?
- Do insects attack only "sick" plants? Why?
- Do weeds have the same evolutionary biome as domesticated crops? e.g. pigweed and soybean
- What is your definition of "health?"

Boron Deficiency-Induced Membrane Permeability

Leakage of K^+ , sucrose, phenolics and amino acids from sunflower leaves as influenced by B supply

B supply (μM)	Potassium	Sucrose	Phenolics ($\mu\text{g g}^{-1}$ FW [2h] $^{-1}$)	Amino acids
0.01	630	900	79	163
0.20	390	440	72	122
1.0	52	70	17	33
20.0	18	20	13	23

Food as Anti-medicine

- “Increasing consumption of red meat was associated with increased risk of invasive breast cancer (HR_{highest vs. lowest quartile}: 1.23, 95% CI: 1.02–1.48, $p_{\text{trend}} = 0.01$).”
- [Jamie J. Lo](#) [Yong-Moon Mark Park](#) [Rashmi Sinha](#) [Dale P. Sandler](#). Association between meat consumption and risk of breast cancer: Findings from the Sister Study. *Cancer Epidemiology*, 06 August 2019. <https://doi.org/10.1002/ijc.32547>; AOA Morning Brief, 9 August 2019.

Longevity and Diet

- “In evaluating the relationship between very low meat intake (less than once weekly) and longevity, 6 studies were evaluated. **A very low meat intake was associated with a significant reduction in risk of death in 4 studies, a nonsignificant reduction in risk of death in the fifth study, and no reduction in risk in the sixth study. Two of the studies involving low meat intake showed a significant reduction in mortality risk, especially with a longer duration (=2 decades) of adherence to the diet. The protective effect of a low meat intake appeared to be reduced after the ninth decade.**”
- "Does Low Meat Consumption Increase Life Expectancy in Humans?" Singh PN, Sabate J, Fraser GE, Am J Clin Nutr, 2003;78(Suppl):526S-532S.

Diet and Breast Cancer

- In a prospective cohort study involving 35,372 pre- and post-menopausal women aged 35-69 years, **meat consumption, particularly red and processed meats, was found to be positively associated with risk of breast cancer.** Dietary information was gathered using a food-frequency questionnaire. During a mean follow up of 8 years, 395 postmenopausal breast cancer cases and 283 premenopausal breast cancer cases were diagnosed. Using Cox regression adjusted for potential confounders, premenopausal women with high total meat intake showed a 20% increased risk of breast cancer, compared to premenopausal women who did not eat meat. Similarly, premenopausal women with high processed meat (more than 20 g/day) and non-processed meat intakes showed 20% increased risks of breast cancer, compared to premenopausal women who did not eat meat. **Among postmenopausal women, high intake of red meat (more than 57 g/day) was associated with a 56% increased risk of breast cancer, and high intake of processed meat (more than 20 g/day) was associated with a 64% increased risk of breast cancer, compared to no intake of meat.** Thus, the authors of this study conclude that women who consume more total meat, red meat and processed meat may be at an increased risk for breast cancer compared to women who do not consume meat at all.
- “Meat consumption and risk of breast cancer in the UK Women's Cohort Study,” Taylor EF, Burley VJ, et al, Br J Cancer, 2007; 96(7): 1139-46. (Address: Nutritional Epidemiology Group, 30-32 Hyde Terrace, University of Leeds, Leeds, LS2 9LN, UK. E-Mail: j.e.cade@leeds.ac.uk).

Dairy and Breast Cancer

- Bovine leukemia virus, ubiquitous in milk products, has been linked to increase risk of breast cancer
- “Presence of BLV-DNA in breast tissues was strongly associated with diagnosed and histologically confirmed breast cancer, OR=3.07. As many as 37% of breast cancer cases may be attributable to BLV exposure.”
- “Breast cancer incidence is markedly higher in countries with high milk consumption.”
- Buehring GC, Shen HM, Jensen HM, Jin DL, Hudes M, Block G. Exposure to Bovine Leukemia Virus Is Associated with Breast Cancer: A Case-Control Study. *PLoS One*. 2015;10(9):e0134304. Published 2015 Sep 2. doi:10.1371/journal.pone.0134304

Bovine Leukemia Virus Causes Breast Cancer

- “Using similar techniques to study 96 Australian women, we report here detection of retrotranscribed BLV DNA in breast tissue of 40/50(80%) of women with breast cancer versus 19/46(41%) of women with no history of breast cancer, indicating an age-adjusted odds ratio and confidence interval of 4.72(1.71–13.05). These results corroborate the findings of the previous study of US women with an even higher odds ratio for the Australian population. For 48 of the subjects, paired breast tissue samples, removed 3–10 years apart in two unrelated procedures, were available. For 23/31 (74%) of these, in which the first specimen was diagnosed as nonmalignant (benign or premalignant) and the second as malignant, **BLV was already present in benign breast tissue years 3–10 years before the malignancy was diagnosed. This is consistent with the supposition of a causative temporal relationship between BLV infection and subsequent development of cancer.**”
- Buehring GC, Shen H, Schwartz DA, Lawson JS (2017) Bovine leukemia virus linked to breast cancer in Australian women and identified before breast cancer development. PLoS ONE 12(6): e0179367. <https://doi.org/10.1371/journal.pone.0179367>

Diet and DM

- In a study involving 99 subjects with type 2 diabetes, **adherence to a low-fat vegan diet was found to improve glycemic control and cardiovascular risk factors more effectively than adherence to a diet following guidelines set forth by the American Diabetes Association (ADA)**, which also improved glycemic control and cardiovascular risk factors, but to a lesser extent. Subjects were divided into two groups. 49 subjects followed a low-fat vegan diet and 50 subjects followed a diet following ADA guidelines for a period of 22 weeks. Both at baseline and at 22 weeks, subjects were evaluated. By the end of 22 weeks, 43% of subjects on the low-fat vegan diet and 26% of subjects on the ADA diet reduced their medications. Excluding these participants who reduced their medications, HbA1C decreased by 1.23 percentage points among subjects in the vegan group versus only 0.38 points among subjects in the ADA group. When including all participants in the analysis, HbA1C decreased by 0.96 percentage points among subjects in the vegan group versus 0.56 points in the ADA group. Changes in body weight were found to correlate with changes in HbA1C. Subjects in the vegan group lost on average 6.5 kg versus on average a 3.1 kg loss in weight seen in the ADA group. In terms of other cardiovascular risk factors, among subjects who did not change their lipid-lowering medications, LDL cholesterol levels were found to drop by 21.2% among subjects on the vegan diet versus 10.7% among subjects on the ADA diet. Finally, reductions in urinary albumin were also greater among subjects in the vegan group (15.9 mg/24 h), as compared to subjects in the ADA group (10.9 mg/24 h). The results of this study suggest that persons with type 2 diabetes may benefit from adherence to either a low-fat vegan diet or a diet following the guidelines set forth by the ADA, however, adherence to a low-fat vegan diet may be significantly more effective in improving glycemic control, lipid control and reducing weight.
- "A low-fat vegan diet improves glycemic control and cardiovascular risk factors in a randomized clinical trial in individuals with type 2 diabetes," Barnard ND, Cohen J, et al, Diabetes Care, 2006; 29(8): 1777-83. (Address: 5100 Wisconsin Ave., Suite 400, Washington, DC 20016. E-mail: nbarnard@pcrm.org).

The Atkins, Keto, Paleo Quandary

- While a plant-based diet is generally considered healthier than a meat-based diet in preventing the risk of diabetes, not all meats affect the risk equally. As Professor Koh Woon Puay, Professor of Clinical Sciences at Duke-NUS Medical School (Duke-NUS), and her team found out, **higher intake of red meat and poultry is associated with significantly increased risk of developing diabetes**, which is partially attributed to their higher content of heme iron in these meats. This study provides the basis for evidence-based dietary recommendations to the Singapore population in mitigating diabetes risk and reducing the healthcare burden of this chronic condition. These findings come from the Singapore Chinese Health Study, which recruited 63,257 adults aged 45-74 years between 1993 and 1998, and then followed them up for an average of about 11 years. The study found a positive association between intakes of red meat and poultry, and risk of developing diabetes. Specifically, compared to those in the lowest quartile intake, those in the highest quartile intake of red meat and poultry had a **23 per cent and 15 per cent increase in risk of diabetes**, respectively, while the intake of fish/shellfish was not associated with risk of diabetes. The increase in risk associated with red meat/poultry was reduced by substituting them with fish/shellfish.
- Mohammad Talaei, Ye-Li Wang, Jian-Min Yuan, An Pan, Woon-Puay Koh. **Meat, Dietary Heme Iron, and Risk of Type 2 Diabetes Mellitus**. *American Journal of Epidemiology*, 2017; 1 DOI: [10.1093/aje/kwx156](https://doi.org/10.1093/aje/kwx156)

DM v. Meat MOA

- “...association between dietary heme-iron content from all meats and the risk of diabetes, and found a dose-dependent positive association.”

DM and Heme/AGEP

- “There is growing evidence of disordered iron homeostasis in the diabetic condition, with links proposed between dietary iron intakes and both the risk of disease and the risk of complications of advanced disease. In the United States, Britain, and Canada, the largest dietary contributors of iron are cereals and cereal products and meat and meat products. This review discusses the findings of cohort studies and meta-analyses of heme iron and red meat intakes and the risk of type 2 diabetes. These suggest that **processed red meat is associated with increased risk, with high intakes of red meat possibly also associated with a small increased risk.** Historically, humans have relied on large quantities of heme iron and red meat in their diets, and therefore it is paradoxical that iron from meat sources should be associated with the risk of type 2 diabetes. A reason for this association may be drawn from studies of dietary **advanced glycation and lipoxidation endproducts present in processed food and the mechanisms by which insulin output by pancreatic islet cells might be influenced by the protein modifications present in processed red meat.**”
- Desley L. White and Avril Collinson “Red Meat, Dietary Heme Iron, and Risk of Type 2 Diabetes: The Involvement of Advanced Lipoxidation Endproducts.” [Adv Nutr](#). 2013 Jul; 4(4): 403–411. Published online 2013 Jul 8. doi: [10.3945/an.113.003681](https://doi.org/10.3945/an.113.003681)

Mediterranean Diet

- “Mounting evidence suggests that Mediterranean diets could serve as an anti-inflammatory dietary pattern, which could help fighting diseases that are related to chronic inflammation, including visceral obesity, type 2 diabetes and the metabolic syndrome.”
- [Giugliano D](#)₁, [Esposito K](#). “Mediterranean diet and metabolic diseases.” Curr Opin Lipidol. 2008 Feb;19(1):63-8. doi: 10.1097/MOL.0b013e3282f2fa4d.

Inflammation

- “Since the Seven Countries Study, dietary cholesterol and the levels of serum cholesterol in relation to the development of chronic diseases have been somewhat demonised. However, the principles of the Mediterranean diet and relevant data linked to the examples of people living in the five blue zones demonstrate that the key to longevity and the prevention of chronic disease development is not the reduction of dietary or serum cholesterol but the control of systemic inflammation. In this review, we present all the relevant data that supports the view that it is inflammation induced by several factors, such as platelet-activating factor (PAF), that leads to the onset of cardiovascular diseases (CVD) rather than serum cholesterol. **The key to reducing the incidence of CVD is to control the activities of PAF and other inflammatory mediators via diet, exercise, and healthy lifestyle choices.** The relevant studies and data supporting these views are discussed in this review.”
- Alexandros Tsoupras, Ronan Lordan and Ioannis Zabetakis. “Inflammation, not Cholesterol, Is a Cause of Chronic Disease.” [Nutrients](#). 2018 May; 10(5): 604. Published online 2018 May 12. doi: [10.3390/nu10050604](https://doi.org/10.3390/nu10050604)

Inflammation cause of disease

- Chronic inflammation leads to autoimmune disease from MS to AS, Crohn's to IBS, CAD to Cancer.
- Multiple triggers for chronic inflammation
 - chemicals including pesticides and industrial chemicals
 - heavy metals to include lead, aluminum, mercury, cadmium
 - electromagnetic pollution to include stray current
 - diet and processed foods

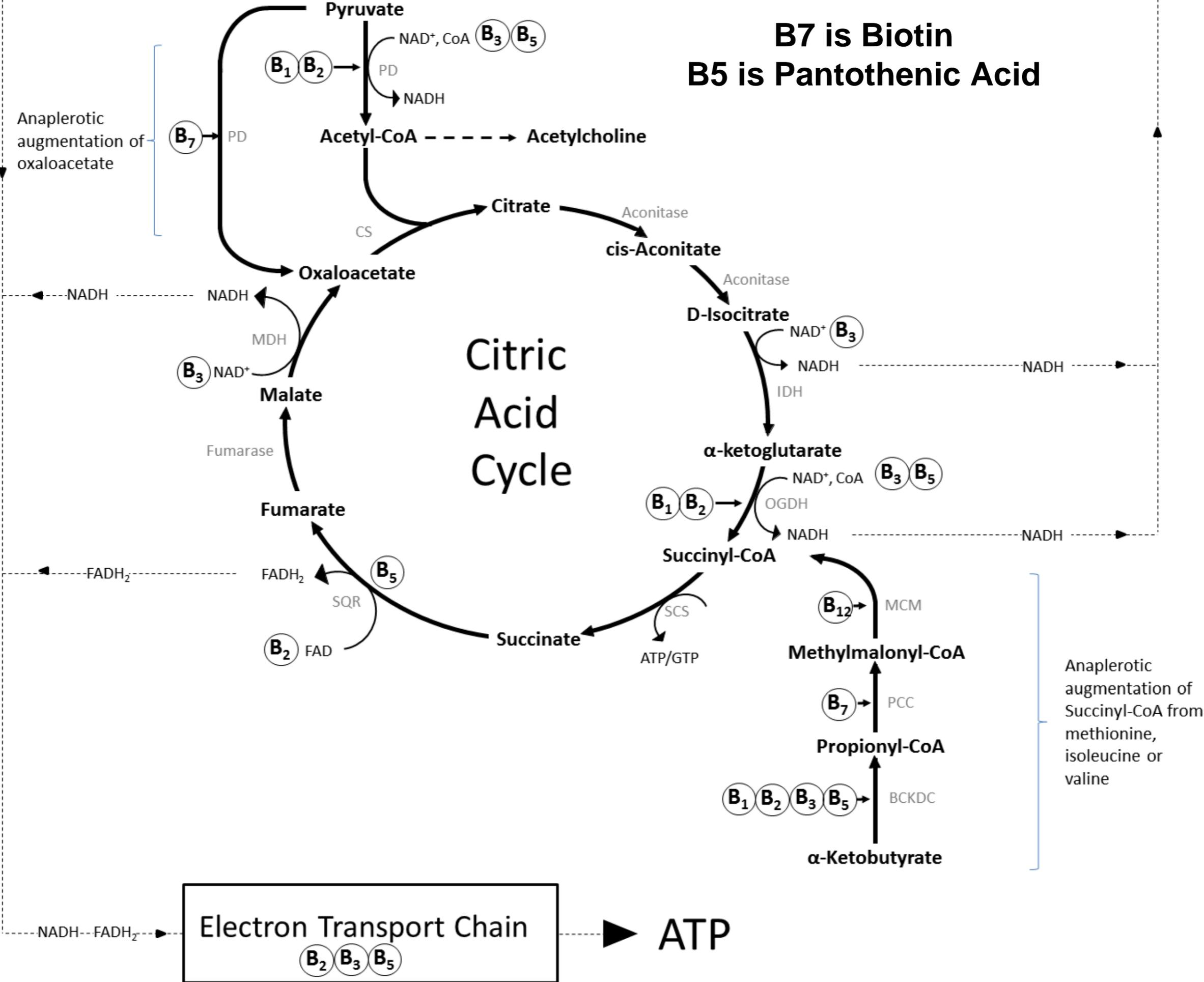
How do we address inflammation?

- Most clinicians prescribe anti-inflammatory drugs
 - NSAIDS
 - Steroids
 - Biologics
- Few clinicians recommend addressing the biggest cause of inflammation: diet - the foods consumed several times per day
 - in fact most physicians are antagonistic to diet and nutritional correlations to disease of any kind

Back to Basics

- **Kreb's Cycle - TCA Cycle**
 - every cell of our body is dependent upon the TCA Cycle to produce ATP, carbohydrates, amino acids, fatty acids and organic acids.
 - every cycle of the TCA Cycle requires a full complement of vitamins and minerals and the more environmental toxicity the more free-radical oxidants are produced and the more antioxidants, vitamins and minerals are needed to keep the TCA Cycle running smoothly.

B7 is Biotin
B5 is Pantothenic Acid



TCA Cycle B Vitamins

- **Figure 1.** The role of B-vitamins in mitochondrial energy production. The citric acid cycle (tricarboxylic/Krebs cycle) is a series of chemical reactions that generate energy, in the form of ATP, in the mitochondria of eukaryotes. Carbohydrates, fats and proteins are first converted to acetyl-CoA, most often via pyruvate, and then undergo eight enzymatic reactions that result in the production of NADH and FADH₂, which transfer the energy generated by the citric acid cycle to the electron transport chain. This in turn leads to the synthesis of ATP, the energy currency of cells. B vitamins contribute (as shown) to this process as co-factors/enzymes such as FAD (B₂), NAD (B₃) and as a component of CoA (B₅), or Co-enzyme Q10 (B₅). The intermediate compounds of the cycle are also sequestered as substrates for the synthesis of other compounds, including amino acids and fatty acids, and several subsequently have to be replenished by anaplerotic synthesis, taking place outside of the cycle. The most prevalent examples are the augmentation of succinyl-CoA from α-ketobutyrate generated from methionine within the methionine cycle (see [Figure 2](#)), and synthesis of oxaloacetate direct from pyruvate. Abbreviations: BCKDC, branched-chain α-ketoacid dehydrogenase complex; CS, citrate synthase; CoA, coenzyme A; FAD/FADH₂, flavin adenine dinucleotide (oxidised/reduced); IDH, isocitrate dehydrogenase; NAD, nicotinamide adenine dinucleotide (+/H = oxidised/reduced); MDH, malate dehydrogenase; MCM, methylmalonyl-CoA mutase; OGDH, α-ketoglutarate dehydrogenase; PCC, propionyl-CoA Carboxylase; PC, pyruvate carboxylase; PD, pyruvate dehydrogenase; SCS, succinyl-CoA synthetase; SQR, succinate-coenzyme Q reductase.
- David O. Kennedy. “B Vitamins and the Brain: Mechanisms, Dose and Efficacy—A Review.” *Nutrients* **2016**, 8(2), 68; <https://doi.org/10.3390/nu8020068>

Full Complement of B's

- “..inter-related functions of the eight B-vitamins and marshals evidence suggesting that adequate levels of all members of this group of micronutrients are essential for optimal physiological and neurological functioning. Furthermore, evidence from human research clearly shows both that **a significant proportion of the populations of developed countries suffer from deficiencies or insufficiencies in one or more of this group of vitamins, and that, in the absence of an optimal diet, administration of the entire B-vitamin group, rather than a small sub-set, at doses greatly in excess of the current governmental recommendations, would be a rational approach for preserving brain health.**”
- David O. Kennedy. “B Vitamins and the Brain: Mechanisms, Dose and Efficacy—A Review.” *Nutrients* **2016**, 8(2), 68;
<https://doi.org/10.3390/nu8020068>

Standard nutrition studies are designed to fail

- “The lack of demonstrable efficacy seen in multiple meta-analyses of supplementation trials involving this small sub-group of homocysteine lowering B vitamins has often prompted a counter commentary that persists with the notion that the underlying homocysteine hypothesis is likely to be correct, **suggesting rather that the methodology or focus of the individual studies or meta-analyses are incorrect**, and that future research should be directed towards sub-groups of the population more likely to benefit, in trials that employ more sensitive measures (e.g., [131]). This may prove a fruitful approach, but given the inter-related cellular functions of the B vitamins, **a more rational approach to research must be to investigate the effects of supplementation with the full range of B vitamins, at doses well in excess of the current governmental RDAs. There is no compelling argument for restricting this research either to a small sub-group of three B vitamins or to the elderly groups of subjects usually employed in these trials.** Certainly, the smaller body of research investigating multivitamins, which has largely been undertaken in healthy children and non-elderly adults, suggests significant benefits to brain function following supplementation with multivitamin products containing a full range of B vitamins at levels well in excess of their RDAs.”
- David O. Kennedy. “B Vitamins and the Brain: Mechanisms, Dose and Efficacy—A Review.” *Nutrients* **2016**, 8(2), 68; <https://doi.org/10.3390/nu8020068>

Clinical Nutrition: Similar to Clinical Medicine

- To get enough magnesium into the system I must...
- use the right form - best Magnesium Chloride liquid especially if an cardiac arrhythmia
- use enough to overcome threshold needed for change, e.g. therapeutic dose
- use enough cofactors such as choline to get sufficiency absorption and utilization from the gut for the Mg to work

The oxymoron of “evidenced based medicine”

- Most often physicians discount diet and specifically nutrition in medicine and health because they fail to follow their own allopathic rules of adjusting dosages until the desired outcome is achieved. They assume that the RDA's are “ideal”, and given with the Standard American Diet and therefore inconsequential in applying “real’ medicine.
- Yet, they will adjust a diuretic to the fluid overload condition of the individual patient, completely neglecting the basic biochemistry of heart cell mitochondria concentration and the real underlying reason the heart is failing: lack of ATP
- No diuretic, no beta blocker, no calcium channel blocker or ACE II at any dose will increase heart cell mitochondrial ATP production
 - that requires a full complement of nutrients esp. CoQ10, magnesium, carnitine, B complex
- David O. Kennedy. “B Vitamins and the Brain: Mechanisms, Dose and Efficacy—A Review.” *Nutrients* **2016**, 8(2), 68; <https://doi.org/10.3390/nu8020068>

CAD: Food as Medicine Trials

- Esselstyne program for reversing CAD
- Cleveland Clinic: strict vegetarian, 20gm fat per day
- Prevent and Reverse Heart Disease - [amazon.com](https://www.amazon.com)

Food IS Medicine

- In 2014, we conducted a second larger study of 198 patients with significant CAD.^[9] Of these patients, 119 had undergone a prior coronary intervention with stents or bypass surgery, and 44 had a previous heart attack. There were multiple comorbidities including hypercholesterolemia, hypertension, obesity, and diabetes. **During four years of follow up, 99.4% of the participants who adhered to WFPBN avoided any major cardiac event including heart attack, stroke, and death, and angina improved or resolved in 93%. Of the 21 non-adherent participants, 13 (62%) experienced an adverse event. When comparing these results to the well-known COURAGE,^[13] and Lyon Diet Heart Study,^[14] which consisted of conventionally treated participants, there is beyond a 30-fold difference in major cardiovascular events favoring WFPBN.**
- Esselstyn CB. A plant-based diet and coronary artery disease: a mandate for effective therapy. *J Geriatr Cardiol.* 2017;14(5):317–320.
doi:10.11909/j.issn.1671-5411.2017.05.004

Natural Studies

- “...in 1951, Strom and Jensen reported a **profound decrease in circulatory diseases in Norway during WWII when the Germans confiscated the country's livestock, forcing the Norwegians to subsist mostly on plant food.**^[17] Results from both the On-Target Transcend trial investigators,^[18] and the Epic Oxford Study^[19] with more than 75,000 participants support the power of nutrition for primary and secondary CVD prevention.”
- “Esselstyn CB. A plant-based diet and coronary artery disease: a mandate for effective therapy. *J Geriatr Cardiol.* 2017;14(5):317–320. doi:10.11909/j.issn.1671-5411.2017.05.004.”

Biochemistry again

- “Researchers at Cleveland Clinic under the direction of Stanley Hazen, which included Tang,^[21] Koeth,^[22] and Wang,^[23] studied the metabolism of lecithin and carnitine found in eggs, meat, milk and dairy products, liver, shellfish, and fish. The intestinal microbiota of omnivores metabolizes these substances producing trimethylamine oxide (TMAO), which causes vascular injury. This investigation was a powerful validation for WFPBN because ingestion of these animal foods by persons who strictly consume plants produces no TMAO. In fact, plant eaters do not have intestinal bacteria capable of producing TMAO.”
- Esselstyn CB. A plant-based diet and coronary artery disease: a mandate for effective therapy. *J Geriatr Cardiol*. 2017;14(5):317–320. doi:10.11909/j.issn.1671-5411.2017.05.004

Daily Supplementation

- Food alone just isn't sufficient to address, counter and reverse the intoxication and nutrient depletion we experience in today's world. Matters not if one eats exclusively organic and biodynamic and lives in a commune where all are back to nature. The polar bears are sick with mercury contamination and it doesn't get much more back to nature than where they live.
- One must get "therapeutic"; meaning quality, ratios and dosing sufficient to overcome the assault AND regenerate to a healthful state. EX: reversal of MS (MRI and symptom proof), RA (RF and symptom reversal), Fibromyalgia reversal.

The “evidence” must be in!

- “...nutritional supplements, such as vitamin B₆, vitamin A, multivitamins, antioxidants, and iron and dietary interventions, such as reduced fat intake, had no significant effect on mortality or cardiovascular disease outcomes (very low– to moderate-certainty evidence).”
- Safi U. Khan, MD; Muhammad U. Khan, MD; Haris Riaz, MD; Shahul Valavoor, MD; Di Zhao, PhD; Lauren Vaughan, MD; Victor Okunrintemi, MD, MPH; Irbaz Bin Riaz, MD, MS; Muhammad Shahzeb Khan, MD; Edo Kaluski, MD; M. Hassan Murad, MD; Michael J. Blaha, MD, MPH; Eliseo Guallar, MD, DrPH; Erin D. Michos, MD, MHS “Effects of Nutritional Supplements and Dietary Interventions on Cardiovascular Outcomes: An Umbrella Review and Evidence Map” Annals of Internal Medicine. August 6, 2019.

Therapeutic Dosing

- If I give a patient an antibiotic requiring a given dose for a specific period of time and the patient takes half the dosing for half the time - what do you say?
- If I give a beta blocker for BP and arrhythmia I must adjust the dose therapeutically for the desire outcome. What do you say if the patient takes half the dose and complains they aren't better? Or maybe 1/10th the therapeutic dose - is the dosing or the beta blocker at fault?
- Why would you think any differently with therapeutic dosing of nutrition?

Nutrients are NOT drugs!

- Drugs will never result in health, only the abatement/suppression/masking of symptoms of chronic disease.
 - Does a BP med cure HTN?
 - Does a biologic med cure RA or Crohns?
 - Does injectable insulin cure DM?
 - Does a steroid inhaler cure asthma?
 - Does an SSRI cure depression?

It's the Kreb's Cycle! Not the test tube

- Unlike drugs, nutrition is collective - meaning the value of one nutrient is dependent upon many or all others.
 - Magnesium and choline
 - Manganese and copper, zinc and iron
 - B vitamins

Optimal Daily Intake

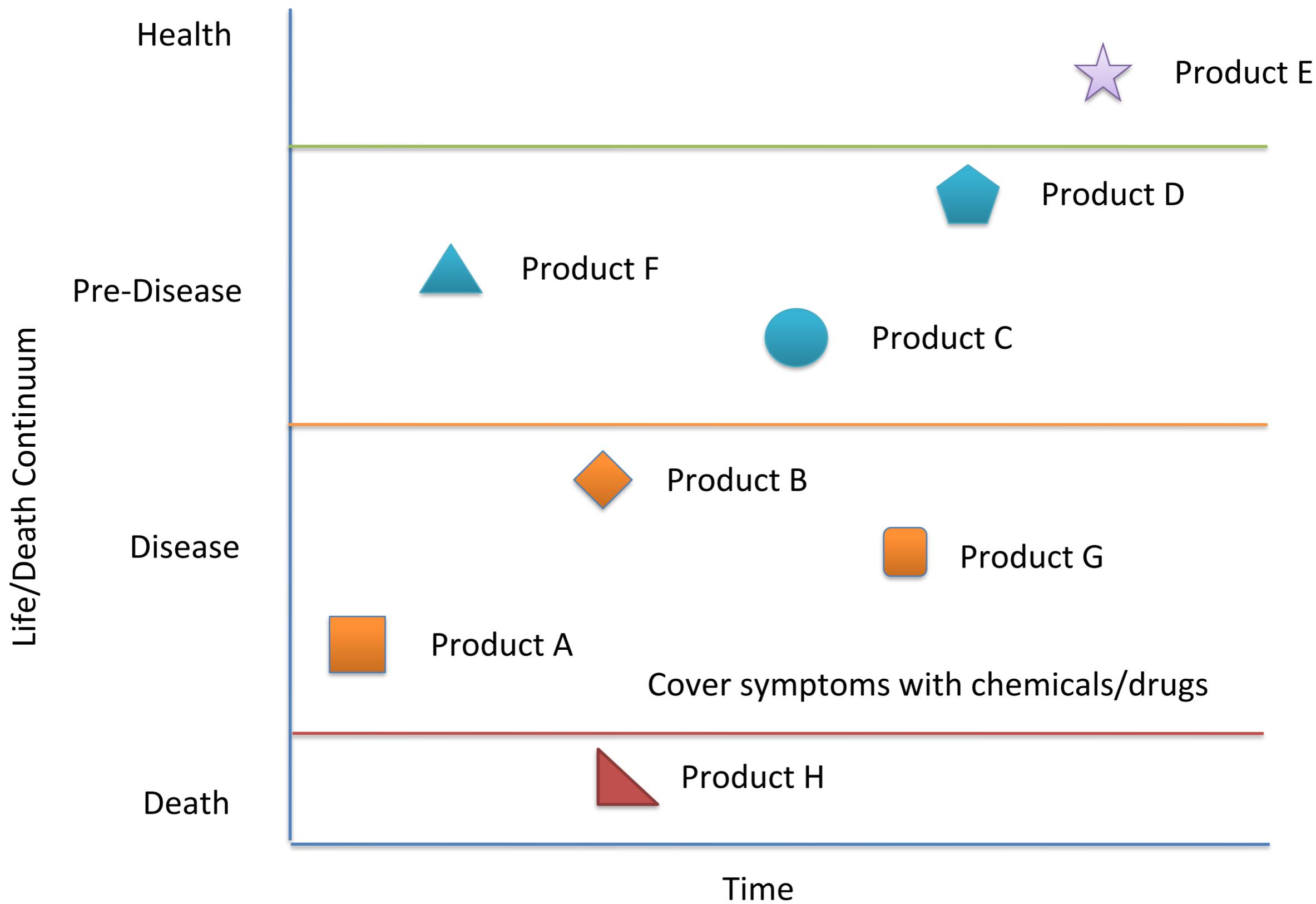
- » Vit A (71% beta-carotene) 35,000 IU
- » Vit C ascorbic acid 2000 mg
- » Vit D3 2000 IU
- » Vit E (as mixed tocopherols) 800 IU
- » Vit K1 150 mg
- » Thiamine (B1) 200 mg
- » Riboflavin (B2 as R-5-P and Riboflavin) 100mg
- » Niacin/niacinamide 250 mg
- » Vit B6 (Pyrodoxine/P-5-P) 300 mg
- » Folate (Calcium folate/5-MTHF) 800 mcg
- » Vit B12 (methyl- and hydroxycobalamin) 1,000 mcg
- » Biotin 500 mcg
- » Pantothenic Acid from Calcium pantothenate 500 mg
- » Iodine (sea kelp and potassium iodide) 1,000 mcg
- » Magnesium (from magnesium glycinate) 500 mg
- » Zinc (from zinc picolinate) 50 mg
- » Selenium (from amino acid chelate) 400 mcg
- » Copper (citrate) 3 mg
- » Manganese (ascorbate) 20 mg
- » Molybdenum (fumerate) 300 mcg
- » Potassium (citrate) 99 mg
- » chromium (from chromium GTF) 400 mcg

ODI cont.

- » Choline (citrate) 300 mg
- » Inositol 300 mg
- » N-Acetyl L-Cysteine 200 mg
- » Betaine HCl 150 mg
- » Bioflavonoids (citrus) 100 mg
- » PABA 100 mg
- » Glutamic Acid HCl 20 mg
- » L-Methionine 12.5 mg
- » Co-Q10 10 mg
- » Boron (citrate) 50 mg
- » Vanadium (Asparate) 300 mcg
- » Trace Elements 100 mcg

Supplement Choice

- Why is it that so many “natural” products have so many wonderful claims and personal accounts but then just don’t help others?
- Its all about your standard of health. What do you consider the goal? what’s acceptable? is there a ulterior motive because you have a dealership to maintain?
- These are the same questions we must ask on the farm or in the garden?



Food IS Medicine: Good or Bad

- The Standard American Diet is the most disease inducing diet program in the world.
- It's about nutrition, therapeutic, insufficient or deficient depending upon one's state of health/disease/stress
- It's about basic biochemistry: Kreb's Cycle and all it's associative cycles and the nutrients needed to drive them
- Diet and lifestyle are the foundation; plant based is potentially the healthiest
- Nutritional supplements must be given per their biochemical needs and interactions, NOT per the RDA and, like a drug, titrated to the optimal therapeutic dose for the individual patient according to their genetic idiosyncrasies

Health v. Disease Management in Practice

- Disease management lends well to established protocols determined by drug manufacturers. It can readily be executed by mid-level practitioners.
- Health management/achievement requires a much more sophisticated approach, more basic science basis especially in biochemistry and the realization that titrating the dose of nutrition to achieve the desired therapeutic outcome is critical to success
- Dump the fad diets: think nutrition; learn how food is produced
- Don't waste your time or money on the majority of nutritional supplements available on the market. They are woefully inadequate to achieve therapeutic outcomes.