Overview

Vitamins – do they work, apparently not...?
Vitamin D – deep dive
Osteoporosis – linked to the microbiome
Sauna
Metabolism/Diabetes – microbiome, fasting, low carb/low insulin
Coffee – is it cancer causing, is it healthy?

Vitamins – Headline

“Most popular vitamin and mineral supplements provide no health benefit, study finds”
They looked at heart disease and stroke outcomes, ONLY.
Supplemental Vitamins and Minerals for CVD Prevention and Treatment

- Folate decreased stroke. (Multiple studies)
- B-complex decreased stroke.
- Niacin may increase all cause mortality, (glycemic effect)
- Anti-oxidants may increase all cause mortality, (Beta-carotene, vitamin E.)
- Optimally, eat a diet high in plants that will contain many of these vitamins and minerals!
- Vitamin D, Calcium, vitamin C had no benefit in CVD.

In the author’s own words, “...MVM supplement use was inversely related to the incidence of CHD when all studies were considered.”

“Let’s conclude. If you want to reduce your risk of cardiovascular disease, eat well, be active, avoid toxins, and...so on. Use lifestyle as medicine, in other words. Don’t rely on a MVM for this purpose, obviously. But if you have other reasons for taking a MVM, this study, like all before it, leave room for potential benefit, while pretty reliably ruling out any meaningful harm.”

David Katz, MD, MPH
Professor of Public Health Yale

“Well, duh”

https://www.linkedin.com/pulse/multivitamins-wont-help-you-well-duh-david/

REDUCE-IT Trial

REDUCE-IT™, a global study of 8,179 statin-treated adults with elevated CV risk. 4.9 years average follow up. Primary endpoint demonstrating an approximately 25% relative risk reduction, a high statistical significance, in major adverse CV events with use of Omega3/EPA 4 grams/day as compared to placebo.
Erythrocyte long-chain omega-3 fatty acid levels are inversely associated with mortality and with incident cardiovascular disease: The Framingham Heart Study - 2500 patients followed for 7.3 years

Omega 3 levels and cholesterol were measured

Those with the highest levels of omega three had the 34% decreased risk of dying from any cause, and 39% lower risk of CVD event

When total cholesterol was compared with the Omega-3 Index in the same models, the latter was significantly related with these outcomes, but the former was not.

We conclude that 1 to 2 seafood meals per week be included to reduce the risk of congestive heart failure, coronary heart disease, ischemic stroke, and sudden cardiac death, especially when seafood replaces the intake of less healthy foods.
THE LANCET

Vitamin D supplementation to prevent asthma exacerbation's: systematic review and meta-analysis of individual participant data

Conclusion
Vitamin D supplementation reduced the rate of asthma exacerbations requiring systemic corticosteroids

The Pediatric Infectious Disease Journal

Preventive effects of vitamin D on Seasonal Influenza in Infants: A multicenter, randomized, open, controlled clinical trial

400 infants randomized into low-dose (400IU) and high-dose vitamin D, (1200IU), groups
Decreased Influenza cases: 78 low-dose vitamin D, 43 high dose vitamin D.
Influenza was less severe in the high-dose vitamin D
Never no adverse effects and the high-dose vitamin D

AAPF recommends 400IU

PLOS

Breast cancer risk markedly lower with serum 25-hydroxy vitamin D concentration greater than 60 versus less than 20 ng/millilitre: Pooled analysis of two randomized trials and the perspective cohort

5038 patients, 4 years, 77 developed breast cancer

Conclusions
Higher 25-hydroxy vitamin D concentrations were associated with the dose response decrease in breast cancer risk with concentrations greater than 60ng/ml being most protected.

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0199265
Vitamin D

- Test – treat to target, 40 - 60 ng/ml, +/- 5 ng/ml
- 2000 – 5000 IU daily typical
- D3 generally thought to be better. “D2, Past it’s usefulness...” Binkley
- Bolus dosing increases risk of fractures and falls, 100,000 IU or greater. Not recommended.
- Replacement dose 5000 – 10,000 for 8 to 12 weeks.
- Safety – remarkable rare toxicity, LAB Medicine 2018, 130,000 levels, 16 years, 4 with symptomatic toxicity.

Vitamins – Headline

“Most popular vitamin and mineral supplements provide no health benefit, study finds”

In Fact ... B-Vitamins, Vitamin D, Omega 3’s Conclusively Beneficial

Not a well informed statement!
Osteoporosis

Greater intake of Fruits and Vegetables was independently associated with a higher BMD and a lower presence of osteoporosis in middle-aged and elderly individuals.

Adherence to a Mediterranean Diet was positively associated with better bone mass in Spanish premenopausal women.

Extra virgin olive oil consumption reduces the risk of osteoporotic fractures in the PREDIMED trial.

Higher fruit and vegetable intake associated with higher BMD in young adults and decreased bone loss over time.

Greater Protein intake benefits BMD and protects against fracture.
How Much Calcium?

35% of US adults take calcium supplements. Taking too much?

Probably a sweet spot around 1000 mg of calcium intake daily.

Food is optimal – wide margin of safety.

Food limits the acute rise in serum calcium and provides other health benefits.

Excess calcium may promote vascular calcification and nephrolithiasis.

Excess calcium promotes and worsens constipation in elderly.

Supplementation – Calcium citrate 150 – 200mg 1 or 2 daily.
The Bone-Vascular Axis: calcium supplementation in the role of vitamin K

February 2019

Western diet low in Vitamin K
Calcium Paradox, Low BMD, Inc. Vascular Calcium, Osteoporosis, CKD
Calcium/Vitamin D improves BMD but Inc. Vascular Calcium

Conclusion
"Clinical studies demonstrate that increased intake of vitamin K could be a promising complementary nutrient in supporting both bone health and protecting vascular calcification."

Three-year low-dose menaquinone-7 supplementation helps decrease bone loss in healthy postmenopausal women

Vitamin K2 – MK7, 180mcg daily, 244 patients, 3 years f/u
Increased vitamin K status based on ratio carboxylated/uncarboxylated Osteocalcin
Increased BMD spine and femoral neck

Nexus – Estrogen, GI Barrier, Inflammation, Probiotics, Calcium, & Bone Health

- Estrogen Deficiency, post menopausal and during lactation, leads to compromised GI barrier function and decreased BMD.

- In lactation physiologic provides necessary calcium for breast milk, in menopause it leads to osteoporosis. (Roberto Pacifici, MD, Paul J. Kostenuik, PhD. Santa Fe Bone Symposium, 2018)

- Compromised GI barrier initiates an inflammatory immune cascade, increased Th17 cells in the gut. These translocate to the bone increasing osteoclastogenic TNF, IL-17, RANKL, decreased BMD.

- Probiotics act to restore GI barrier and normalize host inflammatory immune response BMD.

Sufficient Estrogen

Nature, October 2017
Probiotics

**Mechanisms**

1. Restores GI Membrane – stimulates production of tight junction proteins.
2. Lacto-fermenting bacteria, lactate, increased oestradiol, SCFA, translocate to bone and up regulate Tregs, decreasing osteoclast number and decreased TNF, IL6, IL17, RANKL.

Nature, October 2017
Science Direct Bone Reports 2018

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Nutritional Support of Bone Health - Probiotics

**Mouse Studies**

*JBMR* 2012, Gut Microbiome regulation Bone in Mice – Sterile/Notobiotic mice had 30% increased BMD.

**Ovaryectomized** Sterile/Notobiotic mice have little decrease in BMD (Multiple studies)

**Human Studies**

*JIM* Internal Medicine 2018 June

L. Reuteri (10 Billion CFU) Reduced Bone Loss in Older Women, 12 months, Tibia BMD.


**Dosing** – Multispecies, Lactobacillus and Bifidobacter, 10 – 450 Billion CFU
Estrogen Replacement Therapy: Risk Benefit Analysis

**WHI** – 33% decrease in hip fracture, no increase in all cause mortality or breast cancer mortality.

**POSITION STATEMENT** The 2017 hormone therapy position statement of The North American Menopause Society

Book: *Estrogen Matters*, Avrum Bluming, MD, 2018

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**Exercise for Bone Health**

- “Exercise should be used as a first line therapy for bone health” Lora Giangregorio, PhD. Effects ... musculoskeletal load, physiology, balance, tissue mass.
- Walking is terrific exercise but “not sufficient” to impact BMD. (Inc. lumbar BMD only)
- Progressive resistance training needed – optimally twice weekly, 5 – 10 reps, approaching 85% of one rep max, improves BMD, balance, functional strength. (LiftMor trial JBMR, 2018, Watson)
- This type exercise increases type 2 myofibers responsible for strength and responsiveness.
- Balance challenging exercises – these shift center of gravity and narrow base of support. Many examples Tai Chi is one example.

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**Complimentary Therapies For Bone Health**

*Bone - ECHO, April 30th, 2019*

- Exercise Strength and Balance
- Nutrition Nutrient dense colorful
- Estrogen Judicious replacement
- Protein 30 gm per meal, at least twice daily.
- Vitamin D test, optimize, level 40 – 60 ng/ml
- Calcium 1000mg dietary sources optimal
- Vitamin K2 180 mcg daily
- Probiotics 10 – 450 billion CFU, multispecies - Lactobacillus, Bifidobacter
- Olive Oil 3 – 4 TBSP daily
- Silica 10mg daily
Sauna bathing reduces the risk of stroke in Finnish men and women: A prospective cohort study

Finnish study. 5.5 million people, (1 million saunas in Finland!)

Sauna 4 times weekly or greater were 61% less likely to have a stroke.

Saunas improve the following conditions: Pain, Fibromyalgia, CHF, LDL cholesterol, Hyperglycemia

Conclusions This long-term follow-up study shows that middle-aged to elderly men and women who take frequent sauna baths have a substantially reduced risk of new-onset stroke.

*Neurology*

May 2018

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*Cardiovascular and Other Health Benefits of Sauna Bathing: A Review of the Evidence*

August 2018

Emerging evidence suggests that beyond its use for pleasure, sauna bathing may be linked to several health benefits, which include reduction in the risk of vascular diseases such as high blood pressure, cardiovascular disease, and neurocognitive diseases; nonvascular conditions such as pulmonary diseases; mortality; as well as amelioration of conditions such as arthritis, headache, and flu.

**CONCLUSION** Sauna bathing, an activity used for the purposes of pleasure, wellness, and relaxation, is linked to a remarkable array of health benefits. It is a safe activity and can even be used in people with stable CVD, provided it is used sensibly for an appropriate period of time.
Fasting/Metabolism

**Diabetes Therapy** April 2018

Effectiveness and Safety of a Novel Care Model for the Management of Type 2 Diabetes at 1 Year: An Open-Label, Non-Randomized, Controlled Study

340 Adults with Type 2 Diabetes - Low Carb dietary intervention

- **Weight** decline 13.8 kg
- **Insulin** therapy reduced or eliminated in 94%
- **Sulfonylureas** entirely eliminated
- **HbA1c** decreased 7.6 to 6.3
- **HDL** increased 18%
- **Triglycerides** decreased 24%

[https://www.youtube.com/watch?v=da1vvigy5tQ](https://www.youtube.com/watch?v=da1vvigy5tQ)

**PEDIATRICS** June, 2018

Management of type 1 diabetes with a very low carbohydrate diet: Ludwig, Boston Children's Hospital

Facebook community: TypeOneGrit (Law of Small Numbers)

- 138 patients data and medical records confirmed
- VLCD, 36 grams of carbohydrates daily
- Average hemoglobin A1C 5.7, some below 5

**Very low insulin requirements. Few adverse reactions**

**CONCLUSIONS:** Exceptional glycemic control of T1DM with low rates of adverse events was reported by a community of children and adults who consume a VLCD.
Remission of Human Type 2 Diabetes Requires Decrease in Liver and Pancreas Fat Content but Is Dependent upon Capacity for β Cell Recovery

The Diabetes Remission Clinical Trial reported return and persistence of non-diabetic blood glucose control in 46% of people with type 2 diabetes of up to 6 years duration.

This study demonstrates that β cell ability to recover long-term function persists after diagnosis, changing the previous paradigm of irreversible loss of β cell function in type 2 diabetes.


Eat Late… to Gain Weight!

Daytime
- Digestion Optimal
- Insulin Sensitivity Highest
- Energy Utilization Highest
- Food Choices Healthier

7 A.M.

7 P.M.
- Nighttime
- Digestion Wanes
- Insulin Sensitivity Lowest
- Fat Storage Increases
- Poor Food Choices Common

Eat When the Sun is Out

High caloric intake at breakfast vs. dinner influences weight loss of overweight and obese women.

Two Groups (Randomized women with prediabetes)
1. Breakfast 200, Lunch 500, Dinner 700 calories
2. Breakfast 700, Lunch 500, Dinner 200 calories

Group 2
- Greater weight loss
- Smaller waist circumference
- Lower glucose and insulin
- Lower triglyceride numbers
- Less hungry while losing weight!
- Increased fertility in women with PCOS

Daniela Jakubowicz, Oren Froy, July 2013
**Time Restricted Eating**

- **Fast** overnight 13 or more hours
- **Fast** 3 hours before bed
- **No specific calorie intake**

**Metabolism**
- Lowers cholesterol
- Lowers blood sugar/insulin
- Enhances fat burning
- Improves Fatty Liver Disease
- Lowers Inflammation
- Leads to healthy nutritional ketosis

**Benefits seen with only 5 of 7 days weekly**

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**JAMA Oncology**

**Prolonged Nightly Fasting and Breast Cancer Prognosis**

- Fasting for 13 hours over night, 5 days weekly
- 36% Decreased in Recurrence of Breast Cancer
- 22% Decreased Risk of Death From Any Cause

And...

- Lower cholesterol, A1C, CRP, Less GERD, & Better Sleep

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**In Meal Timing**
Food Order Has a Significant Impact on Postprandial Glucose and Insulin Levels

The mean post‐meal glucose levels were decreased at 30, 60, and 120 min, respectively, and the incremental area under the curve was 73% lower when vegetables and protein were consumed first, before carbohydrate, compared with the reverse food order.

Coffee

Coffee is a very complex beverage. It is high in polyphenols, 100’s, and minerals like magnesium.

Caffeine has stimulant effects, antioxidant, decrease neurodegeneration, depression, mitochondria, anti-inflammatory effects.

Chlorogenic acid, strongest anti-oxidant in coffee, bitter/aromatic, improves BP and glucose metabolism.

Improves health with decreased CVD and decreased all cause mortality with caffeinated as well as decaffeinated coffee.

Frank Hu, M.D., Harvard, Chairman of Public Health.
Coffee Decreases All-Cause Mortality

Harvard, Nurses health study, Health professionals follow-up study 300,000 men and women, followed for 20-30 years

Strong inverse association between Coffee consumption, dose-dependent, in cardiovascular disease, neurological disease, and suicide.

Similar benefits found with caffeinated or decaffeinated coffee consumption.

Coffee and Health Promotion

Coffee consumption is associated with multiple beneficial health outcomes:

Type II diabetes
Oral cancers
Cirrhosis, chronic liver disease, Liver cancer
Kidney stones
Leukemia
Gout
Post MI mortality

Coffee Neuroprotective Effects

Parkinson’s disease 25% decrease risk
Alzheimer’s disease 20% decrease risk
Suicide, 3 cups/day, 45% decrease risk
Depression to 3 cups/day, 15% decreased risk

Mechanism may be due to the anti-inflammatory/polyphenols and caffeine benefits on neurotransmitters like dopamine
Moderate coffee consumption was inversely significantly associated with CVD risk, with the lowest CVD risk at 3 to 5 cups per day, and heavy coffee consumption was not associated with elevated CVD risk.

**Long-Term Coffee Consumption and Risk of Cardiovascular Disease**

Meta-analysis came **1.3 million participants**

15% decrease cardiovascular mortality, 3 to 5 cups/day

**Conclusion** Moderate coffee consumption was inversely significantly associated with CVD risk, with the lowest CVD risk at 3 to 5 cups per day, and heavy coffee consumption was not associated with elevated CVD risk.

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**Integrative Medicine Literature Update 2019**

MONA

M. Chris Link, MD

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**Questions ?**