

From Diet to Supplements: Practical Nutrition for ODs

Tracy Offerdahl, PharmD, RPh, FAAO



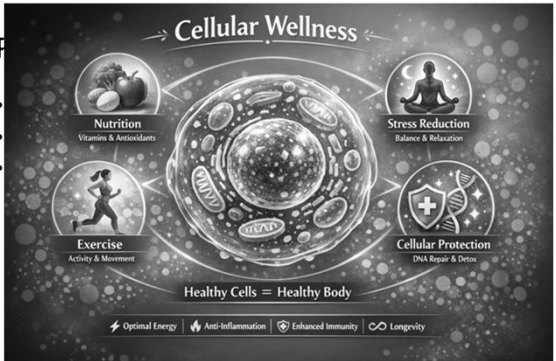
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Disclosures: Tracy Offerdahl, PharmD, FAAO

- **ALL** relevant relationships have been mitigated
 - Non-salaried financial relationship with Pharmanex

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Cellular Wellness



Healthy Cells = Healthy Body

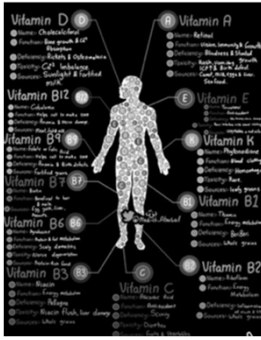
Optimal Energy | Anti-Inflammation | Enhanced Immunity | Longevity

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Our bodies are living miracles of micro- engineering

**The deeper science looks,
the more it confirms:
We are not ordinary!**

**We are built with
PRECISION!**



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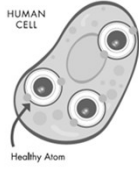
Here's the RUB...

- A body can **ONLY** heal itself if it is **HEALTHY ENOUGH** to do so!
 - Little/no inflammation
 - Appropriate stores of vitamins and minerals, etc.
 - An **ABUNDANCE** of antioxidants!!
 - GOAL for antioxidants: We need an **OCEAN** of them...NOT a puddle!
- It's about **CELLULAR WELLNESS!!**

We are created to be self-healing organisms!

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
CELLULAR ANTI-OXIDANT PROTECTION



Healthy Atom

Our body's health depends on our cells' **health**. To **slow down** aging, limit illness and prevent disease, **we must protect and feed** our cells properly.


Cells are made up of atoms. Healthy atoms have "paired" electrons (orange dots). When healthy cells replicate they make an exact copy. **FREE RADICALS**, atoms missing an electron, steal electrons from surrounding atoms and they alter or destroy cells. Cells that die and cells that replicate in a damaged state are the cause or contribute to premature aging, sickness and diseases such as cancer, heart disease, osteoporosis, and many others.



ANTI-OXIDANT
(Good)

Step 1:


Antioxidants give an extra electron to the free radical.



FREE RADICAL
(Bad)

Step 2:

Neutralized, the chain of free radicals stops here. This reduces your risk of most sicknesses and disease, also slows aging.




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Archives of Toxicology (2023) 97:2499–2524
 https://doi.org/10.1007/s00204-023-03562-9

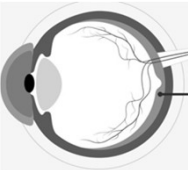
REVIEW ARTICLE

Reactive oxygen species, toxicity, oxidative stress, and antioxidants: chronic diseases and aging

Klaudia Jomova¹ · Renata Raptova² · Suliman Y. Alomar³ · Saleh H. Alwasel³ · Eugenie Nepovimova⁴ · Kamil Marian Valko⁵ 

“Oxidative stress contributes to the pathology of:

- Cancer
- cardiovascular diseases
- Diabetes
- Neurological disorders (Alzheimer’s, Parkinson’s disease)
- Psychiatric diseases
- Renal, lung (COPD, cancer) diseases
- Aging

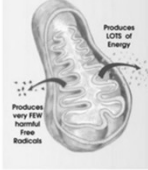


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What are we trying to accomplish?

MITOCHONDRIA


HEALTHY CELL



Produces **LOTS** of Energy

Produces **very FEW** harmful Free Radicals

UN-HEALTHY CELL



Produces **LITTLE** Energy

Produces **LOTS** of harmful Free Radicals

Mitochondria: our life force!

- They produce ATP, etc.
- They **NEED** to effectively pass electrons into its many electron transport chains


• There are **QUADRILLIONS** of mitochondria in our bodies

- If we poison them, it explains how we can get so much **DYSFUNCTION** in so many places in the body!

@drstephenhussey

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The Equalizer




Epidemiological evidence = INVERSE relationship between dietary flavonoid intake and heart disease!


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FOOD IS FUEL.




FOOD IS MEDICINE.






↓



+



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Nutritional Antioxidants

- Exogenous antioxidants
 - Tocopherols (E), ascorbic acid (C), carotenoids, ubiquinone, and polyphenols
- Well known antioxidants
 - Vitamin C, E, Beta-carotene, lutein, zeaxanthin, selenium, quercetin, and resveratrol
- Mechanisms of action
 - Neutralize free radicals/reactive oxygen species
 - Repair oxidized membranes
 - Decrease reactive oxygen species

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Macronutrients versus Micronutrients

<p>Macronutrients</p> <ul style="list-style-type: none"> • Energy and tissue support • Needed in larger amounts for energy and bodily functions • Proteins, fats, and carbohydrates • Provide the energy required for tissues to function, repair, and recover 	<p>Micronutrients</p> <ul style="list-style-type: none"> • Regulation and protection • Needed in smaller amounts, but essential for health • Vitamins, minerals, polyphenols, flavonoids, and carotenoids • Regenerative, anti-inflammatory, and healing
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Key Differences

- **Macronutrients = energy + building blocks**
- **Micronutrients = regulators and protectors** for optimal body function

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Prioritize your fuel...

- Protein > Fat > Carbs
 - Food first
 - The power of the powders...
 - Protein
 - Creatine
 - Colostrum
 - Supergreens
 - Collagen peptides
- Why is the KETOGENIC DIET so popular?
 - Many cancer cells use SUGAR as fuel
 - Eliminate the FUEL, eliminate the cancer!
 - MCT oil
 - Fast absorbing fat
 - Rapid energy (skips digestion...goes right to the liver)
 - Weight loss due to satiety and fat-burning
 - Enhances mental clarity

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WE HAVE LESS THAN IDEAL DIETS

% OF ADULTS MEETING RECOMMENDED DAILY FRUIT & VEGETABLE INTAKE

Category	% of Adults Meeting Recommended Intake
Fruits	~10%
Vegetables	~5%

US data. Source: CDC MMWR 66(45): 2017.

- Fruits and vegetables are the main sources of different colored phytonutrients.
- Only about 10% of us get the minimum recommendations!

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Vitamin Supplementation?

Mitochondria

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Our Food Sources

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Comprehensive Antioxidant Support

- Cell membrane support
- Immune support
- Support the oxidative stress to the extracellular matrix
- Support to cell signaling

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Background Information

- Dietary supplements include vitamins, minerals, herbs, botanicals, amino acids, and enzymes.
- **NOT LEGAL to say that they treat, diagnose, prevent, or cure diseases or conditions.**
- They may have unwanted or unintended effects
 - * BOTH GOOD AND BAD!?!
- **Questions to ask:** What is this product for? What are its intended benefits? How, when, and for how long should I take it?

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1 Ingredient Supplementation

- Won't change your body
- Example: Turmeric
 - * Many proven benefits
 - * How much should I take?
 - Caution on "monotherapy"
- Caution with "this product contains the highest amount of"
- Consider: Lifestyle and full supplementation

Woman hospitalized for liver damage from taking turmeric supplement

She was taking 10x the recommended dose!!!

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Omega 6 vs Omega 3

- Those who follow a **Western diet** are typically eating way too much **omega-6 relative to omega-3**
 - Evolutionary comparisons are often utilized to support this thought...and it is supported as being detrimental
 - Is this why there are so many inflammatory diseases in the Western world?
- The **Mediterranean Diet** has gained much support when compared to the "typical" American or Western diet in the past decade +!
 - It is ALL about the ENORMOUS chemical reaction that is the human body!

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Dosing: General Recommendations

- For general health benefits:
 - 1,500 – 2,000 mg of EPA + DHA in 1-3 divided doses
- For auto-immune disease/anti-inflammatory:
 - 4,000 mg of EPA + DHA daily in divided doses
 - Close follow-up evaluation is necessary
- **BUT...EPA/DHA do not have RESOLVENT activity without being biotransformed (ie into SPMs)**

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The TRUE "Alpha" of the Omegas

OTC Option

- **Specialized Pro-Resolving Mediators**
 - 18-HEPE (18-hydroxyeicosapentaenoic acid)
 - 17-HDHA (17-hydroxydocosahexaenoic acid)
- These typically are produced during the resolution phase (latent phase) of an acute inflammatory response
- AKA lipoxins, resolvins, protectins
 - As we age, or have disease, etc., the ability to produce these are DIMINISHED

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Specialized Pro-Resolving Mediators (SPM)

Essential Fatty Acids From dietary sources

Essential Fatty Acids CONDITIONALLY supports:

- Cell membrane integrity
- Brain health
- Eye health
- Heart health

In some people (advanced age, inflammation), there is inefficient conversion!

Supports the resolution of latent immune response and inflammation

- Tissue remodels
- Return to HOMEOSTASIS in cells

Adapted from Nature, 2014;510:92

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Gut Microbiome

In pathologic conditions, the **permeability of the epithelial lining** may be compromised allowing the passage of toxins, antigens, and bacteria in the lumen to enter the bloodstream creating a "leaky gut."

Environmental factors may trigger inflammation and autoimmune disease

PROBIOTICS may help to reverse/repair leaky gut by producing tighter junctions = toxins, etc. can no longer get through the lining of the gut

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Steps in a Healthy Microbiome

Fiber in diet → **Metabolized by bacteria** → **Short-chain fatty acids (SCFA)**

Acetate, Propionate, Butyrate

PRE-biotics + PRO-biotics = POST-biotics

Specific organisms:

- Bifidobacterium
- Lactobacillus
- *Akkermansia muciniphila*

https://oc-integrative-medicine.com/pre-biotics-pro-biotics-post-biotics/

Rajsree Nambudripad, MD

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Prebiotics

Concord grapes, Table grapes; Capsaicin; Cranberry extracts; Berberine; Black Raspberry; Turmeric; Walnuts

Probiotics

Akkermansia

Health Benefits

- Longevity: Extended life span
- Obesity: Reduction in obesity, improved glucose tolerance, reduced weight gain, alleviated inflammation, increased insulin sensitivity
- Arteriosclerosis, & Colitic disease: Significant reduction
- Cancer: Enhancement in anti-inflammatory endocannabinoids, Secretion of peptides, Glucose metabolism, Functioning of the gut barrier
- Diabetes: Metabolism of liver and gut, Elevating spermidin, polyamines, Short-chain Fatty Acids, 2-hydroxyisobutyrate

The future?

MD Anderson Cancer Center—groundbreaking study

- Found that patients w/ higher levels of the gut bacteria *Akkermansia muciniphila* responded "remarkably better" on immunotherapy
 - Enhanced the immune system to fight cancer
- You can help cultivate it naturally through food
 - Polyphenol rich food (pomegranate, garlic, chicory root, cranberries, green tea...)
 - They specifically feed Akkermansia
- Dr. Pete Sulack (@drpetesulack)
 - "Your drain matters...food IS medicine...and your gut microbiome might be exactly what modern medicine is missing!"

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Calcium

"Calcium is like water...you need it survive, but you can drown in it!"

- functional medicine doctor

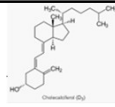
Pathological calcification = "calcinflammation" = misplaced calcium

- associated with many major diseases (cardiac, autoimmune, cancer)
- Calcium in bloodstream attaches to points of inflammation and epithelial lining of blood vessels...it cannot move to bones or bone marrow without a "carrier" (Vit D3 and K2)
- D3 and K2 work synergistically to prevent or treat inflammatory health conditions (cardiac, autoimmune)

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Vitamin D3

- It helps maintain normal blood levels of calcium = helps and maintain strong bones
- vit D also works with other vitamins and minerals and hormones to promote bone mineralization
- It has anti-inflammatory, antioxidant, and neuroprotective properties that help maintain a healthy immune system, regulate cell growth and differentiation, and support muscle function and brain cell activity
- Use Vit D3 (cholecalciferol) is better absorbed!**



Vitamin K2

Vit K is an anti-oxidant

K1 (phylloquinone) - from dark leafy greens; blood coagulation

K2 (menaquinone) - animal proteins and fermented foods in small amounts; gut bacteria can also produce it from K1
may decrease risk of vessel disease

PREVENTS calcium deposits from forming in the walls of blood vessels!!
BECAUSE IT ENHANCES the absorption of D3

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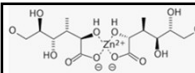
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Coenzyme Q10 (Ubiquinone)

- Muscle mitochondria use ubiquinone
- Info – used as a cardio-protectant in HF, angina, hypertension, other inflammatory diseases
 - Currently, most widely used to prevent/treat statin-induced myopathy
 - Also used in people with osteo- and rheumatoid arthritis

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Zinc



- Essential for immune-cell development
- Some data = ↓ risk of contracting respiratory infection
 - Common cold
 - Influenza
 - SARS-CoV-2
- Zn is important for production of thyroid hormone AND for thyroid hormone to work efficiently (endogenous or drug!)
- It is estimated that 30% of American adults are deficient in zinc, so supplementation may be a good thing

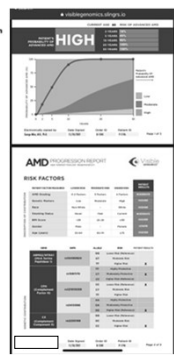


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Zinc Issues...

- AREDS 1: High zinc (80mg) was associated with BPH
- ARMS2 polymorphism (age-related maculopathy susceptibility)
 - Strongly associated with increased risk of developing age-related macular degeneration
 - Most likely to benefit from zinc supplementation
- CFH (complement factor H) polymorphism
 - No benefit from zinc...zinc may WORSEN the AMD
- ARM2 + CFH – it depends...

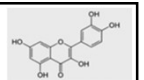
CFH and ARMS2 genetic risk determines progression to neovascular age-related macular degeneration after antioxidant and zinc supplementation



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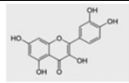
Quercetin

- Yellow, crystalline pigment seen in plants (red, green, purple pigmented fruits and veggies) eg. ONIONS!
- Flavonoid
 - Anti-oxidant = Anti-inflammatory action
 - ↓ expression of inflammatory genes like interleukin
- Used as a supplement to ↓ allergies and to boost immunity
 - Can help stabilize release of histamine which helps to ↓ symptoms like cough, watery eyes, runny nose, hives, indigestion (which is histamine-mediated)



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Quercetin



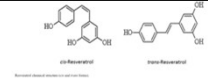
💙 Because it seems to have the ability to lower inflammation and oxidative stress = good for those with heart and blood-vessel related disorders, and may ↓ the risk for Type 2 DM and obesity! (Resveratrol may have similar benefits)

potential benefits to overall health and disease resistance, including anti-carcinogenic, anti-inflammatory, antiviral, antioxidant, and psychostimulant activities, as well as the ability to inhibit lipid peroxidation, platelet aggregation and capillary permeability, and to stimulate mitochondrial biogenesis

BUT we think it can ↓ ZINC if overused!!

Li Y, Yao J, Han C, et al. Quercetin, Inflammation and Immunity. *Nutrients*. 2016;8(3):167. Published 2016 Mar 15. doi:10.3390/nu8030167

Resveratrol



- Another potent anti-oxidant and anti-inflammatory nutritional supplement
- Source: red grapes and red wine
- Benefits seen in cancer, heart disease, and Alzheimer's Disease; arthritis and skin inflammatory conditions (eczema, psoriasis and psoriatic arthritis...)
- There are some bioavailability issues, in general

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Water, Water, Water



Holistic Medicine Guidelines:

- * Unless restricted, an adult should consume 100 ounces of water EVERY DAY!
 - 📄 More than 100 oz = acts as a diuretic
 - 📄 Seltzer should not represent more than 50% of total intake.
 - 📄 Mineral water is fine, as it has no ADDED CO2
- * For every caffeinated beverage, the amount of water needed to replace it is double.
- * Don't just RINSE! REHYDRATE!!
 - * Every "salt" is NOT created equal!!

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Add some salt to your water daily to rehydrate



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Add some salt to your water daily to rehydrate!

- **Sodium:** ESSENTIAL for pulling water into the bloodstream
 - Helps maintain pressure needed to move fluids in and out of cells
- **Iodized salt** (Table salt) simply sits in blood vessels, but it doesn't hydrate all of the other cells in the body
 - LACKS other minerals (e.g. potassium, magnesium)
- This is why Sea salt and Celtic sea salt are used
 - **Himalayan**
 - Contains trace amounts of calcium, iron, magnesium, potassium
 - **Celtic:** slightly "damp"; similar trace minerals to Himalayan
 - **Redmonds Real Salt:** unrefined salt from Utah; also contains trace minerals

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At home monitoring of biomarkers...




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**This is Why We Measure!
You Look Healthy, & Now We Know What to Fix**

- People take supplements and eat healthy
 - Without measuring you don't know if it's actually getting into the cells to OPTIMIZE the beauty, wellness, aesthetics interventions that people spend money on!
- This gives us the ability to course-correct before issues show up

There's more inside your cells than medicine will ever show you.



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Antioxidant Score

Scores are directly impacted by nutrition and supplements. Healthy habits are correlated with your score

Purple	750+	Purple	HIGHEST
Blue	550-749	Blue	HIGHER
Green	400-549	Green	MODERATE TO HIGH
Yellow	300-399	Yellow	MODERATE
Orange	200-299	Orange	LOWER
Red	<199	Red	LOWEST

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What is not measured cannot be improved upon!


- Think about it...
- Do some research...
- Give integrative approaches a try!
 - You and your patients have everything to gain, and nothing to lose

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No more excuses – we can't always blame our genes!

- Chronic inflammatory diseases are the most significant cause of death in the world
- World Health Organization (WHO) ranks chronic diseases as the **greatest threat to human health**
- The prevalence of diseases associated with chronic inflammation is anticipated to increase **persistently for the next 30 years** in the United States
- What contributes to this **CHRONIC INFLAMMATION** = chronic diseases/conditions?
 - Metabolic diseases
 - Insulin Resistance
 - Gut dysbiosis
- Western Medicine model is largely **FAILING**
 - **"Prevention is the BEST MEDICINE"**

FOOD IS FUEL.
FOOD IS MEDICINE.



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Questions

Thank you!
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