How Humans Harvest Sunlight?

Introduction and Intention:

Welcome to my attempt to put into words what some of us can feel. Concepts and models can get us so far, then we need another way to measure and improve health.

Dr. Royal Lee said in the 1950's, "we are feeding people poisons (medications) in trying to treat the reactions of starvation." We call this today OVERFED AND UNDERNOURISHED.

My intention is to offer another perspective, similar to Dr Lee's and thousands of other silenced and murdered and ostracized health professionals trying to help sick people become well with Nature and Free and easy remedies known for thousands of years.

Lee and others knew vitamins were not chemicals but processes involving chemicals. The worship and dogma around this was almost laughable from my perspective now. Why would an MD trained in holistic health in the 1920's state, "vitamins are hormone like substances."

In terms of this paper, my question to you the reader is, "how can irradiated fat ever replace sunlight, or Cod Liver oil, both not replaceable by a chemical substitute?" Vitamin D3 is one isomer chemically of 27 or more forms of D found in sunlights reaction on our skin or in cod liver oil?

I offer you a series of chapters on various aspects of how Humans use sunlight. Plants use it to make sugars, and more. The reaction could be called miraculous. The Fenton reaction in the Chloroplast! Mushrooms make Melanin, similar to the pigment in our skin. And our bodies make a hormone called Melanocyte Stimulating Hormone that is involved in many areas you might find surprising! Read on for that.

There is even debate amongst modern scientists that humans might use sunlight directly, that is not "Vitamin D" based.

Sun dried sea salts are called salt = root word Sal = Sol = Sunlight (crystallized sunlight?)

In Herbal Medicine there are Plants of The Sun like St John's wort. Read on for more about that.

The next page has an outline, and I suggest reading through the outline first, then go into the first chapter, the basics we are not educated on.

OUTLINE

PLEASE LOOK TO LEFT COLUMN FOR OUTLINE WITH CLICKABLE PAGE LINKS

Editors / Craig’s Note -

Enjoy this document created out of demand and for exploration and discovery of the truth of life, health, and nature’s secrets.

If you have comments, some of you have the ability to comment and others please send a screenshot with your edits and or comments. One person cannot possibly know it all, hence this is a living document meant to share and explore life together.

Full credit goes to Morley Robbins of The Root Cause Protocol, whose work validated my own sense of Vitamin D3 effectiveness, and the hidden toxicity of iron overload and buried old secrets from 50-120 years ago the powers of darkness did not want us to know.

Credit goes to The Weston Price Foundation, and the San Mateo WAPF for hosting me December 2023 to give another version of this talk.

SUNLIGHT IS A NUTRIENT

Light Capture - how?

By Craig Lane
www.healthalkemy.com - See individual pages below for sources and referencing

Light is photonic energy, but what is it really? One of the "bridge molecules" of light in our bodies are the amino acids Phenylalanine and Tyrosine. Tyrosine is made into Thyroid hormone = energy use in the body. Sort of like the accelerator pedal on a car. And to top it off, the Neurotransmitter Dopamine is involved and our skin pigment producing Melanocytes (think Melanin and the Pineal hormone of light Melatonin!!!) WOW!!!!

ASPECTS OF LIGHT - in physical form as amino acids, and effects upon plants and animals.

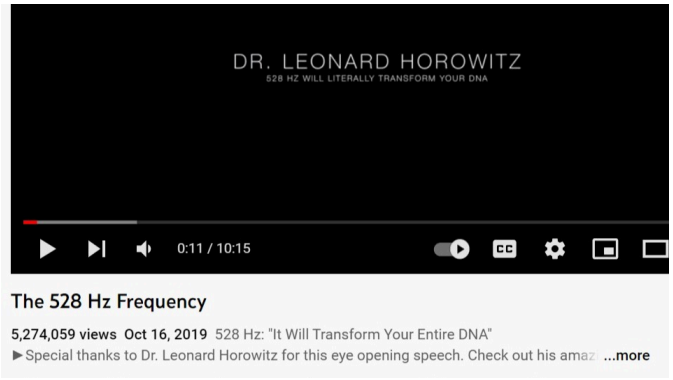
PHENYLALANINE —Phenylalanine is an essential amino acid, which is a precursor to tyrosine, another amino acid. Phenylalanine, after its hydroxylation to tyrosine, **is also the precursor of dopamine**, and of norepinephrine and epinephrine, hormones secreted by the adrenal medulla. **Melanin, the black pigment of skin and hair, is also derived from tyrosine.**

Phenylalanine prevents the breakdown of the brain's morphine like painkillers, enkephalins which inflate mood and depress appetite. Increases alertness and assertiveness, suppresses appetite, and is an **effective antidepressant.** Helpful as a daytime Growth Hormone releaser.

The neurotransmitter Dopamine increases feelings of well-being, alertness, sexual excitement and aggression; and reduces compulsive behavior. **Tyrosine is a natural amphetamine and precursor to adrenaline**

Frequencies of Light and Sound?

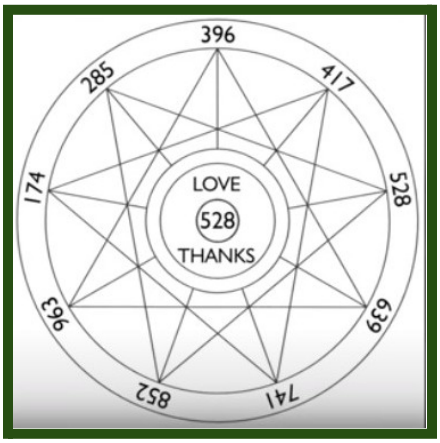
Another strange connection is frequency. Sound and light travel in a frequency, they are not static things, life is always in motion, like a dance.



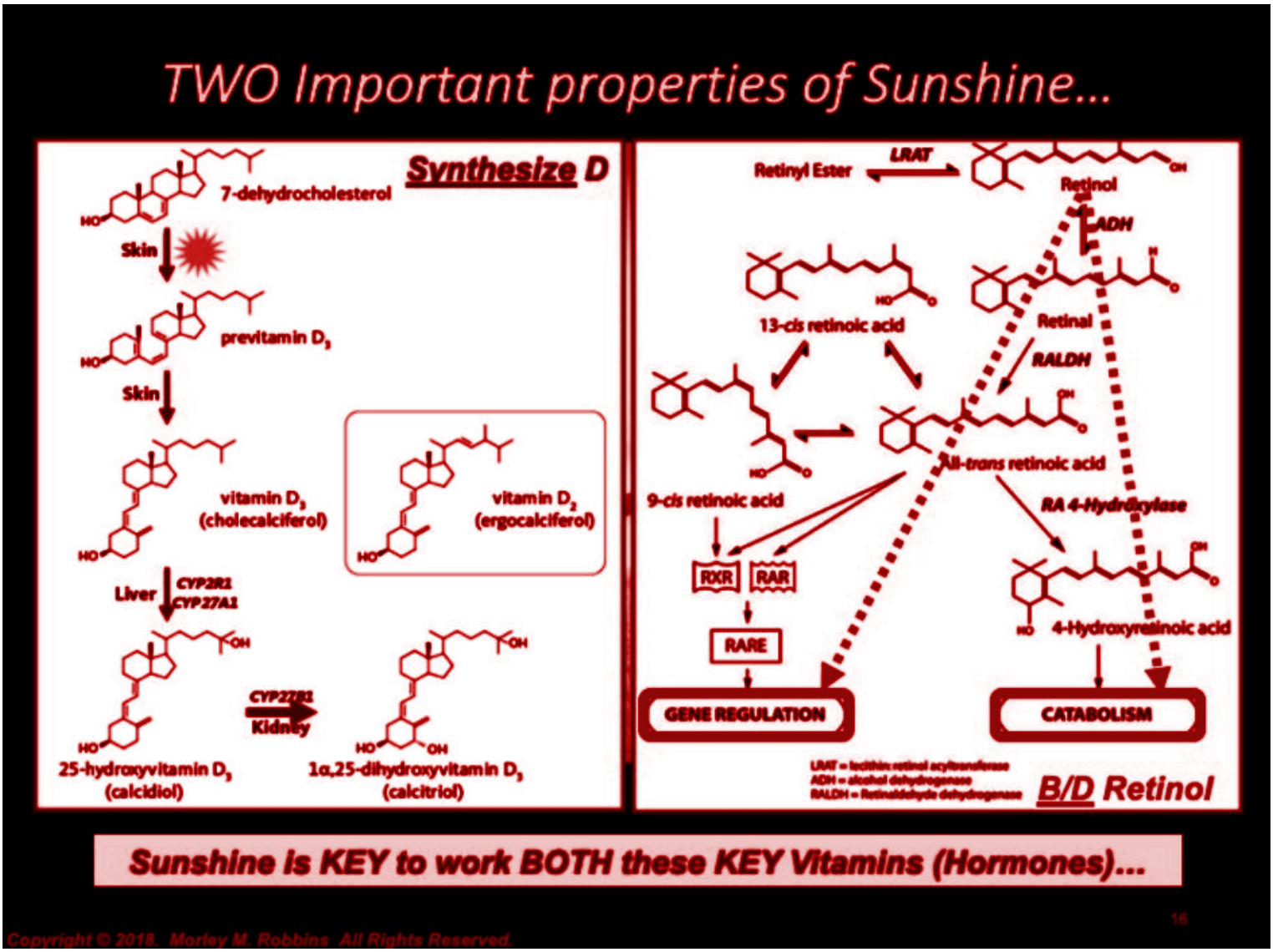
https://youtu.be/0nO48UIzLk8

“light and sound reception…on reception transmission for intercellular communication and cellular up-regulation…cellular up-regulation means…every millisecond instant you're really investing right now in water…water is the most energy conductive of all of the materials, it's a superconductor…”

“so this is explains it let's say that 9:16AM you're here and you are putting out negative thoughts negative behaviors negative actions it's all energy the neurology and your brains powerful 86% of you is God water so now that's going out and it goes out and here's what happens it goes out - goes up and down. This is called the event horizon. You shoot down through the middle of the event horizon which is the plot ball of our lives, spins back around ultimately and comes right back bringing you “karma” or cause and effect



NOW ON TO SUNLIGHT AND THE "VITAMINS"

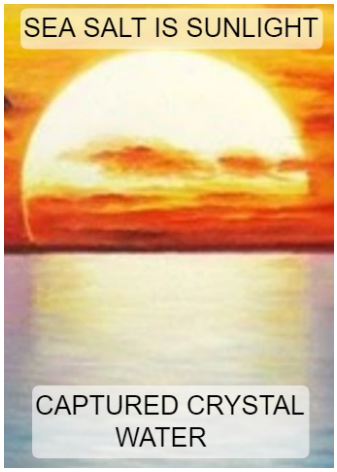


SUNLIGHT activates the retinoids (Vitamin A - not carotenes) for overall metabolism and activation of genes in the body (sunlight on us)

NOW AFTER THIS TASTE LET US EXPLORE SOME WAYS WE CAN "CAPTURE SUNLIGHT" OTHER THAN WHAT WE HAVE BEEN ERRONEOUSLY "TAUGHT"

Image credit Root Cause Protocol - Morley Robbins

Salt Sol Sole Sunlight dried into SeaWater



SUMMARY - SUNLIGHT DRIES OUT OCEAN WATER = SALTS/MINERALS DRIED IN SUNLIGHT RETAIN THE ALGAE AND PROTEIN/MINERAL MATRIX, SEE DETAILS FURTHER ON

Sun dried foods - LINK TO ARTICLES

SUMMARY - it appears that mushrooms dried in the Sun have Vitamin D2 form/isomer, and I have been "told" sun dried foods in general - like the sun dried to do for Mango is also a good way to get "sunlight" in a food. Is this Vitamin D or something else?

Vitamin A - read following pages

SUMMARY - sunlight harvester, Two forms in nature = Carotenoids >>> water soluble, lycopene is a carotenoid = A family of chemistry around this Medical Herbalism book goes into this, carotenoids In presence of fat and digestion >>> turns into Retinol or Vitamin A = Fat soluble -

Vitamin D - read following pages

SUMMARY - sunlight filter - like sunglasses, made from cholesterol in the skin, protection from UV and other harmful elements while also encouraging nutrients into the blood

Vitamin E - - read following pages

SUMMARY - Antioxidant, repair, oxygen support, DNA/RNA protection, sterility prevention, promotion of mineral metabolism, Wheat germ oil was once called "vitamin E, " plus all raw fats/oils have E.

Vitamin F - - read following pages

Summary: Few people today have heard of vitamin F, but back in the heyday of vitamin research, this fat-based complex and vitamin D synergist was widely recognized as an essential nutrient for the human body, obtainable only from food and ideally from animal fats. In this 1949 article, Dr. Royal Lee expounds the nature of vitamin F as a complex of compounds that includes—but is not limited to—the famous "essential fatty acids' ' of today's nutrition, linolenic acid and linoleic acid. In vitamin F these two compounds work in tandem with a host of other cofactors, including the critical arachidonic acid, Dr. Lee explains, to promote such important actions as calcium transport, prostate function, immunity, and even cancer prevention. Moreover, he writes, when vitamin F combines with phospholipids (as occurs in mammalian livers), it forms a complex that exhibits *different nutritional activity* than that of vitamin F. This complex, which Dr. Lee calls vitamin F2, is intimately involved in the repair and generation of new tissue, making it vital for any therapy of "muscular dystrophies, creeping paralysis, anemic states, weakness, and atrophy." While modern science continues to underplay vitamins and minerals, articles like this remind us that these essential micronutrients are involved in the most fundamental functions of the body, and even a slight deficiency in any one of them can have catastrophic consequences on our health. From *Vitamin News*, 1949.

PLANTS OF THE SUN?

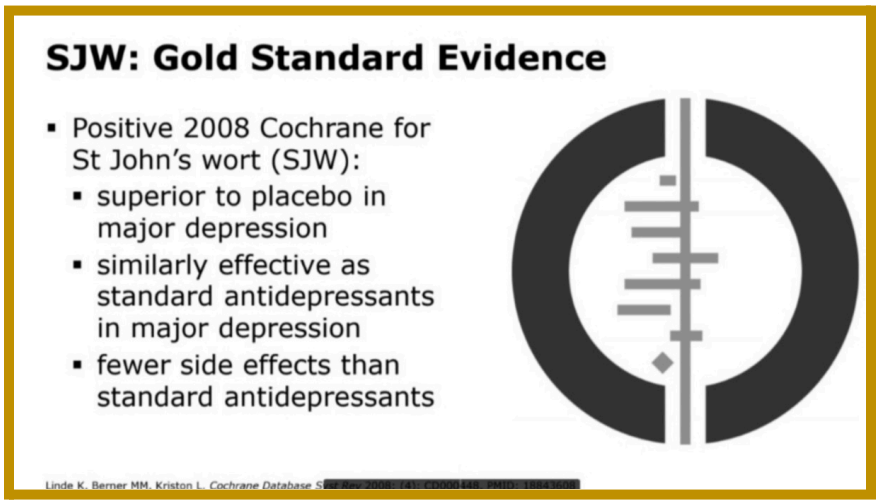
Plants cannot seek comfort like animals, getting out of the elements like heat, light, wind and more.
They are the ultimate Alchemists. They turn CO2 and H2O into glucose with sunlight, they make blood similar to humans except one major difference, they have a “brain,” they have sex organs, and they communicate.
By using plant juices, fibers, and elements, we are directly taking in sunlight via the plant itself. Vitamin C’s piece called ascorbic acid is almost the same as sugar and plants make it out of air, water, and sunlight - literally, wow!!!

St John’s Wort as Possible Support for Withdrawal: (of depression medications)

Herbal detox – Benzodiazepine withdrawal treatment with the help of St. John’s Wort?
Moeller S, Sitter A, Darrelmann UG et al. Asian J Psychiatr 2019; 45: 26–27

An otherwise healthy 49-year-old patient presented to a German hospital with a 4-year history of benzodiazepine use disorder (in other words, benzodiazepine dependence). Over this time his dose of alprazolam had increased, with the patient taking approximately 4 mg/day during the last 9 months. The patient took St John’s Wort(900 mg, presumably the daily dose of extract) for at least 3 months prior to hospitalization. Withdrawal treatment was provided by substitution with another benzodiazepine, clonazepam. The dose of clonazepam started at 1 mg, 4 times a day, and was reduced by approximately 0.4 mg/day over about 2 weeks. The patient was unaware of the drug dose. He was also administered St John’s Wort, 425 mg, three times a day (product undefined). He experienced mild withdrawal symptoms (tachycardia and mild tremor of the hands) only once, at the beginning of the hospital stay. The patient was discharged from hospital without symptoms after 18 days. In a follow-up visit, 3 months after discharge from the hospital, the patient remained drug free and continued taking St John’s Wort.

Key Finding
St John’s Wort, at a probable relatively high dose, assisted a patient undergoing benzodiazepine withdrawal treatment in hospital = MORE LIGHT AND LESS DARKNESS = DEPRESSION - DARKNESS



NOTICE THE YELLOW FLOWER = COLOR OF THE SUN, TURNS RED = THE COLOR OF BLOOD IN SOLUTION

OF ALCOHOL, OIL OR ACID.

ST. JOHNS WORT - Character: Bitter-sweet, cool, drying

Meridians/Organs affected: liver, kidney,spleen, stomach

Constituents: glycosides (hypericin), naphthodianthrones, especially the active constituents hypericin and pseudohypericin; flavonols (inerutin, quercetin, isoquercetin, quercetin, isoquercitrin, rutin and kaempferol); volatile oils; tannins (up to 16% in the flowers, 10% in the herb); resins; also small amounts of an essential oil, choline, pectine, alkaloids, vitamin C, vitamin A and beta-sitosterol. The hypericin is so strongly antiviral that it is being researched for use in treating HIV and AIDS

Actions: astringent, analgesic, antidepressant, antispasmodic, stimulates bile flow, antiviral, anti-inflammatory, sedative, restorative tonic for the nervous system.

Medicinal Uses: It's been used for centuries for depression, melancholy and hysteria. Paracelsus was one that prescribed it for these afflictions.

One study by Dittmann, Hermann and Palleske showed that Hyperforat, a preparation based on a total extract, gave a well-reproducible specific inhibition of anaerobic glycolysis in secretions of brain tumors. An infusion of leaves and flowers in olive oil is excellent for skin burns. The herb/flowers are the parts used for lung problems, bladder complaints, diarrhea, dysentery, depression, hemorrhages and

jaundice. Steep two teaspoons of the herb per cup of water for twenty minutes. Take one half cup in the morning and one-half cup at bed time.

The research on St. John's Wort has been substantiated on its effects on mild to moderate depression. In a series of studies that were presented in 1992 at the Fourth International Congress on Phytotherapy in Munich, Germany it helped well over half of those in the study. In less than a month of taking this herb, the depression and accompanying disturbed sleep and fatigue experienced by participants in these studies generally improved. In another study in Germany in 1984, depressed women were given a tincture of St John's Wort.

A suggested tincture is 1 tsp tincture of St. John's Wort leaf, ½ tsp tinctures of licorice root, ginseng root, lemon balm leaf and ashwaganda. Combine ingredients. Take 1 dropperful 3 times a day. The mood-lightening effect does not develop quickly—it is necessary to take it for up to 2-3 months. The first effects will be felt within 2-3 weeks.
To help regulate disturbed sleep patterns try St. John's Wort. It adjusts brain chemistry, helping to increase the availability of the neurotransmitter serotonin.

It's also a nervous system relaxant that helps you recover when your nerves are damaged, inflamed or strained. To use it as such take 1 tsp each tincture of St. John's Wort flowers, skullcap leaves, fresh oats and licorice root; ½ dropperful each tinctures of ginger root and vervain leaves. Combine ingredients and take 1 dropperful every half hour, as needed during an emergency. To relieve chronic pain, take 2-4 dropperfuls a day.

The aerial parts taken internally can lighten the mood and lift the spirits. They make a restorative nerve tonic, ideal for anxiety and irritability, especially during menopause. They are also good for chronic, longstanding conditions where nervous exhaustion is a factor. They can relieve a variety of nerve pains such as sciatica and neuralgia. It is also a valuable tonic for the liver and gallbladder.

In regards to Parkinson's it may have a potential to help based on the following. Smokers have an unusually low risk of the disease because nicotine increases the release of dopamine in the brain. The enzyme monoamine oxidase (MAO) depresses dopamine, so it would make sense that medications that inhibit MAO would boost dopamine and decrease Parkinson's risk, as nicotine does. Ethnobotanist Jim Duke's suggestion is to try a tincture standardized to 0.1 percent hypericin and take 20-30 drops three times a day if you have Parkinson's.

Other Sun plants?

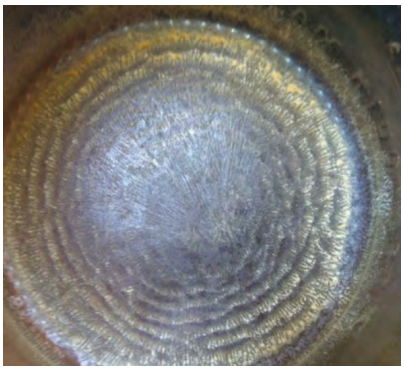
All plants capture sunlight - but these in Alchemy are considered to have an affinity to the Sun.

ASHWAGANDHA +++ increases hemoglobin (red blood count) and increases hair **melanin pigment** as well
BILBERRIES - flavonols are plant pigments made to attract pollinators = sex
CARDAMOM PODS - lights the "fire/agni" of consciousness
CHAMOMILE FLOWERS - looks like the sun
CINNAMON BARK STICKS - warming solar herb
ROSEMARY LEAF - moves along stagnation, brings more memory and clarity
SAFFRON - moves stagnation
ST. JOHN'S WORT - yellow flowers and harvested June 21st = St Johns Day
YERBA MATE - in small doses highly increases clarity

SALT - SAL (SOL) = Seawater capture of light

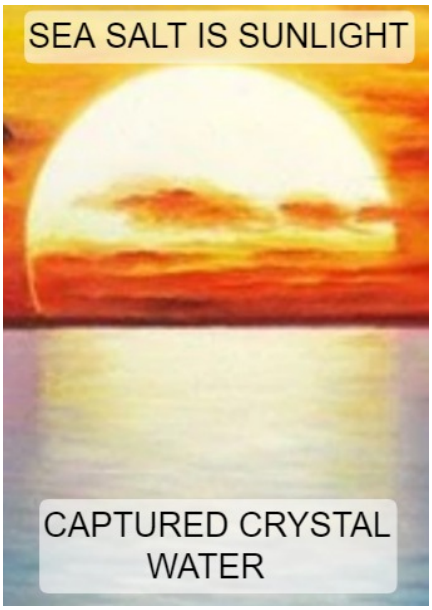
“Throughout time, salt (sodium chloride) played an important role in human societies. In ancient times, salt was used as a form of currency and to preserve foods, such as meat and fish…
“...it was a precious commodity that played an important part in the development of the ancient world. For most of human history, salt was considered an extremely valuable commodity, as valuable as gold among ancient civilisations…
Therefore, salt was known as the “white gold”, although several other commodities, such as sugar, cotton, marbles, ivory and water, also received that designation [1, 2, 3, 4, 5, 6, 7, 8, 9].

LINK TO ARTICLE
—----------



There are five factors that differentiate the different types of salt:

1. The amount of trace minerals in each salt.
2. The ratio of those minerals.
3. The particle size and structure of those minerals.
4. The level of contamination with additives, chemicals or pollution.
5. The research on that specific salt shows its health benefits.



LINK TO ARTICLE

Only Original Himalayan Crystal Stones:
✓ Includes the 84 minerals considered essential nutrients for life and energy
✓ Floods your body with electrolytes which can improve conductivity and stimulate circulation*
✓ Improve hydration into your cells*
✓ Helps balance acid-alkaline imbalances*
✓ Helps normalize blood pressure*

✓ Supports detoxification and helps cleanse the intestines*
✓ Supports a properly functioning metabolism*

Vitamin A, Vitamin D, Vitamin E/F

RCP Article - https://therootcauseprotocol.com/the-vitamin-d-controversy/

As anyone who has read my regular posts online, you have learned that I am one of few wellness guys who isn't ga-ga over Vitamin-D. It's not the 1st time that I've cut against the grain in my career, but I want to offer an explanation that will hopefully explain my counter-cultural rationale…

In my humble opinion, Vit-D is the most misunderstood, but over-recommended supplement on the Planet. What is worth noting is that it is, in fact, a Hormone — not a Vitamin, and it is also the FIRST hormone to exist on Planet Earth. Hmmmm. So it's been around for hundreds of millions of years, we as a species have co-existed with this Hormone for at least 6 million years, and NOW, all of a sudden in the last decade, it has become a crisis of Biblical proportions. Forgive me, but I'm not buying it. Why? Because very few practitioners have taken the time to fully understand exactly HOW this Hormone works or is metabolized in the Human Body.

OK, so let me start with a riddle… We all know that there is a layer of Cholesterol under our skin that when activated by the Sun gets converted into Hormone-D… right? Well, here's the riddle: How is it that as Americans we have the HIGHEST levels of Cholesterol, and at the same time also have the LOWEST levels of Vit-D on this Planet?!?… Doesn't make sense, does it? Actually it makes perfect sense, let me explain… (And no, it doesn't have anything to do with exposure to the Sun.)

Let's go back to that conversion of Cholesterol into Hormone-D's active form, Calcitriol… there are actually THREE metabolic transactions (under the Skin, in the Liver and in the Kidney) that convert that Cholecalciferol (pre-Hormone-D form) >> Calcidiol (Storage form, aka 25[OH]) >> Calcitriol (Active form, aka 1,25[OH]2). **Now here's where it gets fascinating… ALL of those transactions can ONLY happen when Magnesium is present in proper amounts! Huh? More hmmmm… You mean the Vit-D blood test (aka 25[OH] blood test) is actually a perfect blood test for Mg status?** Yup! That's EXACTLY what I'm saying…

And it's showing that almost everyone in America is woefully short on Maggie!
Given that Vit-D is a Hormone, it's worth noting that ALL Hormones have a Target Cell and a Target Mission. Vit-D's Target Cells are the Intestines, and its Target Mission is to have the Intestines ABSORB MORE CALCIUM AND PUT IT INTO THE BLOODSTREAM, AT THE EXPENSE OF MAGNESIUM ABSORPTION… So here's what that famous blood test is ACTUALLY telling us: the blood test is measuring STORAGE Vit-D (Calcidiol) and it seems that everyone in America is now LOW…

Why? Because the body in its innate wisdom KNOWS that there is TOO MUCH CALCIUM in the blood, so it is keeping the Storage Vit-D level low for two reasons: 1) there's too much Calcium already in the blood; and 2) there's not enough Magnesium to flip the Storage-D into Active-D. They are flip-sides of the same coin… And how do I know this empirically?

I've witnessed the very same dynamic on hundreds and hundreds of Hair Tissue Mineral Analysis tests on clients.

High doses of Vit-D, again — a very strong Hormone, puts significant demands on the Magnesium stores of our body to convert it to its Active status. And like any strong Hormone, it does have an impact, but there is also a heavy price to pay for it.

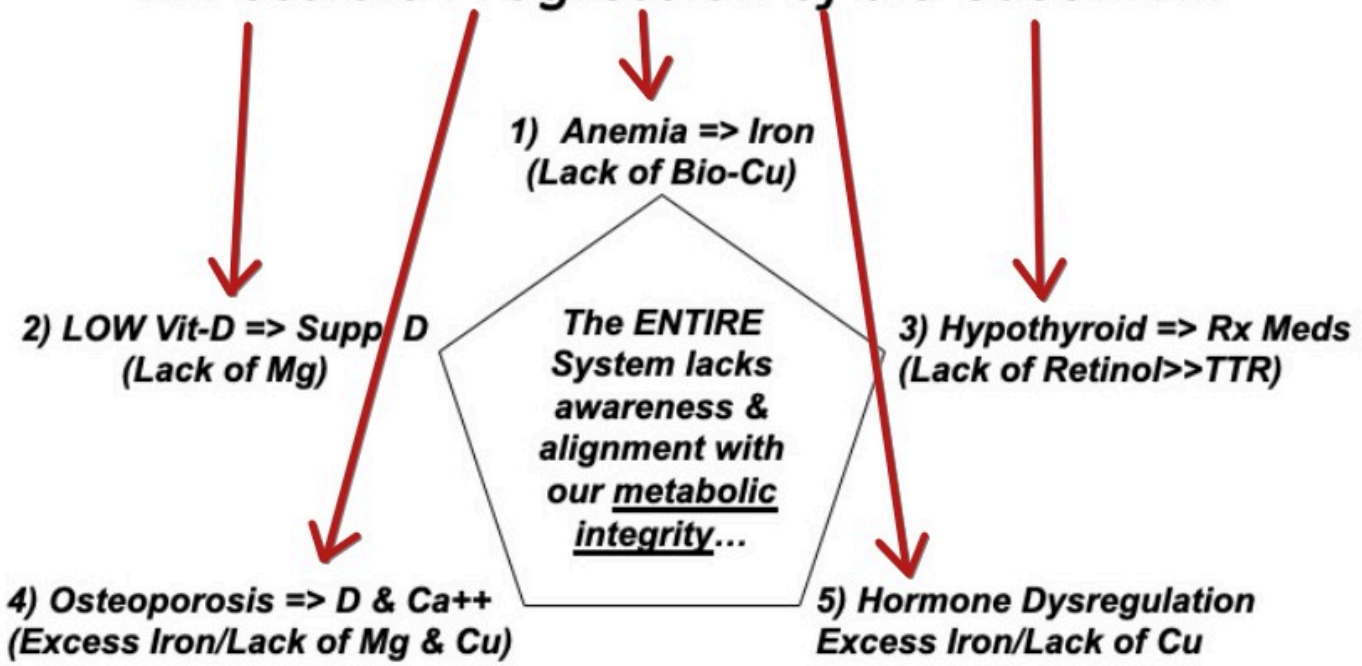
Mildred S. Seelig, MD, one of the world's greatest authorities on Magnesium, regarded excess Vit-D supplementation as a noted DRAIN on Mg status. And far too many "studies" on Vit-D measure Storage Vit-D levels (Calcidiol), and then in the course of those same "studies," administer Active Vit-D as a treatment. In the Hospital setting, this is called "clinical science," at a Carnival it is called "Bait & Switch…"

Final comments, what to do? Get more sunshine! Up your Mg supplementation! And should you live near the North Pole or the Upper Midwest), do what your Scandinavian Ancestors did for thousands of years: eat foods that are infused with not just Magnesium, but also Vit-A, and Vit-K which are essential cofactors for the proper metabolism of Vit-D — and how many practitioners have commented on that critical aspect of Vit-D metabolism?!? Aside from Chris Masterjohn, PhD, and Carolyn Dean, MD, ND, the chorus is very, very thin. CAVEAT EATOR!

So, please eat grass-fed Liver, free-range eggs, and wild-caught deep-sea fish. These are rich sources of the key nutrients noted above. The last thing I would be putting in my body, or the bodies of my clients, is a synthetically derived "Vitamin" that is made from sheep-skin oil (Lanolin) that is exposed to UV-B light in a factory. It doesn't sound too natural to me, so I prefer the form that has worked flawlessly on this Planet for thousands of years, and seems to work on most continents outside of North America…

- Origin of retinol on the planet… it was here before D!
- Researchers talk about retinol being a light sensor
- 7.5M years later – Vit D comes along… it's a filter not a sensor
- So Vit D is here to help us filter – it's like sunglasses for light in our body
- If you take nothing else away from this class – be mindful that Hormone D is NOT a playful sunshine vitamin

A Possible Progression of dis-ease?!?...



Things that go "Bump!" in the night…

This vogue "D"ietary supplement is REALLY a HORMONE!

- What OTHER Hormone is sold OTC?!?
- What OTHER Hormone Testing ***IGNORES*** the ***Active*** Status?!?

Hormone-D "D"ulls the functions of Retinol, ANOTHER KEY Hormone

- Who here understands the actions of RARs, RORs, RXRs, RZRs?
- Sunlight ACTIVATES 2 Critical Events:
  - Synthesis/Build-up of Hormone-D…
  - Breakdown of Retinol >> Retinoic Acids (Hormones) & Nuclear Receptors…
- ***A*** is a "*Sensor*," and ***D*** is "Filter" (*Sunglasses*…)

Hormone-D is NOT a "D"ipstick function, it is a "D"ynamic indicator of metabolic homeostasis & integrity…

- Low Vit-D is a Billboard for "D"ysfunction… ***NOT a "D"isease…***
- Correlation is ***NOT*** Causation! *(Lucas & Wolf, 2019, "Then Came the Randomized Clinical Trials")*

Extensive Studies of A-nemia of Vit-A Def...

Table 1 Epidemiological studies of vitamin A deficiency and anemia, 1985–2000

Subjects	Year*	Location		Findings	Reference
Children, preschool	1986	Brazil	52	32.7% with serum retinol < 0.70 μmol/l; 44.6% with hemoglobin < 113 g/l	Araújo *et al* (1986)
Children, 6–60 months	1993	Pakistan	532	49% with serum retinol < 0.70 μmol/l; 67% with anemia	Molla *et al* (1993a)
Children	1993	Ethiopia	240	30.2% with serum retinol < 0.35 μmol/l; depressed indicators of iron status	Wolde-Gebriel *et al* (1993)
Children, 36–83 months	1989	Micronesia	60	Of 31 children with abnormal CIC, 52.9% had hematocrit < 34%	Lloyd-Puryear *et al* (1989)
Children, 36–83 months	1991	Chuuk[b]	455	23.6% with xerophthalmia; 40% with anemia	Lloyd-Puryear *et al* (1991)
Children, preschool	1996	Brazil	563	15% with serum retinol < 0.35 μmol/l; 22.2% with anemia	Santos *et al* (1996); Assis *et al* (1997)
Children, 4–24 months	1999	South Africa	115	37% with serum retinol < 0.70 μmol/l; 63% with anemia	Faber & Benade (1999)
Children, 18–36 months	2000	Mexico	219	29% with serum retinol < 0.70 μmol/l; 70% with hemoglobin < 115 g/l	Allen *et al* (2000)
Children, 1–5 y	2000	Honduras	1243	14.2% with serum retinol < 0.70 mol/l; 29% anemic; 15.5% w/both	Albalak *et al* (2000)
School-aged children	1999	South Africa	131	51% with serum retinol < 0.70 μmol/l; 22% with anemia	Oelofse *et al* (1999)
School-aged children	2000	Bangladesh	164	20% with serum retinol < 0.70 mol/l; 31% with anemia	Persson *et al* (2000)
Girls, 10–19 y	1998	Malawi	118	27% with serum retinol < 0.70 μmol/l;11% with anemia	Fazio-Tirrozzo *et al* (1998)
Boys, girls, 10–17 y	2000	Bangladesh	861	2.1% with xerophthalmia; 94% of males, 98% of females with anemia	Shahabuddin *et al* (2000)
Pregnant women	2000	Malawi	697	88.8 with serum retinol < 1.05 μmol/l; 73.1% with anemia; all HIV positive	Semba *et al* (2000a)
Pregnant women	2000	Nepal	390	20% with serum retinol < 0.70 μmol/l; 78.9% with anemia	Bondevik *et al* (2000)
Pregnant women	2000	Nepal	336	54.2% with serum retinol < 1.05 μmol/l; 72.6% with anemia	Dreyfuss *et al* (2000)

*Year of publication. [b]Formerly Truk.

Source: Semba RD Bloem MW, 2002, *"The Anemia of Vitamin A Deficiency: Epidemiology and Pathogenesis"* **European Journal of Clinical Nutrition**; 56: 271-281; doi:10.1038/sj/ejcn/1601320

Missing Information = Missing TRUTH

Vitamin-A = LIGHT SENSOR

Vitamin-D = LIGHT FILTER

Your text here

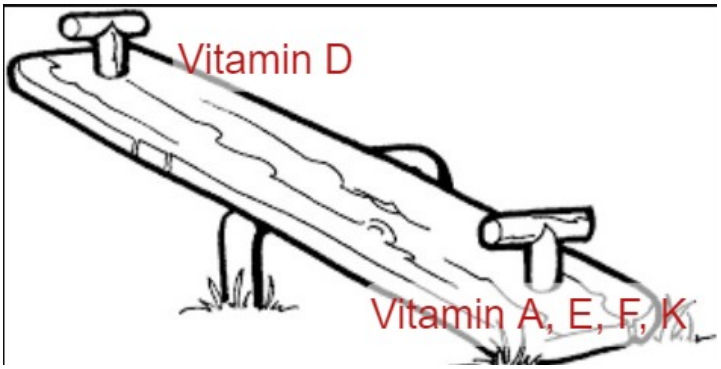
"intelligent"

"dumb"

Vitamin D and it's positives and negatives

One of the most mis-understood of the vitamins, D is not a vitamin per se. It is a hormonal process our skin, liver, cells, and tissues make a hormonal process from cholesterol.

Morley Robbins, founder of RCP, states this about vitamin D, "a sunlight filter." Wow, thats interesting!



You know when you're in the sun too long and feel tired? You heard of "sunstroke?" You heard of people getting sick from too much sunlight? Well they do. Our ancestors knew this and used what was called "Vitamin F" as a D antagonist. All the fat soluble vitamins have a complicated relationship, and when we push on one - or take one without the others, esp in synthetic form from radiated lanolin, we imbalance the others. Like a teeter totter. Push down one side the other goes up

Misled…

Misfed…

Here's an Important & timely "mainstream" article on the "D"angers of Hormone-D:
https://www.sciencenews.org/article/*vitamin-d-supplements-lose-luster*

Those looking for *MORE* Scientific Rigor:

- Deng et al, 2013: (***FOCUS on Figure 1…***)
  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3765911/

- Amer et al, 2013: (**!!**) ***FOCUS on NO Clinical Benefit of Storage-D > 21 ng/dL!!***
  https://www.amjmed.com/article/S0002-9343(13)00084-3/pdf

- Mangin et al, 2014: ***(FOCUS on the FACT that "Low Storage-D REALLY Means HIGH INFLAMMATION!!! which REALLY means BOTH LOW Mg and HIGH stored Iron -- that does NOT show on a standard blood test!)***
  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4160567/

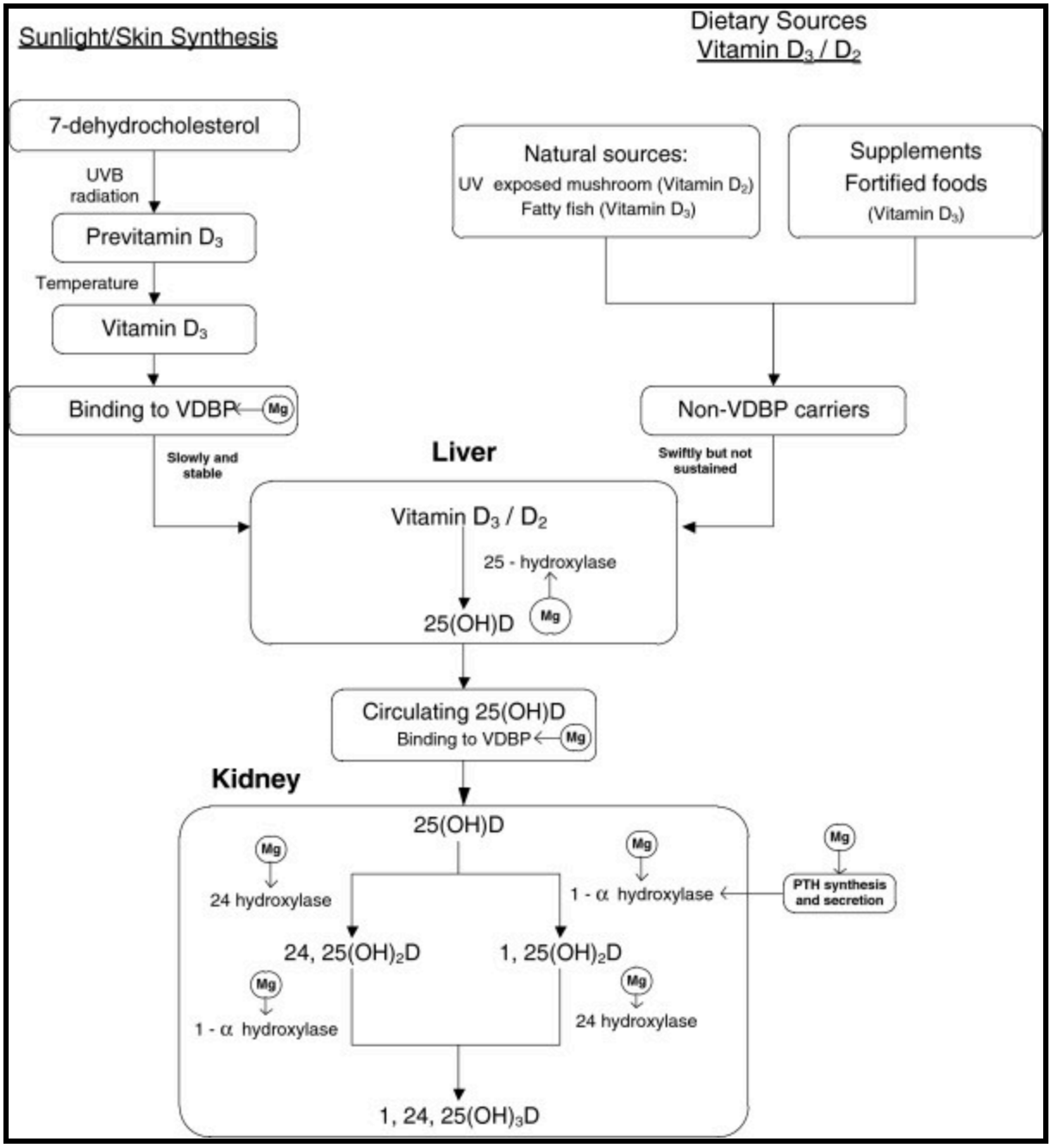
This is Bedrock #1…

Frederick C. Kummerow, PhD

(4 Oct, 1914 – 1 Jun, 2017)

"Ladies & Gentlemen, you do NOT supplement with Vitamin-D… "

(Dr. Kummerow's opening remarks at an International Symposium on Vitamin-D in the 1980's by premiere scientists & Nobel Laureates…)



Fred was a significant researcher – Morley included multiple articles he suggests we focus on within this slide

- When Morley met with Fred, he highlighted that Morley needed to know about the connection with mag, D etc
- Focus on scientists who have integrity in their work – watch their work
- Mildred Seelig
- Fred
- Lesley Klevey
- Loren Pickart
- Douglas Kell
- The managing ?? Of the Lancet – has left... what's the cause of that?
- There are 8 enzymes who manage Vit D in the body – all are dependent on Vit D
- That then dictates how you would look at Vit D status
- The big debate in the mineral world... Do minerals activate enzymes, or do enzymes activate minerals?
- You can't transform the precursors to that state, unless there is adequate mag
- If the individual is stressed out, then they can't do things either

- Fred took mag away to see what would happen

This is Bedrock #3...

CLINICAL SIGNIFICANCE

- In healthy adults, there exists an inverse association between 25(OH)D and all-cause and cardiovascular disease mortality.
- In healthy adults, there seems to be no additional protection against all-cause or cardiovascular disease mortality once serum 25(OH)D levels rise above 21 ng/mL.
- We suggest that clinical trials for the primary prevention of cardiovascular disease with 25(OH)D supplementation may target healthy adults with serum 25(OH)D levels of ≤21 ng/mL.

Table 2 Hazard Ratios and 95% CIs for All-cause and Cardiovascular Mortality per 10 ng/mL Change in 25(OH)D from Univariate and Multivariate Cox Regression Models

	Vitamin D ≤21 ng/mL		Vitamin D >21 ng/mL	
Cox Regression Models	Hazard Ratio	95% CI	Hazard Ratio	95% CI
All-cause mortality				
Univariate	0.59	0.45-0.77	0.83	0.65-1.06
Multivariate	0.54	0.35-0.84	0.83	0.63-1.11
Cardiovascular mortality				
Univariate	0.56	0.38-0.82	0.91	0.56-1.5
Multivariate	0.50	0.26-0.98	0.83	0.47-1.5

CI = confidence interval.
Multivariate models were adjusted for race, age, sex, hypertension, smoking status, C-reactive protein, obesity, total cholesterol, renal function, and serum glucose.

Similarly, with univariate regression model using single spline, we observed 44% reduction in the risk of cardiovascular disease mortality for each 10-ng/mL. change in 25(OH)D up to 21 ng/mL (HR 0.56; 95% CI, 0.38-0.82) (**Figure**). An increase in serum 25(OH)D levels above 21 ng/mL. was not associated with reduction in the risk of cardiovascular disease mortality (HR 0.91; 95% CI, 0.56-1.5). In the multivariable models, the inverse relation between 25(OH)D and cardiovascular disease mortality remained significant below (HR 0.50; 95% CI, 0.26-0.98) but not above its population median (HR 0.83; 95% CI, 0.47-1.47) of 21 ng/mL. (**Table 2**).

Amer M et al, 2013, *"Relationship between 25-Hydroxyvitamin-D and All Cause & Cardiovascular Disease Mortality"* **Am Jrl of Medicine** https://www.amjmed.com/article/S0002-9343(13)00084-3/fulltext

Importance of Bedrock #4…

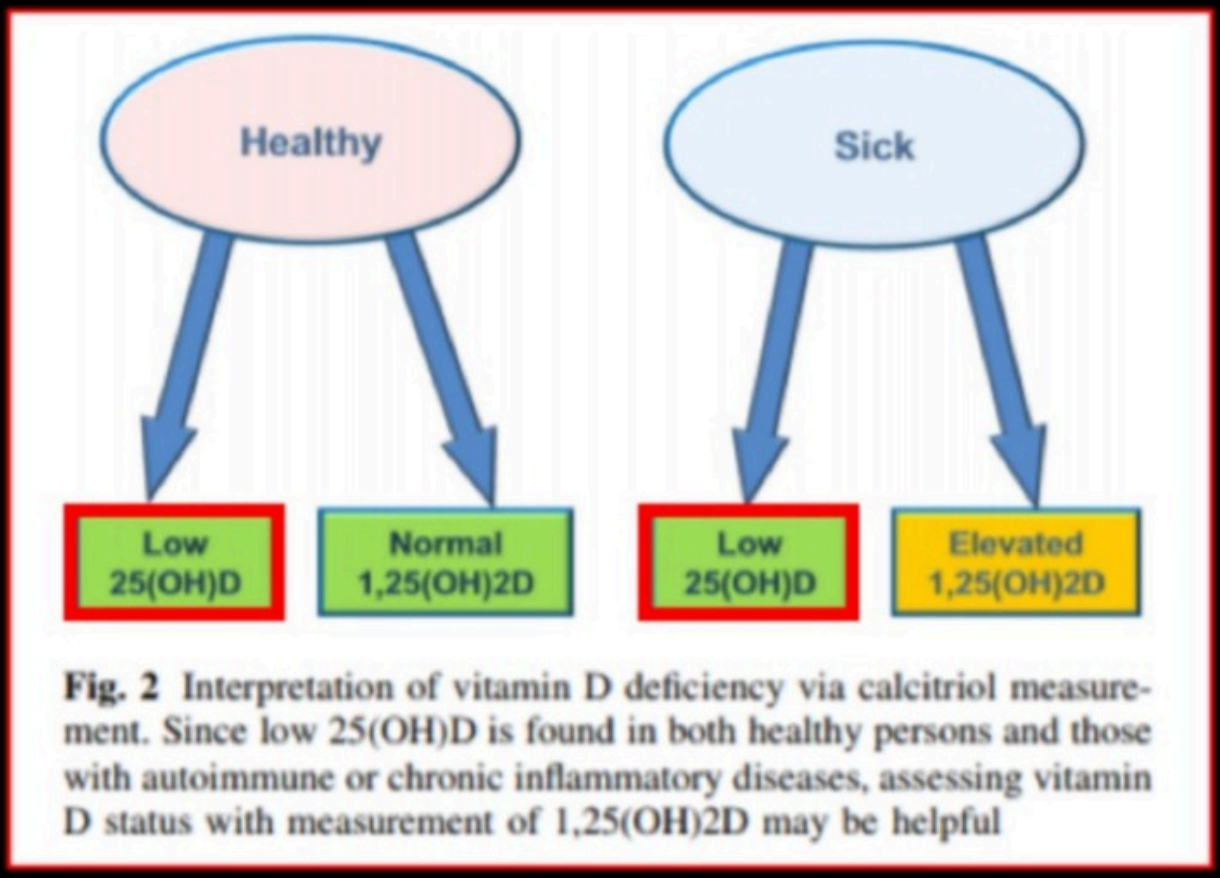
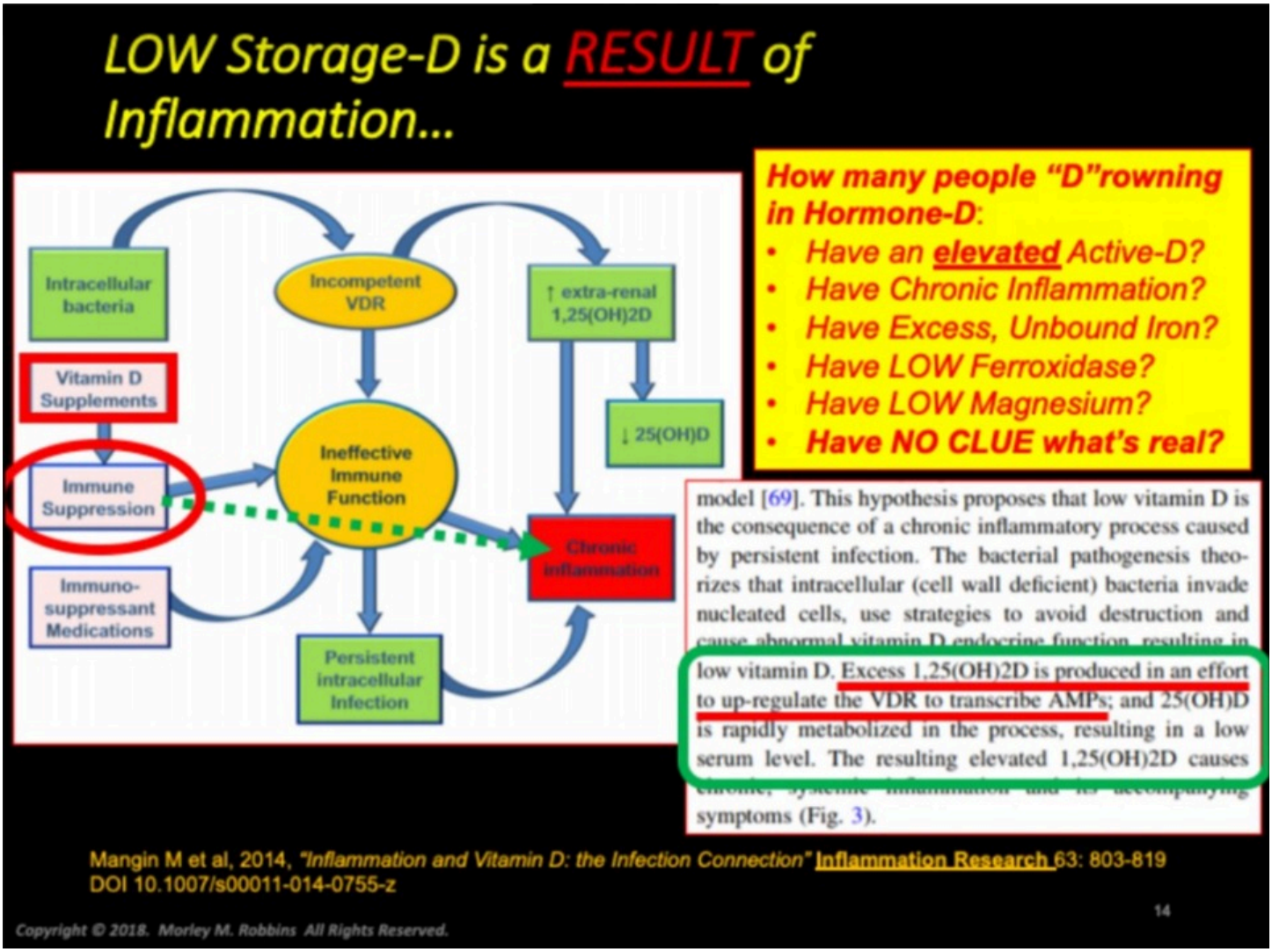


Fig. 2 Interpretation of vitamin D deficiency via calcitriol measurement. Since low 25(OH)D is found in both healthy persons and those with autoimmune or chronic inflammatory diseases, assessing vitamin D status with measurement of 1,25(OH)2D may be helpful

Mangin M et al, 2014, *"Inflammation and Vitamin D: the Infection Connection"* Inflammation Research 63: 803-819 DOI 10.1007/s00011-014-0755-z

Nurse and PhD in nutrition – M Mangin

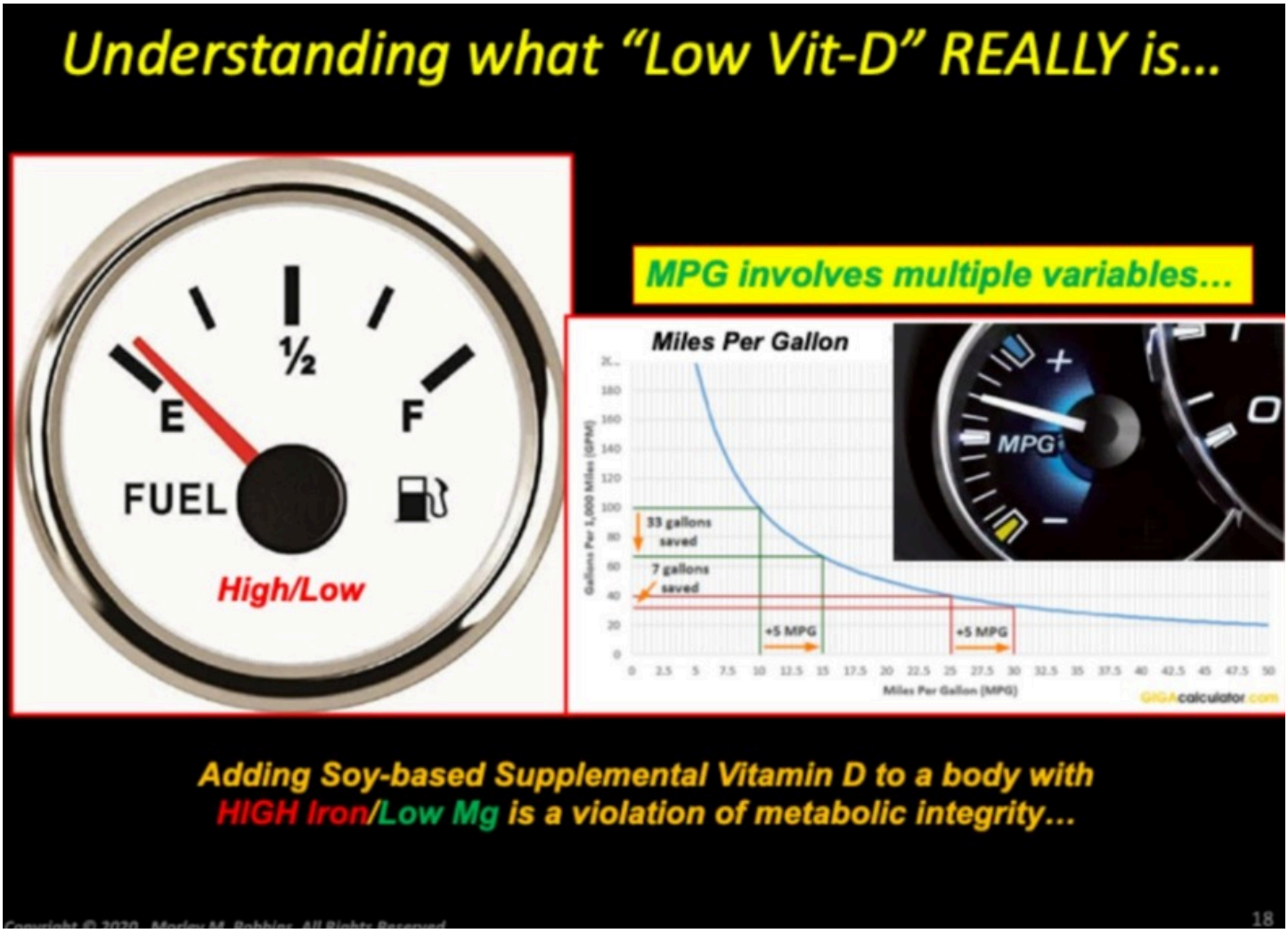
- This article took 3 weeks to take in – a very intense and dense article
- As Morley has understood more, he has gone back to read and take in more
- It's a very important article – it may not jump out at first, but it's worth taking time to take it in if you like research
- What surprises people, is that both healthy and sick people have low D... active D is what separates them
- It's intriguing to learn 'why'



Low storage D is a result of inflammation, NOT a cause of it
• What causes inflammation is a build up of iron
• Causes mag loss, trigger for iron accumulation and then inflammation
• There's a link between immune function and Vit D
• Plenty of research to show that the immune system is suppressed by Vit D
• What are the second and third order implications of suppressing the body?
• A powerful hormone (Vit D) pushing down the immune response?
• Morley spoke to a client some years ago – asked what medication she's on?
• "Why would I take medication to suppress the reaction my body has?"
• Morley hadn't thought of that
• What Dr Mangin is showing – immune suppression and chronic inflammation
• Class 4 will talk about the importance of immune activation – chronic immune activation
• Very important phrase that Morley has just learned about
• Much of the population is stuck in this state
• The body is really smart – this isn't just in the kidneys... it's happening in extra-renal-tissue (eg in macrophages)
• The body is trying to sense a threat, and diverting the Vit D into an active status so it can become AMP's
• How many people you know are drowning in Vit D, have the checklist? MANY! Is it monitored though by those who prescribe Vit D supplements...
• We need to be careful about what we use as data for our decisions…

"D Leaps TALL Buildings" is ALL Narrative...

Attributes ascribed to "D3" are => Calcitriol<>VDR<>RXR

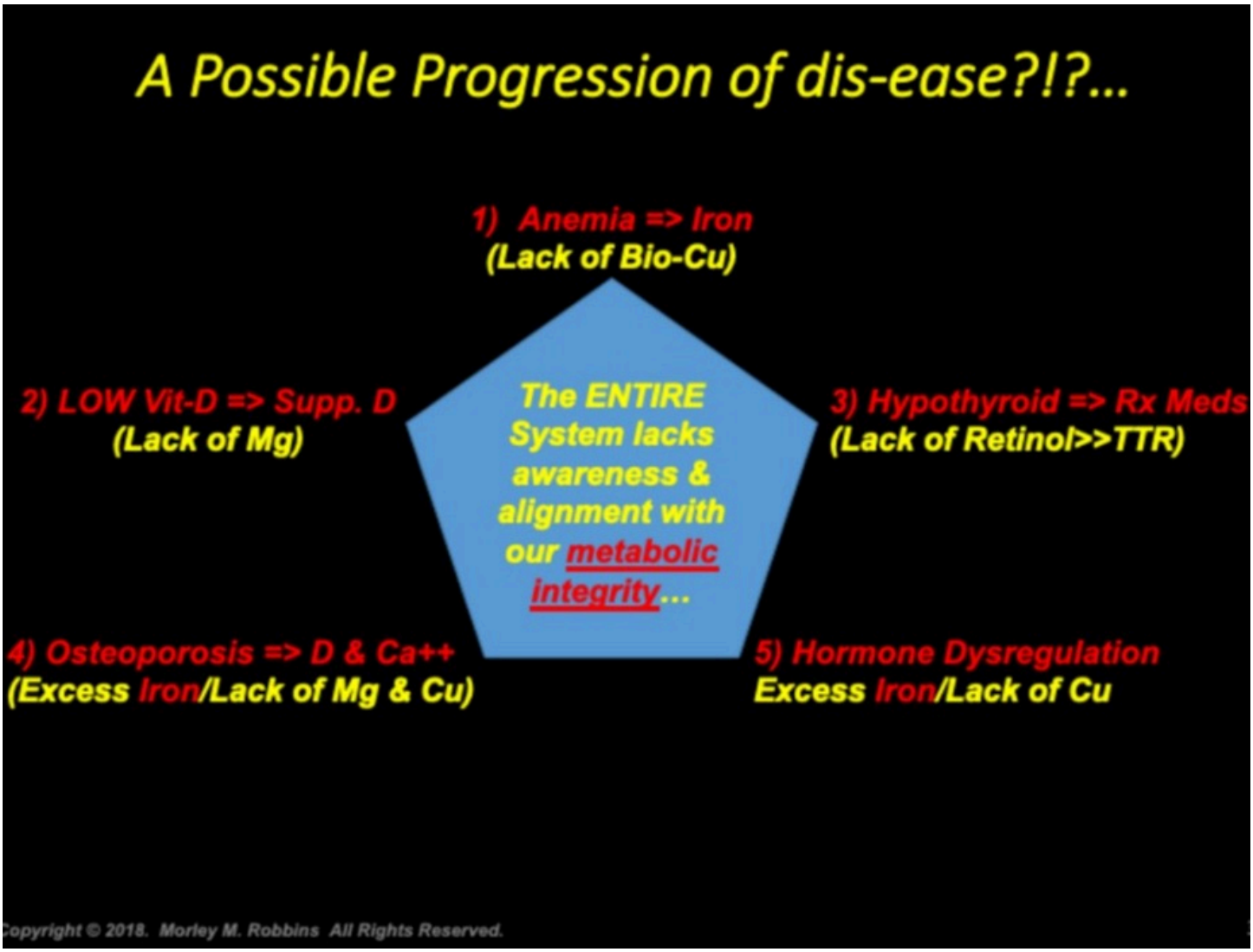


What IS low vitamin d?

• We've been trained to see Vit D as a fuel gauge – "you're low, you need more D!"

• Vit D is more like MPG – have to worry about tyre pressure, stroke volume, the arc of the spark plug, compression ratio and many other variables... add more gas if you want, but it's not going to change those

A Possible Progression of dis-ease?!?...



Things that go "Bump!" in the night…

This vogue "D"ietary supplement is REALLY a HORMONE!

- What OTHER Hormone is sold OTC?!?
- What OTHER Hormone Testing ***IGNORES*** the ***Active*** Status?!?

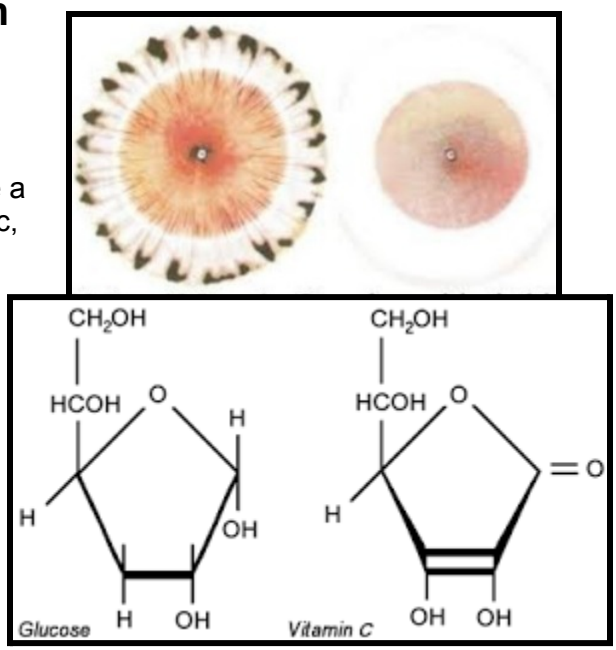
Hormone-D "D"ulls the functions of Retinol, ANOTHER KEY Hormone

- Who here understands the actions of RARs, RORs, RXRs, RZRs?
- Sunlight ACTIVATES 2 Critical Events:
  - Synthesis/Build-up of Hormone-D…
  - Breakdown of Retinol >> Retinoic Acids (Hormones) & Nuclear Receptors…
- ***A*** is a "*Sensor*," and ***D*** is "Filter" (*Sunglasses*…)

Hormone-D is NOT a "D"ipstick function, it is a "D"ynamic indicator of metabolic homeostasis & integrity…

- Low Vit-D is a Billboard for "D"ysfunction… ***NOT a "D"isease…***
- Correlation is ***NOT*** Causation! *(Lucas & Wolf, 2019, "Then Came the Randomized Clinical Trials")*

Vitamin C and Glucose, their connection with plant Chloroplast function of light harvest



Vitamins are complexes, they are parts of enzyme systems – Like a watch which is a timekeeping mechanism – it is functional, organic, interactive – a watch is not a hunk of brass – Vitamin C is not ascorbic acid – it is more – it is complex – organic – functional – whole, not inorganic chemical parts.

INTERESTING FACTS ABOUT VITAMIN C
The Nobel Prize and Dr. Royal Lee Noble Prize Winner (for discovering ascorbic acid)
Albert Szent-Gyorgyi, MD, PhD (1893-1986) is also credited with discovering bioflavonoids in 1935.

By 1934, Dr. Royal Lee, the founder of Standard Process, Inc. had already combined the benefits of Vitamin C with Bioflavonoids in theHealthBuilding complex known as Cataplex C. Dr. Szent-Gyorgy discovered bioflavonoids in trying to help a patient with subcutaneous capillary bleeding. He had success with whole food “Vitamin C” with “vitamin P” included but the “pure” ascorbic acid had no effect ! [Nature 138:798;1936, Nature 137:27;1936]

Aren’t all “Vitamin C” products the same?
The complete Vitamin C-Complex has many actions within our bodies—fighting infection, building tissues, regulating inflammation, preventing cancer and heart disease 1, 2 —to name a few!

But are you, your family and friends taking true Vitamin C-Complex? Or are you merely taking a large dose of a partial factor of the HealthBuilding Vitamin C- Complex – ascorbic acid?

Read the labels in any market or drugstore and you might think that ascorbic acid IS Vitamin C, and that Vitamin C is nothing more than ascorbic acid. But this is far from the truth.

Even Albert Szent-Gyorgyi, MD, PhD (1893-1986), the Nobel Prize winner who “discovered” ascorbic acid, believed very soon thereafter that ascorbic acid in a whole food form was the true beneficial health factor, not ascorbic acid alone.

What is Vitamin C-Complex, anyway??
Vitamin C-Complex is not merely ascorbic acid! Ascorbic acid is only part of the Vitamin C-Complex! Let’s learn more. True Vitamin C-Complex is a whole food complex made up of Vitamin C (ascorbic acid) and Vitamin P (bioflavonoids). Like all vitamin complexes, Vitamin C-Complex is an example of a working mechanism which only functions effectively when all the parts are present.

What are the parts of the Vitamin C-Complex?
They are: Ascorbic acid, (commonly known as Vitamin C), an antioxidant which protects from free radical damage. Bioflavonoids, (sometimes called Vitamin P), the vascular fragility factors.
Most people who think they are taking “Vitamin C” are actually taking only ascorbic acid.
Although ascorbic acid is found in wholesome foods, the ascorbic acid typically found in“health food stores” and drugstores is a synthetic chemical manufactured from corn syrup (sugar) and sulfuric acid. Remember, ascorbic acid found in nature is just one part of the Vitamin C-Complex.
Nature intended your body to only use very small amounts of organic ascorbic acid.
MORE IS NOT BETTER.
Surplus ascorbic acid must be eliminated through the kidneys, putting unnecessary strain on these vital organs. Surplus ascorbic acid also upsets the balance of trace minerals in the body. One could say that high doses of ascorbic acid are toxic to your body. Ascorbic acid that is out of balance with organic factors found in nature is

not a healthy way to get our HealthBuilding Nutritional Essentials.

Let's take a deeper look at some of the HealthBuilding factors the organic, whole food Vitamin C-Complex provides:
Bioflavonoids, (the vascular fragility factor), sometimes known as Vitamin P. Vitamin P increases capillary strength and decreases the risk of bleeding. Bruising, broken blood vessels, bleeding gums are all improved with healthful bioflavonoids, and bones, cartilage, ligaments and tendons are all strengthened, preventing injury and speeding the healing process. There are nearly 4000 different bioflavonoids—some of the most well-known are rutin, quercetin, citrin and hesperidin. Bioflavonoids are also known to decrease the risk of developing cancer 1, 2, but only when consumed as whole foods.

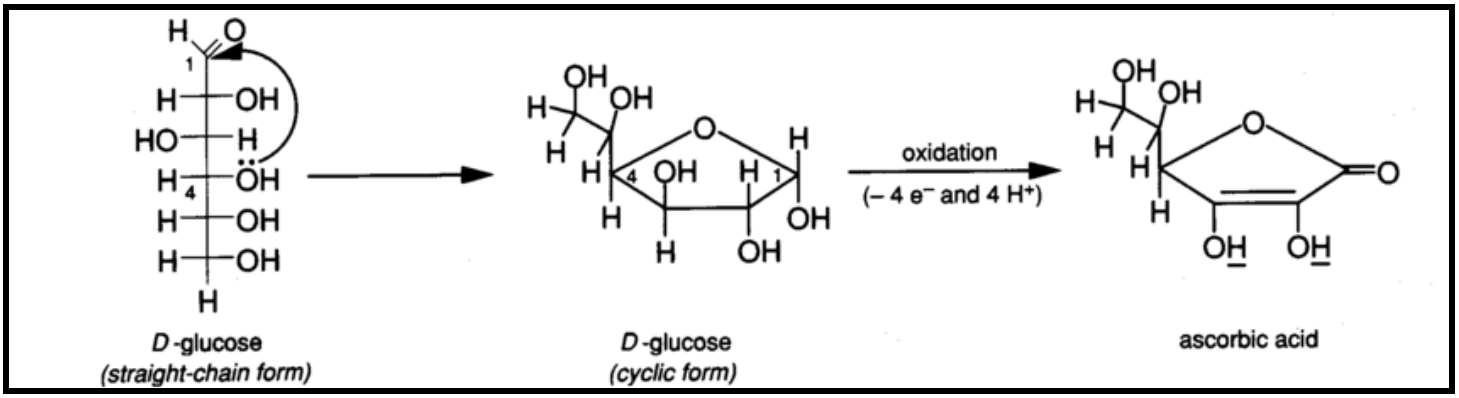
Our Bodies Need More than Ascorbic Acid!
Bioflavonoids are true nutritional essentials that cannot be manufactured by the human body. They must be obtained from fresh fruits, vegetables and whole food concentrates high in the Vitamin C-Complex. Research has consistently shown that when nutrients are consumed as **the complete "biological action package"** present in whole foods, true health benefits are achieved.

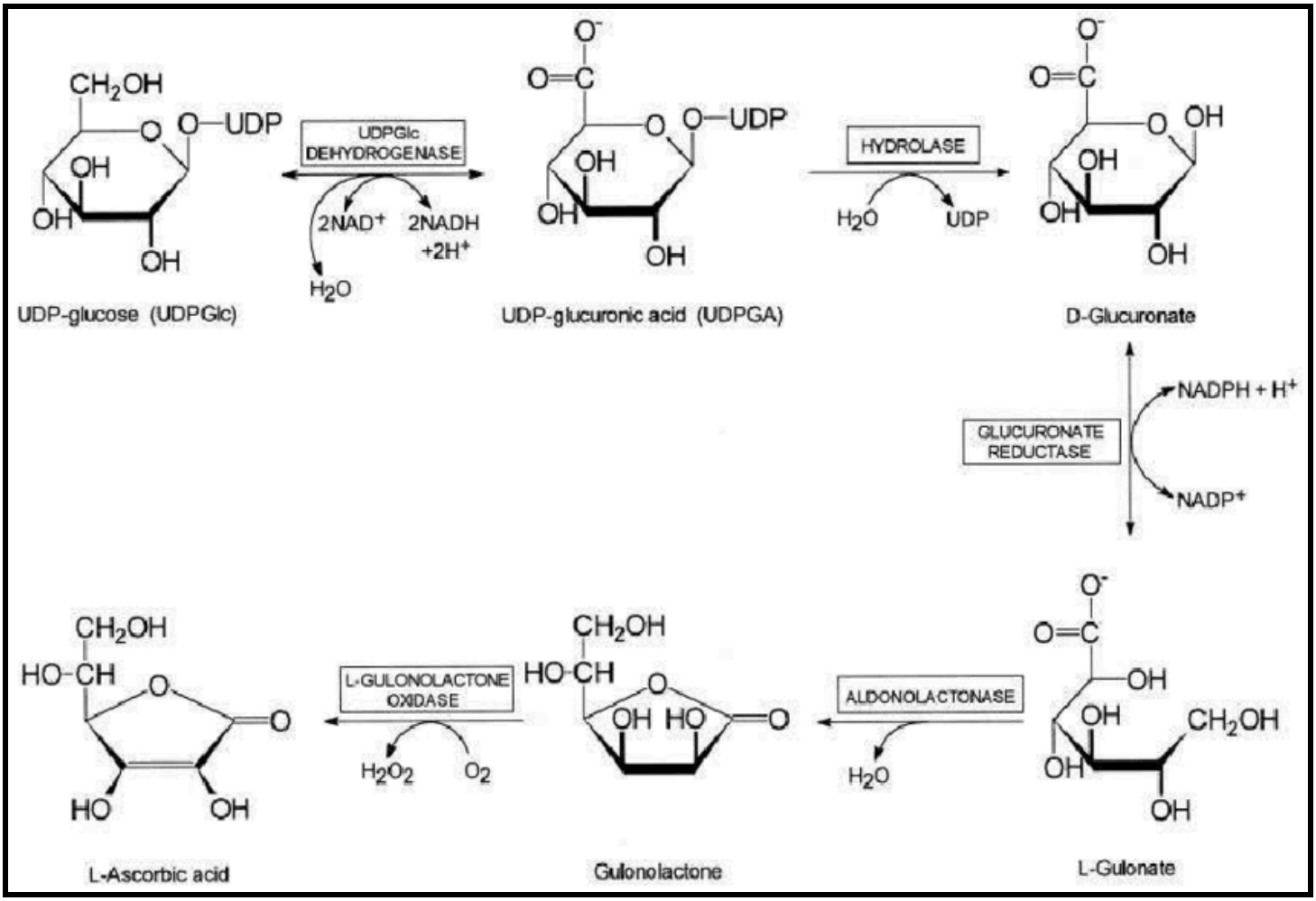
In fact, Vitamin C cannot be effectively utilized without bioflavonoids being present in your foods.

Prevent Heart Attacks and Strokes with Vitamin C-Complex. Vitamin C found in the form of whole foods like fruit and vegetables have long been known to lower the risk of heart attack. Oxidation and inflammation of plaques deposited in the coronary arteries are triggers for many heart attacks. Components of the Vitamin C-Complex decrease oxidation of lipids and control inflammation, thus reducing the risk of heart attacks and strokes.

Research has shown that the maximum health benefits are derived from consumption of 800 grams of fruit and vegetables daily. Yet only a very small percentage of individuals eat the recommended 5-9 servings of fruit and vegetables daily. How to make up the difference? Whole food concentrates are the answer to getting your Vitamin C-Complex HealthBuilding factors consistently and conveniently. As you have learned – Vitamin C-Complex is a Nutritional Essential.

STUDY ON HOW ASCORBIC ACID AFFECTS BLOOD GLUCOSE READINGS


D-glucose
(straight-chain form)
D-glucose
(cyclic form)
oxidation
(– 4 e⁻ and 4 H⁺)
ascorbic acid


UDP-glucose (UDPGlc)
UDPGlc DEHYDROGENASE
2NAD⁺
2NADH +2H⁺
H2O
UDP-glucuronic acid (UDPGA)
HYDROLASE
H2O
UDP
D-Glucuronate
GLUCURONATE REDUCTASE
NADPH + H⁺
NADP⁺
L-Gulonate
ALDONOLACTONASE
H2O
Gulonolactone
L-GULONOLACTONE OXIDASE
H2O2
O2
L-Ascorbic acid

Race, Skin & Converting Sunlight Into Metabolic Energy -
Melanin and It's Mysteries

Posted on: Monday, March 19th 2012 at 3:15 pm, Written By: Sayer Ji, Founder

While ubiquitous in nature, melanin, which provides the coloring found in hair, skin, eyes, feathers, scales, etc., is an especially important substance as far as the human condition is concerned. Melanin's role in determining skin color makes it the primary physiological basis for racial differentiation among humans; in fact, entire civilizations have arisen and fallen due to perceptions and misperceptions concerning its nature and significance.

It is for this reason that we have chosen to focus on melanin's lesser known, biological role and how being more pigmented, i.e. darker skinned, or put oppositely, being less intensely de-pigmented, i.e. less light skinned, may have a unique set of health benefits which have been repressed or misrepresented over the course of history, in order to fuel race-based constructs.

Melanin, after all, has a diverse set of roles in various organisms. From the ink of the octopus, to the melanin-based protective colorings of bacteria and fungi, melanin offers protection against a variety of threats: from predators and similar biochemical threats (host defenses against invading organisms), UV light, and other chemical stresses (i.e. heavy metals and oxidizing agents). **Commonly overlooked, however, is melanin's ability to convert gamma and ultraviolet radiation into metabolic energy within living systems.**

Single-celled fungi, for instance, have been observed thriving within the collapsed nuclear reactor at Chernobyl, Ukraine, using gamma radiation as a source of energy. Albino fungi, without melanin, were studied to be incapable of using gamma radiation in this way, proving that gamma rays initiate a yet-unknown process of energy production within exposed melanin.

Vertebrate animals, in fact, may convert light directly into metabolic energy through the help of melanin. In a review on the topic published in 2008 in the Journal of Alternative and Complementary Medicine, titled "Melanin directly converts light for vertebrate metabolic use: heuristic thoughts on birds, Icarus and dark human skin," Geoffrey Goodman and Dani Bercovich offer a thought-provoking reflection on the topic, the abstract of which is well worth reading in its entirety:

Pigments serve many visually obvious animal functions (e.g. hair, skin, eyes, feathers, scales). One is 'melanin', unusual in an absorption across the UV-visual spectrum which is controversial. Any polymer or macro-structure of melanin monomers is 'melanin'. Its roles derive from complex structural and physical-chemical properties e.g. semiconductor, stable radical, conductor, free radical scavenger, charge-transfer.

Clinicians and researchers are well acquainted with melanin in skin and ocular pathologies and now increasingly are with internal, melanized, pathology-associated sites not obviously subject to light radiation (e.g. brain, cochlea). At both types of sites some findings puzzle: positive and negative neuromelanin effects in Parkinsons; unexpected melanocyte action in the cochlea, in deafness; melanin reduces DNA damage, but can promote melanoma; in melanotic cells, mitochondrial number was 83% less, respiration down 30%, but development similar to normal amelanotic cells.

A little known, avian anatomical conundrum may help resolve melanin paradoxes. One of many unique adaptations to flight, the pecten, strange intra-ocular organ with unresolved function(s), is much enlarged and heavily melanized in birds fighting gravity, hypoxia, thirst and hunger during long-distance, frequently sub-zero, non-stop migration. The pecten may help cope with energy and nutrient needs under extreme conditions, by a marginal but critical, melanin-initiated conversion of light to metabolic energy, coupled to local metabolite recycling.

Similarly in Central Africa, reduction in body hair and melanin increase may also have lead to 'photomelano metabolism' which, though small scale/ unit body area, in total may have enabled a sharply increased development of the energy-hungry cortex and enhanced human survival generally. Animal inability to utilize light energy directly has been traditionally assumed. Melanin and the pecten may have unexpected lessons also for human physiology and medicine.

If the authors are correct, a longstanding assumption that animals are incapable of utilizing light energy directly is now called into question. In other words, our skin may contain the equivalent of melanin "solar-panels," and it may be possible to "ingest" energy, as plants do, directly from the Sun. We already know that sunlight exposure can reduce the risk of over 30 diseases, and that its primary metabolite in our skin, vitamin D, may reduce the risk of over 200.

Our biological connection and dependence to the sun, in fact, is so profound, that the very variation in human skin color from African, melanin-saturated dark skin, to the relatively melanin de-pigmented, Caucasian lighter-skin, is a byproduct of the offspring of our last common ancestor from Africa (as determined by mitochondrial DNA) migrating towards sunlight-impoverished higher latitudes, which began approximately 60,000 years ago. In order to compensate for the lower availability of sunlight, the body rapidly adjusted, essentially requiring the removal of the natural "sunscreen" melanin from the skin, which interferes with vitamin D production; vitamin D, of course, is involved in the regulation of over 2,000 genes, and therefore is more like a hormone, without which our entire genetic infrastructure becomes destabilized.

While a life-saving adaptation, the loss of melanin likely has adverse health effects, which include losing the ability to convert sunlight into metabolic energy, increased **prevalence of Parkinson's disease (which involves de-melanization of the substantia nigra),** and others effects which have yet been investigated in any detail. For now, it is important to point out that within the span of only 60,000 years (a nanosecond in biological time), many of the skin "color" differences among the world's human inhabitants reflect how heavily genetically-conserved was the ability of the human body to produce vitamin D. Furthermore, the trade-off involved in maintaining the ability create enough vitamin D within a sunlight-deprived clime by sacrificing melanin may have had adverse health effects that are only now being realized.

Sayer Ji is the founder and chair of GreenMedInfo.com. His writings have been published in the Wellbeing Journal, the Journal of Gluten Sensitivity, and have been featured on numerous websites, including Mercola.com, NaturalNews.com, Infowars.com, Care2.com. His critically acclaimed essay series The Dark Side of Wheat opens up a new perspective on the universal, human-species specific toxicity of wheat, and is now available for PDF download.

Disclaimer: This article is not intended to provide medical advice, diagnosis or treatment. Views expressed here do not necessarily reflect those of GreenMedInfo or its staff.

---

https://modernfarmer.com/2016/01/mushrooms-vitamin-d/

Vitamin D is a weird one in terms of vital nutrients; in fact, it's sometimes considered a hormone and not a vitamin, because you don't typically get more if it by ingesting. Think of vitamin C, perhaps most often associated with citrus fruits like oranges: You get it by eating an orange. But vitamin D is synthesized by the body itself.

Sunlight hits the skin, and the UVB radiation is absorbed into the body in the form of vitamin D. But it's not useful yet; it has to be carried through the bloodstream to the liver, where it's converted once, and then to the kidneys, where it's converted again. Then it's carried again by the bloodstream to bones and organs where it's needed.

After all that conversion, the new vitamin is used by the body to facilitate the absorption of other minerals;

There are a few different compounds grouped under the “vitamin D” banner, but the most important are typically referred to as vitamin D3 and vitamin D2. Vitamin D3 is the type that your body synthesizes with sunlight, while vitamin D2 is more easily retrieved from foods. Supplements containing both are available, but D3 is harder to find, and also is made from animal products, which might put it off-limits for those with certain diets. Comparisons of the two have generally found that D3 supplements are more easily converted by the body and last longer, but a 2012 analysis of the studies on the topic found that for daily, low-dose supplements, vitamin D2 is just as effective.

But supplements aren’t the only way to get vitamin D2: Mushrooms have been shown to be in the very rare group of foods (along with lichen, some oily fish, and alfalfa) to contain significant amounts of vitamin D. A 2013 study found that the effects of those eating mushrooms (well, mushroom powder, but still) were identical to those taking the same amount of vitamin D2 supplements.

The craziest thing? Exposing mushrooms to sunlight – seriously, just, like, placing mushrooms in the sun – causes them to act like solar panels and such up and create much higher levels of vitamin D2. Sun-dried (or even artificially-UV-light-dried) mushrooms can have dramatically ramped-up vitamin D2 levels, although most commercially dried mushrooms are dried indoors.

Biochemistry, Melanin - original link

Daniel I. Schlessinger; McDamian Anoruo; Joel Schlessinger. Author Information Last Update: May 8, 2022.

Introduction

Melanin is a term used to describe a large group of related molecules responsible for many biological functions, including pigmentation of skin and hair and photoprotection of skin and eye.[1][2][3]

Fundamentals

In humans, melanin exists as three forms: eumelanin (which is subdivided further into black and brown forms), pheomelanin, and neuromelanin.

Cellular

Eumelanin and pheomelanin are produced in various amounts in the basal layer of the epidermis within cells called melanocytes. Melanocytes are the mature forms of melanoblasts, which migrate from the neural crest following neural tube closure. As melanin is produced within melanocytes, it is packaged in small, round membrane-bound organelles called melanosomes. Melanosomes are transported from melanocytes to neighboring keratinocytes via tentacle-like dendritic processes. Melanosomes arriving in keratinocytes are positioned superficially to cell nuclei, which serves to protect from incoming ultraviolet (UV) radiation.[4]

Molecular

The first step of **biosynthesis of both eumelanin and pheomelanin begins the same way. Tyrosine is converted into dihydroxyphenylalanine (DOPA), which requires tyrosine hydroxylase and tetrahydrobiopterin as a cofactor. The enzyme tyrosinase then converts dihydroxyphenylalanine into dopaquinone**, which can follow a variety of pathways to form the eumelanin or pheomelanin.

The primary stimulus for melanogenesis and subsequent melanosome production is UV radiation, which upregulates melanocyte production of pro-opiomelanocortin (POMC) and its downstream products, alpha-melanocyte-stimulating hormone (alpha-MSH) and adrenocorticotropic hormone (ACTH). The overall effect is to increase eumelanin production. (Interestingly, people with proopiomelanocortin mutations have red hair and Fitzpatrick skin type 1 due to the relative increase in pheomelanin to eumelanin expression).

Neuromelanin is a dark pigment produced by dopaminergic and noradrenergic cells of the substantia nigra and locus coeruleus as a breakdown product of dopamine.[5]

Function

In its various forms, melanin fulfills a variety of biological functions, including skin and hair pigmentation and photoprotection of the skin and eye.

Pigmentation of the skin results from the accumulation of melanin-containing melanosomes in the basal layer of the epidermis. Differences in skin pigmentation result both from the relative ratio of eumelanin (brown–black) to pheomelanin (yellow–red), as well as the number of melanosomes within melanocytes. Pheomelanin accounts for the pinkish skin constituting the lips, nipples, vagina, and glans of the penis. In general, lightly pigmented skin tends to contain melanocytes with clusters of two to three melanosomes, whereas darkly pigmented skin tends to contain individual melanosomes which can melanize neighboring keratinocytes more readily. The overall melanin density correlates with the darkness of skin as well as Fitzpatrick skin type.

The interplay between melanin and UV radiation is complex. Researchers widely believe that melanin production in melanocytes increased as an evolutionary adaptation to the widespread loss of human body hair more than a million years ago. Populations living closer to the equator tended to develop a greater proportion of eumelanin, which is a UV–absorbent, antioxidant, and free radical scavenger. Conversely, populations living further from the equator are relatively richer in pheomelanin, which produces free radicals in response to UV radiation, accelerating carcinogenesis. As the main stimulus for cutaneous vitamin D production is UV light exposure, it follows that dark-skinned individuals also tend to have lower levels of vitamin D and should be screened accordingly.

Less clear is the link between melanin, the sun, and cutaneous immunology. Both acute and chronic UV light exposure induces immunosuppression; UVA light is used therapeutically for a large number of skin conditions,

including psoriasis. Intriguingly, melanin is believed to have immunomodulatory and even anti-bacterial properties, although the underlying mechanisms have not yet been fully elucidated. Malignant melanocytes rich in melanin are less sensitive to chemo-, radio-, or photodynamic therapy, and amelanotic melanomas have longer disease-free and overall survival than melanotic ones. Therefore, some have suggested inhibition of melanogenesis as a therapy for malignant melanoma.
Just as melanin protects the skin from photodamage, it also protects the eye. Melanin is concentrated in the iris and choroid, and those with gray, blue, and green eye colors, as well as albinos, have more sun-related ocular issues.
Hair color is determined by the relative proportion of various forms of melanin:

- Black and brown hair results from varying degrees of black and brown eumelanin
- Blonde hair results from a small amount of brown eumelanin in the absence of black eumelanin
- Red hair results from roughly equal amounts of pheomelanin as eumelanin. Strawberry blonde hair results from brown eumelanin in the presence of pheomelanin.

Clinical Significance

Each step in the formation and transport of melanin may be impaired, resulting in a diverse group of diseases:[6][7][8]

- **Melanoblast:** Waardenburg syndrome, a group of autosomal recessive (AR) and dominant (AD) diseases characterized by a white forelock, skin hypopigmentation, and premature graying of the hair, results from impaired melanoblast migration to their destination tissue (i.e., iris, hair). Various forms also include congenital deafness, heterochromia iridis, synophrys, and dystopia canthorum.
- **Melanocyte:** Vitiligo, a disease characterized by photosensitive and depigmented white patches surrounded by normally pigmented skin and ophthalmologic issues, results from auto-immune destruction of melanocytes.
- **Melanosome:** Chédiak-Higashi syndrome, an autosomal recessive disease characterized by partial oculocutaneous albinism, platelet dysfunction, hemophagocytic lymphohistiocytosis (HLH), and immunodeficiency, results from mutations in genes which likely regulate lysosomal trafficking. Griscelli syndrome, an autosomal recessive group of diseases, characterized by hair and skin hypopigmentation, results from mutations in the protein complex responsible for the transfer of mature melanosomes to keratinocytes. Various forms also include neurologic impairment, immunodeficiency, and HLH.
- **Tyrosinase:** Phenylketonuria, an autosomal recessive disease characterized by intellectual disability, epilepsy, fair, blonde hair and blue eyes, and other skin changes, results from a deficiency of the phenylalanine hydroxylase enzyme. The pigmentary changes are due to competitive inhibition of tyrosinase by phenylalanine buildup. Oculocutaneous albinism, a group of autosomal recessive diseases characterized by hypopigmentation and ocular problems, results from mutations of the tyrosinase (TYR) gene. Vogt-Koyanagi-Harada syndrome, a disease characterized by progression through phases of meningoencephalitis, uveitis, alopecia with vitiligo-like depigmentation, and recurrent uveitis, results from autoimmune destruction of melanosome-bound antigens, possibly including the tyrosinase enzyme itself.
- **Dopaminergic neurons:** Parkinson disease, a neurodegenerative condition characterized by progressive postural and gait difficulties, results from drop-out of neuromelanin-producing dopaminergic neurons in the brain. Depigmentation of the substantia nigra pars compacta is a pathologic hallmark of the condition.

References

1.Maranduca MA, Branisteanu D, Serban DN, Branisteanu DC, Stoleriu G, Manolache N, Serban IL. Synthesis and physiological implications of melanic pigments. Oncol Lett. 2019 May;17(5):4183-4187. [PMC free article] [PubMed]
2.rnandez-Flores A, Saeb-Lima M, Cassarino DS. Histopathology of aging of the hair follicle. J Cutan Pathol. 2019 Jul;46(7):508-519. [PubMed]
3.Starace M, Alessandrini A, Brandi N, Piraccini BM. Use of Nail Dermoscopy in the Management of Melanonychia: Review. Dermatol Pract Concept. 2019 Jan;9(1):38-43. [PMC free article] [PubMed]
4.D'Alba L, Shawkey MD. Melanosomes: Biogenesis, Properties, and Evolution of an Ancient Organelle. Physiol Rev. 2019 Jan 01;99(1):1-19. [PubMed]
5.Del Bino S, Duval C, Bernerd F. Clinical and Biological Characterization of Skin Pigmentation Diversity and Its Consequences on UV Impact. Int J Mol Sci. 2018 Sep 08;19(9) [PMC free article] [PubMed]
6.Juhasz MLW, Levin MK. The role of systemic treatments for skin lightening. J Cosmet Dermatol. 2018 Dec;17(6):1144-1157. [PubMed]
7.Saleem MD. Biology of human melanocyte development, Piebaldism, and Waardenburg syndrome. Pediatr Dermatol. 2019 Jan;36(1):72-84. [PubMed]
8.Carballo-Carbajal I, Laguna A, Romero-Giménez J, Cuadros T, Bové J, Martinez-Vicente M, Parent A, Gonzalez-Sepulveda M, Peñuelas N, Torra A, Rodríguez-Galván B, Ballabio A, Hasegawa T, Bortolozzi A, Gelpi E, Vila M. Brain tyrosinase overexpression implicates age-dependent neuromelanin production in Parkinson's disease pathogenesis. Nat Commun. 2019 Mar 07;10(1):973. [PMC free article] [PubMed]

α-MSH (melanocyte stimulating hormone)

α-MSH is a neuropeptide hormone produced by the hypothalamus, anterior pituitary and skin melanocytes. α-MSH in the brain is derived from ACTH. α-MSH significantly influences immunological activities, including a number of cytokines. Additionally, α-MSH influences sexual arousal, appetite, and may play a significant role in the regulation of circadian rhythms. α-MSH is used along with a variety of tests to evaluate the effects of various inflammatory states.

Low Values

- Lyme disease If 25OHD levels are low or low/normal and Calcitriol levels are 1.5-2X higher, Lyme disease may be a factor.
    - Consider Lyme testing if suspected: PCR testing, IgG/IgM antibodies and T-cell Elispot
- VDR (vitamin D receptor) inactivation While not conclusively known, the inactivation of the VDR may theoretically lead to elevated blood levels of calcitriol. Pathogenic vectors capable of VDR inactivation include: Borrelia (Lyme), EBV (epstein Barr virus), CMV (cytomegalovirus), gliotoxin (produced from fungi and molds such as aspergillus, penicillium, trichoderma)
- Traumatic Brain Injury (TBI) TBI patients have been found to have lower α- MSH (R)
- Anorexia Anorexia is associated with lower MSH ®
- Mold or biotoxin exposure Mold-related illness is associated with lower α-MSH levels. Chronic inflammatory activity due to mold or biotoxin exposure is believed to damage the hypothalamus, leading to suppressed production of α-MSH. α-MSH is often used with a battery of other tests to assess mold or biotoxin exposure. Other tests include: VEGF, TGFß-1, C4a, ADH, MMP-9, and urinary mycotoxin Assessments

Medications capable of lowering MSH
melatonin, GABA

Potential Etiologies Information
Medications capable of raising
1,25 dihydroxyvitamin D, Estrogen, Isoniazid, Thiazide diuretics, Vitamin D3

US Units SI Units
Optimal Range 15-25 pg/ml 15-25 pg/ml
Alarm Value <6, >40 <6, >40

Elevated Values

Chronic inflammation Suppression of α-MSH is believed to be consequence of chronic inflammation, which may be negatively affecting brain function

Chronic fatigue syndrome CFS/ME may feature higher MSH levels, particularly within the first 5 years after diagnosis

Addison's disease Addison's disease has shown to feature higher MSH levels (R). Importantly, MSH is derived from ACTH. If Addison's is suspected, consider plasma ACTH and cortisol and urinary cortisol studies

Insulin resistance/obesity Higher MSH levels have been observed in insulin resistant, obese men

Medications capable of increasing MSH
Insulin, nicotine, vasoactive intestinal polypeptide (VIP)

Beyond mitochondria, what would be the energy source of the cell?

Arturo S Herrera, Maria Del C A Esparza, Ghulam Md Ashraf, Andrey A Zamyatnin, Gjumrakch Aliev [1]

Affiliations expand

- PMID: 25645910
- DOI: 10.2174/1871524915666150203093656

Abstract
Currently, cell biology is based on glucose as the main source of energy. Cellular bioenergetic pathways have become unnecessarily complex in their eagerness to explain how the cell is able to generate and use energy from the oxidation of glucose, where mitochondria play an important role through oxidative phosphorylation.

During a descriptive study about the three leading causes of blindness in the world, the ability of melanin to transform light energy into chemical energy through the dissociation of water molecule was unraveled.

Initially, during 2 or 3 years; we tried to link together our findings with the widely accepted metabolic pathways already described in metabolic pathway databases, which have been developed to collect and organize the current knowledge on metabolism scattered across a multitude of scientific articles.

However, **firstly, the literature on metabolism is extensive but rarely conclusive evidence is available, and secondly, one would expect these databases to contain largely the same information, but the contrary is true**. For the apparently well-studied metabolic process **Krebs cycle, which was described as early as 1937 and is found in nearly every biology and chemistry curriculum, there is a considerable disagreement between at least five databases. Of the nearly 7000 reactions contained jointly by these five databases, only 199 are described in the same way in all the five databases.**

Thus, to try to integrate chemical energy from melanin with the supposedly well-known bioenergetic pathways is easier said than done; and the lack of consensus about metabolic networks constitutes an insurmountable barrier. After years of unsuccessful results, we finally realized that the chemical energy released through the dissociation of water molecule by melanin represents over 90% of cell energy requirements. These findings reveal a new aspect of cell biology, as glucose and ATP have biological functions related mainly to biomass and not so much with energy. Our finding about the unexpected intrinsic property of melanin to transform photon energy into chemical energy through the dissociation of water molecule, a role performed supposedly only by chlorophyll in plants, seriously questions the sacrosanct role of glucose and thereby mitochondria as the primary source of energy and power for the cells.

Similar articles
- The Role of Melanin to Dissociate Oxygen from Water to Treat Retinopathy of Prematurity.
- Herrera AS, A Esparza MDC, Arias PES, Ashraf GM, Mosa OF, Fisenko VP, Sologova SS, Dostdar SA, Sokolov AV, Bovina EV, Chubarev VN, Tarasov VV, Somasundaram SG, Kirkland CE, Aliev G.
- Cent Nerv Syst Agents Med Chem. 2019;19(3):215-222. doi: 10.2174/1871524919666190702164206.
- PMID: 31267880
- Macromolecular crowding: chemistry and physics meet biology (Ascona, Switzerland, 10-14 June 2012).
- Foffi G, Pastore A, Piazza F, Temussi PA.
- Phys Biol. 2013 Aug;10(4):040301. doi: 10.1088/1478-3975/10/4/040301. Epub 2013 Aug 2.
- PMID: 23912807
- Mitochondrial biogenesis: pharmacological approaches.
- Valero T.
- Curr Pharm Des. 2014;20(35):5507-9. doi: 10.2174/1381612820351409111421118.
- PMID: 24606795
- Cerebrospinal Fluid, Brain Electrolytes Balance, and the Unsuspected Intrinsic Property of Melanin to Dissociate the Water Molecule.
- Herrera AS, Ashraf GM, Del Carmen Arias Esparza M, Tarasov VV, Chubarev VN, Avila-Rodriguez MF,

Makhmutova A, Ganash M, Mosa OF, Hafeez A, Bachurin SO, Aliev G.
- CNS Neurol Disord Drug Targets. 2018;17(10):743-756. doi: 10.2174/1871527317666180904093430.
- PMID: 30179148 Review.
- Translational Metabolomics of Head Injury: Exploring Dysfunctional Cerebral Metabolism with Ex Vivo NMR Spectroscopy-Based Metabolite Quantification.
- Wolahan SM, Hirt D, Glenn TC.
- In: Kobeissy FH, editor. Brain Neurotrauma: Molecular, Neuropsychological, and Rehabilitation Aspects. Boca Raton (FL): CRC Press/Taylor & Francis; 2015. Chapter 25.
- **PMID: 26269925** Free Books & Documents. **Review.**

See all similar articles

Cited by 6 articles

- COX5B-Mediated Bioenergetic Alterations Modulate Cell Growth and Anticancer Drug Susceptibility by Orchestrating Claudin-2 Expression in Colorectal Cancers.
- Chu YD, Lim SN, Yeh CT, Lin WR.
- Biomedicines. 2021 Dec 28;10(1):60. doi: 10.3390/biomedicines10010060.
- **PMID: 35052740** Free PMC article.
- Mitochondria as a Platform for Dictating the Cell Fate of Cultured Human Corneal Endothelial Cells.
- Numa K, Ueno M, Fujita T, Ueda K, Hiramoto N, Mukai A, Tokuda Y, Nakano M, Sotozono C, Kinoshita S, Hamuro J.
- Invest Ophthalmol Vis Sci. 2020 Dec 1;61(14):10. doi: 10.1167/iovs.61.14.10.
- **PMID: 33275651** Free PMC article.
- The Long-Term Effect of Medically Enhancing Melanin Intrinsic Bioenergetics Capacity in Prematurity.
- Herrera AS, Solís Arias PE, Esparza MDCA, Bernal LFT, Bondarev AD, Fisenko VP, Chubarev VN, Minyaeva NN, Mikhaleva LM, Tarasov VV, Somasundaram SG, Kirkland CE, Aliev G.
- Curr Genomics. 2020 Nov;21(7):525-530. doi: 10.2174/1389202921999200417172817.
- **PMID: 33214768** Free PMC article. **Review.**
- COX5B-Mediated Bioenergetic Alteration Regulates Tumor Growth and Migration by Modulating AMPK-UHMK1-ERK Cascade in Hepatoma.
- Chu YD, Lin WR, Lin YH, Kuo WH, Tseng CJ, Lim SN, Huang YL, Huang SC, Wu TJ, Lin KH, Yeh CT.
- Cancers (Basel). 2020 Jun 22;12(6):1646. doi: 10.3390/cancers12061646.
- **PMID: 32580279** Free PMC article.
- Polarized Expression of Ion Channels and Solute Carrier Family Transporters on Heterogeneous Cultured Human Corneal Endothelial Cells.
- Hamuro J, Deguchi H, Fujita T, Ueda K, Tokuda Y, Hiramoto N, Numa K, Nakano M, Bush J, Ueno M, Sotozono C, Kinoshita S.
- Invest Ophthalmol Vis Sci. 2020 May 11;61(5):47. doi: 10.1167/iovs.61.5.47.
- **PMID: 32455435** Free PMC article.

See all "Cited by" articles

Publication types
- Research Support, Non-U.S. Gov't
- Review

MeSH terms
- Angiogenesis Inhibitors / metabolism
- Angiogenesis Inhibitors / pharmacology
- Animals
- Cornea / blood supply
- Cornea / drug effects
- Cornea / metabolism
- Cytoplasm / drug effects
- Cytoplasm / metabolism*
- Energy Metabolism / drug effects
- Energy Metabolism / physiology*
- Glucose / metabolism

- Humans
- Melanins / metabolism
- MelaninMitochondria / drug effects
- Mitochondria / metabolism*

Substances
- Angiogenesis Inhibitors
- Melanins
- Glucose

Related information
- MedGen
- PubChem Compound (MeSH Keyword)

LinkOut - more resources
- Full Text Sources
    - Bentham Science Publishers Ltd.
    - Ingenta plc

Ionizing radiation attracts soil fungi

Nelli N Zhdanova 1, Tatyana Tugay, John Dighton, Victor Zheltonozhsky, Patrick McDermott
Affiliations expand

- PMID: 15506020
- DOI: 10.1017/s0953756204000966

Abstract
During the last 15 years, about 2000 strains of 200 species of 98 genera of fungi have been isolated from around the Chernobyl Atomic Energy Station. Many of these microfungi are capable of growing into and decomposing 'hot particles'; carbon based radioactive graphite from the reactor and **there are suggestions that some fungi actively direct their growth toward sources of radioactivity, possibly attracted to the carbon skeleton of these structures**. In our experiments, we eliminated the confounding effects of carbon as a fungal resource, by developing experimental protocols that expose fungal spores and their germinating hyphae to directional sources of ionizing radiation allowing us to measure fungal response to ionizing radiation per se. We show that both beta and gamma radiation promote directional growth of hyphae towards the source of ionizing radiation.

Similar articles
- The influence of ionizing radiation on spore germination and emergent hyphal growth response reactions of microfungi.
- Tugay T, Zhdanova NN, Zheltonozhsky V, Sadovnikov L, Dighton J.
- Mycologia. 2006 Jul-Aug;98(4):521-7. doi: 10.3852/mycologia.98.4.521.
- PMID: 17139845
- Simulation of growth of colonies of filamentous fungi in a hydrogen peroxide gradient.
- Aslanidia KB, Tsyganov MA, Ivanova AE, Belozerskaya TA, Ivanitskii GR.
- Dokl Biochem Biophys. 2007 Mar-Apr;413:47-9. doi: 10.1134/s1607672907020020.
- PMID: 17546950 No abstract available.
- [The effect of hydrogen peroxide on the growth of microscopic mycelial fungi isolated from habitats with different levels of radioactive contamination].
- Ivanova AE, Aslanidi KB, Karpenko IuV, Belozerskaia TA.
- Mikrobiologiia. 2005 Nov-Dec;74(6):756-65.
- PMID: 16400985 Russian.
- Fungi and ionizing radiation from radionuclides.
- Dighton J, Tugay T, Zhdanova N.
- FEMS Microbiol Lett. 2008 Apr;281(2):109-20. doi: 10.1111/j.1574-6968.2008.01076.x. Epub 2008 Feb 13.
- PMID: 18279333 Review.
- Thirty years after the Chernobyl accident: What lessons have we learnt?
- Beresford NA, Fesenko S, Konoplev A, Skuterud L, Smith JT, Voigt G.
- J Environ Radioact. 2016 Jun;157:77-89. doi: 10.1016/j.jenvrad.2016.02.003. Epub 2016 Mar 24.
- PMID: 27018344 Review.

Cited by 24 articles
- The Isolation and Characterization of Rare Mycobiome Associated With Spacecraft Assembly Cleanrooms.
- Blachowicz A, Mhatre S, Singh NK, Wood JM, Parker CW, Ly C, Butler D, Mason CE, Venkateswaran K.
- Front Microbiol. 2022 Apr 26;13:777133. doi: 10.3389/fmicb.2022.777133. eCollection 2022.
- PMID: 35558115 Free PMC article.
- Fungal Melanins and Applications in Healthcare, Bioremediation and Industry.

- Mattoon ER, Cordero RJB, Casadevall A.
- J Fungi (Basel). 2021 Jun 18;7(6):488. doi: 10.3390/jof7060488.
- PMID: 34207260 Free PMC article. Review.
- Radioactivity to Rethink the Earth's Energy Balance.
- Terranova ML.
- Glob Chall. 2021 Mar 17;5(6):2000094. doi: 10.1002/gch2.202000094. eCollection 2021 Jun.
- PMID: 34141445 Free PMC article.
- Advances in space microbiology.
- Bijlani S, Stephens E, Singh NK, Venkateswaran K, Wang CCC.
- iScience. 2021 Apr 3;24(5):102395. doi: 10.1016/j.isci.2021.102395. eCollection 2021 May 21.
- PMID: 33997680 Free PMC article. Review.
- Melanins as Sustainable Resources for Advanced Biotechnological Applications.
- Galeb HA, Wilkinson EL, Stowell AF, Lin H, Murphy ST, Martin-Hirsch PL, Mort RL, Taylor AM, Hardy JG.
- Glob Chall. 2020 Nov 25;5(2):2000102. doi: 10.1002/gch2.202000102. eCollection 2021 Feb.
- PMID: 33552556 Free PMC article. Review.

See all "Cited by" articles

Publication types

- Research Support, U.S. Gov't, Non-P.H.S.

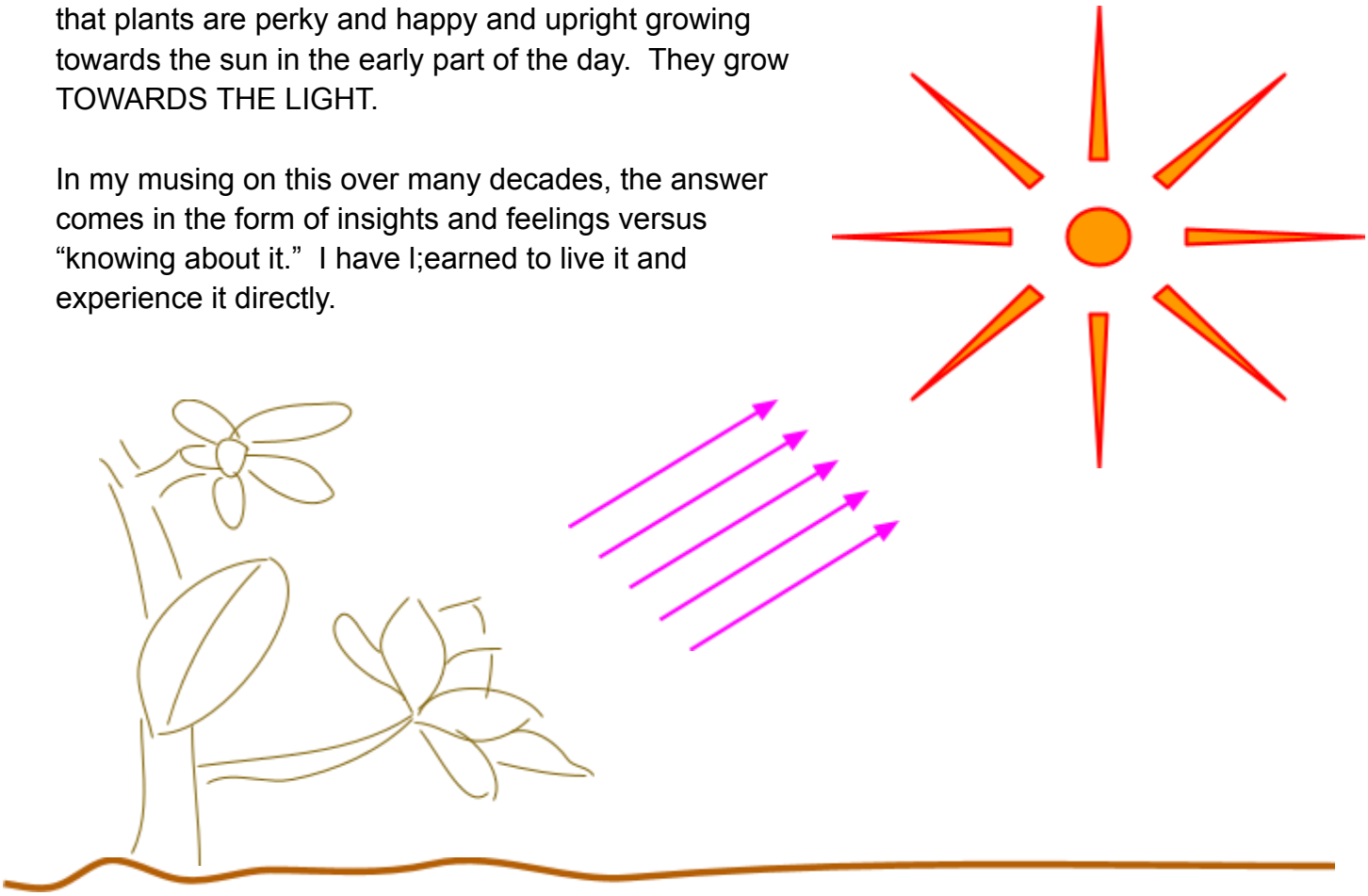
MeSH terms

- Beta Particles
- Chernobyl Nuclear Accident
- Gamma Rays
- Mitosporic Fungi / growth & development*
- Mitosporic Fungi / isolation & purification
- Mitosporic Fungi / radiation effects*
- Soil Microbiology*
- Ukraine

Plants Grow Towards The Light…What Do Humans Grow Towards?

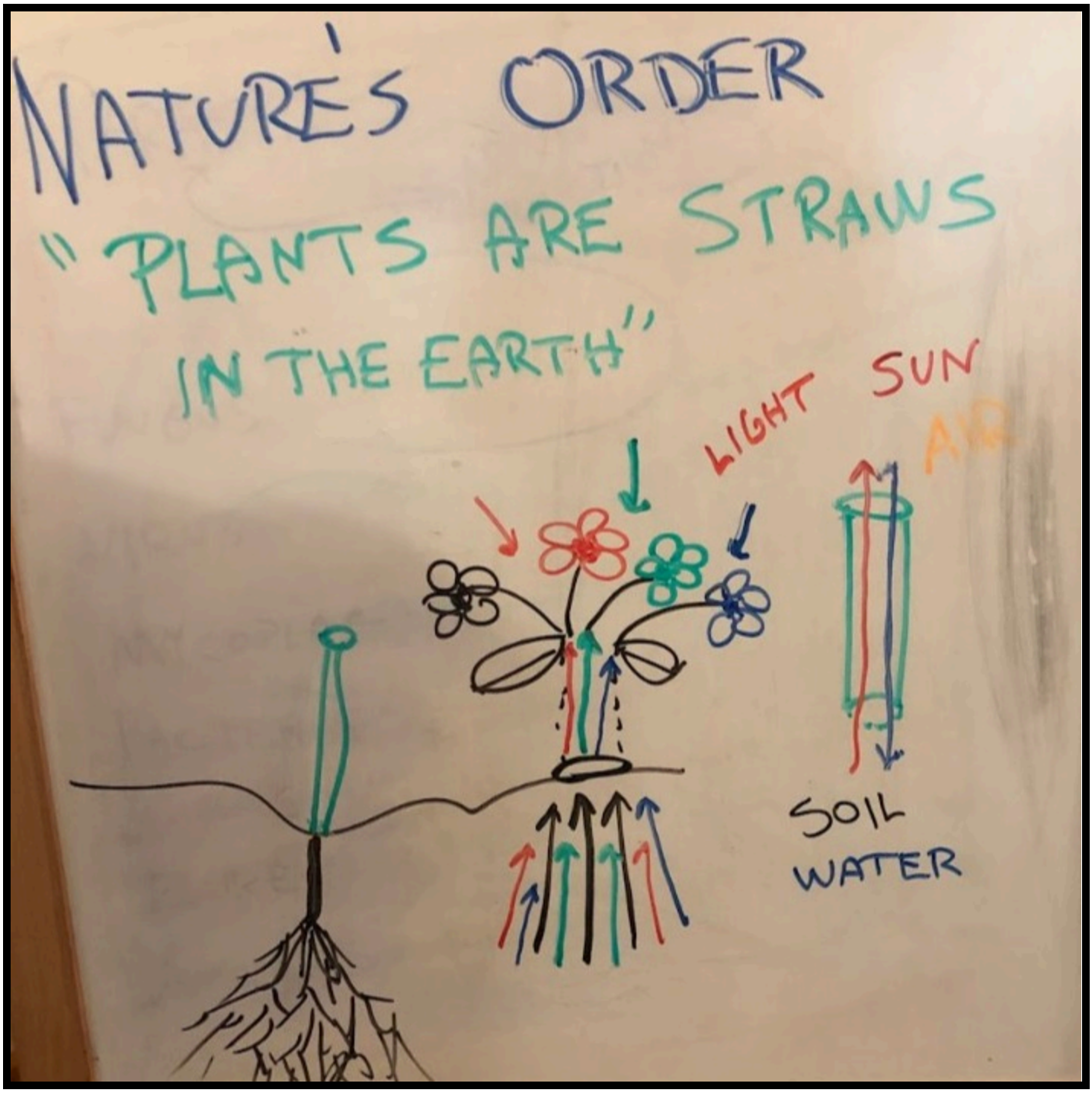
Throughout my life, it has become more than obvious that plants are perky and happy and upright growing towards the sun in the early part of the day. They grow TOWARDS THE LIGHT.

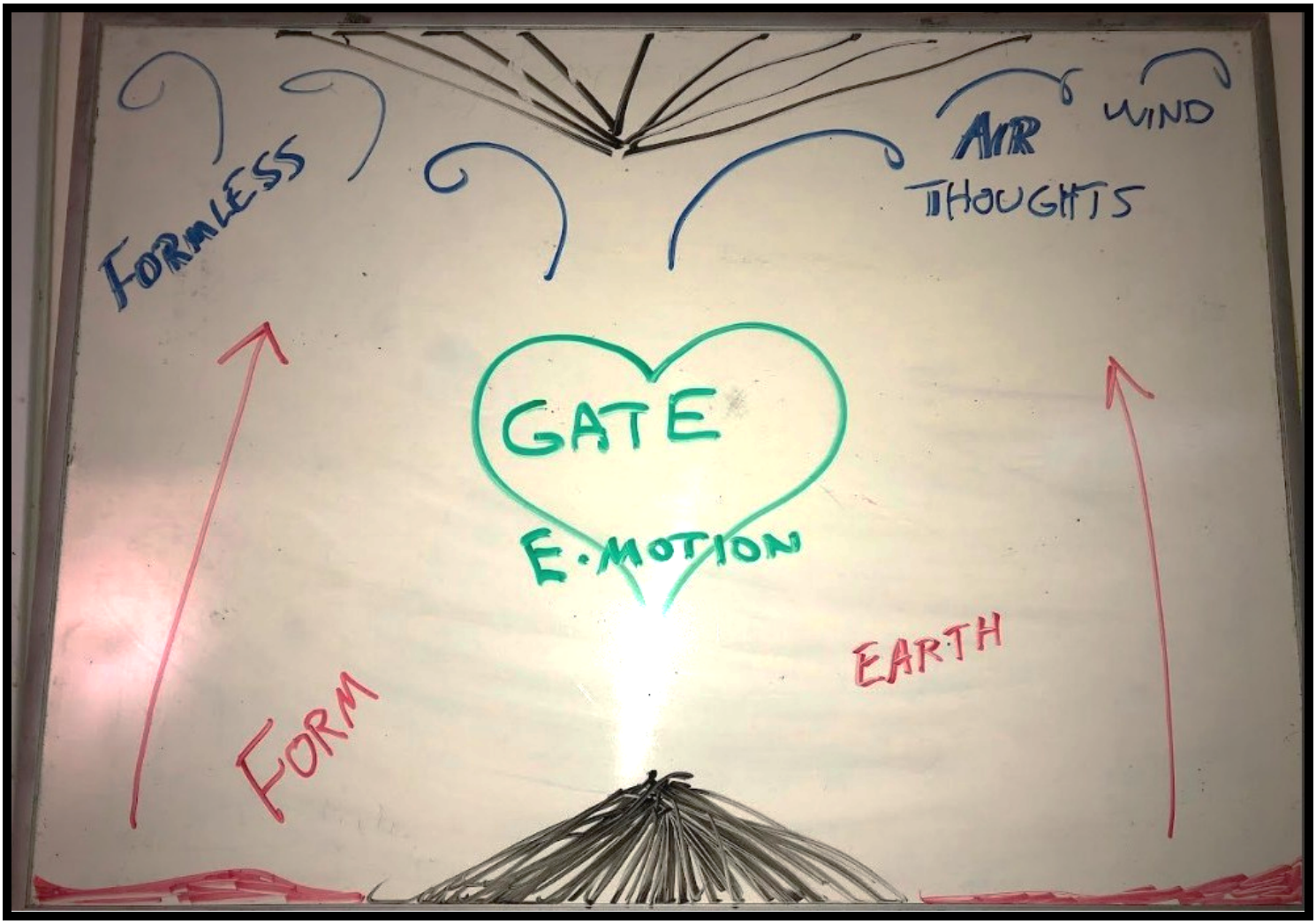
In my musing on this over many decades, the answer comes in the form of insights and feelings versus "knowing about it." I have l;earned to live it and experience it directly.



In my query of what do humans grow towards - the answers are less obvious.
My sense of this are explained below in bullet points:

- Life is fractal, the large mirrors the small and vice versa
- In this we are cells in the Earth, the Earth is a cell in something larger…
- We have cells that make up our "body."
- These cells are said to have "individual personalities" (ingrid naiman describing live blood analysis what she saw over 30 plus years)
- Based on the above I deduced that we are The Captain of the Cell and Microbe Earth Suit…
- Our "cells" listen to us, know our thoughts BEFORE we perceive them, and live in the present, while by the time we perceive the present moment, life has moved on to the next present moment.
- Health means the same thing as Yoga = wholeness, present, aware
- **My contention is humans grow towards health**
- We feel this as an absence of identity, a sense of joy without cause, a presence that eliminates any identity with thought, feeling, sensation, or anything in the world of phenomena does not define what we are.
- Truth, health, and alignment feel light, clear, quiet, and awake/aware, we operate from choice when needed and respond
- Death, misalignment, untruth is heavy, dark, sticky, confusing, loud, violent, tense, polarized


NATURE'S ORDER
"PLANTS ARE STRAWS
IN THE EARTH"
LIGHT SUN
AIR
SOIL
WATER


FORMLESS
AIR
WIND
THOUGHTS
GATE
E-MOTION
EARTH
FORM

Appendix
Food Sources of Vitamin D

USDA databases compiled in the 1980s list the following foods as rich in vitamin D. The amounts given are for 100 grams or about 3 1/2 ounces. These figures demonstrate the difficulty in obtaining 4,000 IU vitamin D per day from ordinary foods in the American diet. Three servings of herring, oysters, catfish, mackerel or sardines plus generous amounts of butter, egg yolk, lard or bacon fat and 2 teaspoons cod liver oil (500 iu per teaspoon) yield about 4,000 IU vitamin D—a very rich diet indeed!

Cod Liver Oil	10,000
Lard (Pork Fat)	2,800
Atlantic Herring (Pickled)	680
Eastern Oysters (Steamed)	642
Catfish (Steamed/Poached)	500
Skinless Sardines (Water Packed)	480
Mackerel (Canned/Drained)	450
Smoked Chinook Salmon	320
Sturgeon Roe	232
Shrimp (Canned/Drained)	172
Egg Yolk (Fresh)	148
(One yolk contains about 24 IU)	
Butter	56
Lamb Liver (Braised)	20
Beef Tallow	19
Pork Liver (Braised)	12
Beef Liver (Fried)	12
Beef Tripe (Raw)	12
Beef Kidney (Simmered)	12
Chicken Livers (Simmered)	12
Small Clams (Steamed/Cooked Moist)	8
Blue Crab (Steamed)	4
Crayfish/Crawdads (Steamed)	4
Northern Lobster (Steamed)	4

The Many Forms of Vitamin D

There are two types of vitamin D found in nature. Vitamin D_2 is formed by the action of UV-B on the plant precursor ergosterol. It is found in plants and was formerly added to irradiated cows milk. Most milk today contains D_3. Vitamin D_3 or cholecalciferol is found in animal foods. Both forms of vitamin D have been used successfully to treat rickets and other diseases related to vitamin D insufficiency.

Many consider D_3 the preferred vitamin, having more biologic activity. Vitamin D_3 as found in food or in human skin always comes with various metabolites or isomers that may have biological benefit. Dr. Price believed that there were as many as 12 metabolites or isomers in the vitamin D found in animal foods. When vitamin D is taken in the form of fish oil, or eaten in foods such as eggs or fish, these metabolites will be present. Both D_2 and D_3 can be toxic when taken inappropriately in large amounts.

When humans take in vitamin D from food or sunlight, it is converted first in the liver to the form 25(OH)D and then in the kidney to 1,25(OH)D. These active forms of vitamin D are available by prescription and are given to patients with liver or kidney failure or those with an hereditary metabolic defect in vitamin-D conversion.

---

www.healthline.com › nutrition › vitamin-d-from-sun
How to Safely Get Vitamin D From The Sun - Healthline

Apr 4, 2023 · Regular sun exposure is the most natural way to get enough vitamin D. To maintain healthy blood levels, aim to get **10–30 minutes of midday sunlight,** several times per week.

The Miracle of Vitamin D

Additions by craig lane www.healthalkemy.com, By **Krispin Sullivan, CN**

Contents

In April of 2000 a clinical observation published in *Archives of Internal Medicine* caught my attention. Dr. Anu Prabhala and his colleagues reported on the treatment of five patients confined to wheelchairs with severe weakness and fatigue. Blood tests revealed that all suffered from severe vitamin D deficiency. The patients received 50,000 IU vitamin D per week and all became mobile within six weeks.[1]

Dr. Prabhala's research sparked my interest and led to a search for current information on vitamin D, how it works, how much we really need and how we get it. The following is a small part of the important information that I found.

Any discussion of vitamin D must begin with the discoveries of the Canadian-born dentist Weston A. Price. In his masterpiece *Nutrition and Physical Degeneration*, Dr. Price noted that the diet of isolated, so-called "primitive" peoples contained "at least ten times" the amount of "fat-soluble vitamins" as the standard American diet of his day.[2] Dr. Price determined that it was the presence of plentiful amounts of fat-soluble vitamins A and D in the diet, along with calcium, phosphorus and other minerals, that conferred such high immunity to tooth decay and resistance to disease in nonindustrialized population groups.

Today another Canadian researcher, Dr. Reinhold Vieth, argues convincingly that current vitamin D recommendations are woefully inadequate. The recommended dose of 200-400 international units (IU) will prevent rickets in children but does not come close to the optimum amount necessary for vibrant health.[3] According to Dr. Vieth, the minimal daily requirement of vitamin D should be in the range of 4,000 IU from all sources, rather than the 200-400 currently suggested, or ten times the Recommended Daily Allowance (RDA). Dr. Vieth's research perfectly matches Dr. Price's observations of sixty years ago!

Vitamin D From Sunlight

Pick up any popular book on vitamins and you will read that ten minutes of daily exposure of the arms and legs to sunlight will supply us with all the vitamin D that we need. Humans do indeed manufacture vitamin D from cholesterol by the action of sunlight on the skin but it is actually very difficult to obtain even a minimal amount of vitamin D with a brief foray into the sunlight.[4,5]

Ultraviolet (UV) light is divided into 3 bands or wavelength ranges, which are referred to as UV-C, UV-B and UV-A.[6] UV-C is the most energetic and shortest of the UV bands. It will burn human skin rapidly in extremely

small doses. Fortunately, it is completely absorbed by the ozone layer. However, UV-C is present in some lights. For this reason, fluorescent and halogen and other specialty lights may contribute to skin cancer.

UV-A, known as the "tanning ray," is primarily responsible for darkening the pigment in our skin. Most tanning bulbs have a high UV-A output, with a small percentage of UV-B. UV-A is less energetic than UV-B, so exposure to UV-A will not result in a burn, unless the skin is photosensitive or excessive doses are used. UV-A penetrates more deeply into the skin than UV-B, due to its longer wavelength. Until recently, UV-A was not blocked by sunscreens. It is now considered to be a major contributor to the high incidence of non-melanoma skin cancers.[7] Seventy-eight percent of UV-A penetrates glass so windows do not offer protection.

The ultraviolet wavelength that stimulates our bodies to produce vitamin D is UV-B. It is sometimes called the "burning ray" because it is the primary cause of sunburn (erythema). However, UV-B initiates beneficial responses, stimulating the production of vitamin D that the body uses in many important processes. Although UV-B causes sunburn, it also causes special skin cells called melanocytes to produce melanin, which is protective. UV-B also stimulates the production of Melanocyte Stimulating Hormone (MSH), an important hormone in weight loss and energy production.[8]

The reason it is difficult to get adequate vitamin D from sunlight is that while UV-A is present throughout the day, the amount of UV-B present has to do with the angle of the sun's rays. Thus, UV-B is present only during midday hours at higher latitudes, and only with significant intensity in temperate or tropical latitudes. Only 5 percent of the UV-B light range goes through glass and it does not penetrate clouds, smog or fog.

Sun exposure at higher latitudes before 10 am or after 2 pm will cause burning from UV-A before it will supply adequate vitamin D from UV-B. This finding may surprise you, as it did the researchers. It means that sunning must occur between the hours we have been told to avoid. Only sunning between 10 am and 2 pm during summer months (or winter months in southern latitudes) for 20-120 minutes, depending on skin type and color, will form adequate vitamin D before burning occurs.[9]

It takes about 24 hours for UV-B-stimulated vitamin D to show up as maximum levels of vitamin D in the blood. Cholesterol-containing body oils are critical to this absorption process.[10] Because the body needs 30-60 minutes to absorb these vitamin-D-containing oils, it is best to delay showering or bathing for one hour after exposure. The skin oils in which vitamin D is produced can also be removed by chlorine in swimming pools.

The current suggested exposure of hands, face and arms for 10-20 minutes, three times a week, provides only 200-400 IU of vitamin D each time or an average of 100-200 IU per day during the summer months. In order to achieve optimal levels of vitamin D, 85 percent of the body surface needs exposure to prime midday sun. (About 100-200 IU of vitamin D is produced for each 5 percent of body surface exposed, we want 4,000 iu.) Light skinned people need 10-20 minutes of exposure while dark skinned people need 90-120 minutes.[11]

Latitude and altitude determine the intensity of UV light. UV-B is stronger at higher altitudes. Latitudes higher than 30° (both north and south) have insufficient UV-B sunlight two to six months of the year, even at midday.[12] Latitudes higher than 40° have insufficient sunlight to achieve optimum levels of D during six to eight months of the year. In much of the US, which is between 30° and 45° latitude, six months or more during each year have insufficient UV-B sunlight to produce optimal D levels. In far northern or southern locations, latitudes 45° and higher, even summer sun is too weak to provide optimum levels of vitamin D.[13-15] A simple meter is available to determine UV-B levels where you live.

Vitamin D From Food

What the research on vitamin D tells us is that unless you are a fisherman, farmer, or otherwise outdoors and exposed regularly to sunlight, living in your ancestral latitude (more on this later), you are unlikely to obtain

adequate amounts of vitamin D from the sun. Historically the balance of one's daily need was provided by food. Primitive peoples instinctively chose vitamin-D-rich foods including the intestines, organ meats, skin and fat from certain land animals, as well as shellfish, oily fish and insects. Many of these foods are unacceptable to the modern palate.

For food sources to provide us with D the source must be sunlight exposed. With exposure to UV-B sunlight, vitamin D is produced from fat in the fur, feathers, and skin of animals, birds and reptiles. Carnivores get additional D from the tissues and organs of their prey. Lichen contains vitamin D and may provide a source of vitamin D in the UV-B sunlight-poor northern latitudes.[16] Vitamin D content will vary in the organs and tissues of animals, pigs, cows, and sheep, depending on the amount of time spent in UV-B containing sunlight and/or how much D is given as a supplement. Poultry and eggs contain varying amounts of vitamin D obtained from insects, fishmeal, and sunlight containing UV-B or supplements. Fish, unlike mammals, birds and reptiles, do not respond to sunlight and rely on vitamin D found in phytoplankton and other fish. Salmon must feed on phytoplankton and fish in order to obtain and store significant vitamin D in their fat, flesh, skin, and organs. Thus, modern farm-raised salmon, unless artificially supplemented, may be a poor source of this essential nutrient.

Modern diets usually do not provide adequate amounts of vitamin D;[17] partly because of the trend to low fat foods and partly because we no longer eat vitamin-D-rich foods like naturally reared poultry and fatty fish such as kippers, and herring. Often we are advised to consume the egg white while the D is in the yolk or we eat the flesh of the fish avoiding the D containing skin, organs and fat. Sun avoidance combined with reduction in food sources contribute to escalating D deficiencies. Vegetarian and vegan diets are exceptionally poor or completely lacking in vitamin D predisposing to an absolute need for UV-B sunlight. Using food as one's primary source of D is difficult to impossible.

Vitamin D Miracles

Sunlight and vitamin D are critical to all life forms. Standard textbooks state that the principal function of vitamin D is to promote calcium absorption in the gut and calcium transfer across cell membranes, thus contributing to strong bones and a calm, contented nervous system. It is also well recognized that vitamin D aids in the absorption of magnesium, iron and zinc, as well as calcium.

Actually, vitamin D does not in itself promote healthy bone. Vitamin D controls the levels of calcium in the blood. If there is not enough calcium in the diet, then it will be drawn from the bone. High levels of vitamin D (from the diet or from sunlight) will actually demineralize bone if sufficient calcium is not present.

Vitamin D will also enhance the uptake of toxic metals like lead, cadmium, aluminum and strontium if calcium, magnesium and phosphorus are not present in adequate amounts.[18] Vitamin D supplementation should never be suggested unless calcium intake is sufficient or supplemented at the same time.

Receptors for vitamin D are found in most of the cells in the body and research during the 1980s suggested that vitamin D contributed to a healthy immune system, promoted muscle strength, regulated the maturation process and contributed to hormone production.

During the last ten years, researchers have made a number of exciting discoveries about vitamin D. They have ascertained, for example, that vitamin D is an antioxidant that is a more effective antioxidant than vitamin E in reducing lipid peroxidation and increasing enzymes that protect against oxidation.[19;20]

Vitamin D deficiency decreases biosynthesis and release of insulin.[21] Glucose intolerance has been inversely associated with the concentration of vitamin D in the blood. Thus, vitamin D may protect against both Type I and Type II diabetes.[22]

The risk of senile cataract is reduced in persons with optimal levels of D and carotenoids.[23]

PCOS (Polycystic Ovarian Syndrome) has been corrected by supplementation of D and calcium.[24]

Vitamin D plays a role in regulation of both the "infectious" immune system and the "inflammatory" immune system.[25]

Low vitamin D is associated with several autoimmune diseases including multiple sclerosis, Sjogren's Syndrome, rheumatoid arthritis, thyroiditis and Crohn's disease.[26;27]

Osteoporosis is strongly associated with low vitamin D. Postmenopausal women with osteoporosis respond favorably (and rapidly) to higher levels of D plus calcium and magnesium.[28]

D deficiency has been mistaken for fibromyalgia, chronic fatigue or peripheral neuropathy.[1;28-30]

Infertility is associated with low vitamin D.[31] Vitamin D supports production of estrogen in men and women.[32] PMS has been completely reversed by addition of calcium, magnesium and vitamin D.[33] Menstrual migraine is associated with low levels of vitamin D and calcium.[81]

Breast, prostate, skin and colon cancer have a strong association with low levels of D and lack of sunlight.[34-38]

Activated vitamin D in the adrenal gland regulates tyrosine hydroxylase, the rate limiting enzyme necessary for the production of dopamine, epinephrine and norepinephrine. Low D may contribute to chronic fatigue and depression.[39]

Seasonal Affective Disorder has been treated successfully with vitamin D. In a recent study covering 30 days of treatment comparing vitamin D supplementation with two-hour daily use of light boxes, depression completely resolved in the D group but not in the light box group.[40]

High stress may increase the need for vitamin D or UV-B sunlight and calcium.[41]

People with Parkinsons and Alzheimers have been found to have lower levels of vitamin D.[42;43]

Low levels of D, and perhaps calcium, in a pregnant mother and later in the child may be the contributing cause of "crooked teeth" and myopia. When these conditions are found in succeeding generations it means the genetics require higher levels of one or both nutrients to optimize health.[44-47]

Behavior and learning disorders respond well to D and/or calcium combined with an adequate diet and trace minerals.[48;49]

Vitamin D and Heart Disease

Research suggests that **low levels of vitamin D** may contribute to or be a cause of syndrome X with associated **hypertension, obesity, diabetes and heart disease**.[50] Vitamin D regulates vitamin-D-binding proteins and some calcium-binding proteins, which are responsible for carrying calcium to the "right location" and protecting cells from damage by free calcium.[51] Thus, high dietary levels of calcium, when D is insufficient, may contribute to calcification of the arteries, joints, kidney and perhaps even the brain.[52-54]

Many researchers have postulated that **vitamin D deficiency leads to the deposition of calcium in the arteries and hence atherosclerosis,** noting that northern countries have higher levels of cardiovascular disease and that more heart attacks occur in winter months.[55-56]

Scottish researchers found that calcium levels in the hair inversely correlated with arterial calcium—the more calcium or plaque in the arteries, the less calcium in the hair. Ninety percent of men experiencing myocardial infarction had low hair calcium. When vitamin D was administered, the amount of calcium in the beard went up and this rise continued as long as vitamin D was consumed. Almost immediately after stopping supplementation, however, beard calcium fell to pre-supplement levels.[27]

Administration of dietary vitamin D or UV-B treatment has been shown to lower blood pressure, restore insulin sensitivity and lower cholesterol.[58-60]

The Battle of the Bulge

Did you ever wonder why some people can eat all they want and not get fat, while others are constantly battling extra pounds? The answer may have to do with vitamin D and calcium status. Sunlight, UV-B, and vitamin D normalize food intake and normalize blood sugar. Weight normalization is associated with higher levels of vitamin D and adequate calcium.[61] Obesity is associated with vitamin-D deficiency.[62-64] In fact, obese persons have impaired production of UV-B-stimulated D and impaired absorption of food source and supplemental D.[65]

When the diet lacks calcium, whether from D or calcium deficiency, there is an increase in fatty acid synthase, an enzyme that converts calories into fat. Higher levels of calcium with adequate vitamin D inhibit fatty acid synthase while diets low in calcium increase fatty acid synthase by as much as five-fold. In one study, genetically obese rats lost 60 percent of their body fat in six weeks on a diet that had moderate calorie reduction but was high in calcium. All rats supplemented with calcium showed increased body temperature indicating a shift from calorie storage to calorie burning (thermogenesis).[61]

The Right Fats

The assimilation and utilization of vitamin D is influenced by the kinds of fats we consume. Increasing levels of both polyunsaturated and monounsaturated fatty acids in the diet decrease the binding of vitamin D to D-binding proteins. Saturated fats, the kind found in butter, tallow and coconut oil, do not have this effect. Nor do the omega-3 fats.[66] D-binding proteins are key to local and peripheral actions of vitamin D. This is an important consideration as Americans have dramatically increased their intake of polyunsaturated oils (from commercial vegetable oils) and monounsaturated oils (from olive oil and canola oil) and decreased their intake of saturated fats over the past 100 years.

In traditional diets, saturated fats supplied varying amounts of vitamin D. Thus, both reduction of saturated fats and increase of polyunsaturated and monounsaturated fats contribute to the current widespread D deficiency.

Trans fatty acids, found in margarine and shortenings used in most commercial baked goods, should always be avoided. There is evidence that these fats can interfere with the enzyme systems the body uses to convert vitamin D in the liver.[80]

Vitamin D Therapy

In my clinical practice, I test for vitamin-D status first. If D is needed, I try to **combine sunlight exposure with vitamin D and mineral supplements.**

Single, infrequent, intense, skin exposure to UV-B light not only causes sunburn but also suppresses the immune system. On the other hand, frequent low-level exposure normalizes immune function, enhancing NK-cell and T-cell production, reducing abnormal inflammatory responses typical of autoimmune disorders, and reducing occurrences of infectious disease.[26;67;68-71] Thus **it is important to sunbathe frequently for short periods of**

time, when UV-B is present, rather than spend long hours in the sun at infrequent intervals. Adequate UV-B exposure and vitamin-D production can be achieved in less time than it takes to cause any redness in the skin. It is never necessary to burn or tan to obtain sufficient vitamin D.

If sunlight is not available in your area because of latitude or season, **sunlamps** made by **Sperti** can be used to provide a natural balance of UV-B and UV-A. Used according to instructions, these lamps provide a safe equivalent of sunlight and will not cause burning or even heavy tanning. **Tanning beds**, on the other hand, are not acceptable as a means of getting your daily dose of vitamin D because they provide high levels of UV-A and very little UV-B.

If you have symptoms of vitamin-D insufficiency or are unable to spend time in the sun, due to season or lifestyle or prior skin cancer, consider adding a supplement of 1,000 IU daily. Higher levels may be needed but should be recommended and monitored by your health care practitioner after testing serum 25(OH)D. 1,000 iu can be obtained from a concentrated supplement or from 2 teaspoons of high quality cod liver oil. Both Carlson Labs and Solgar make a 1,000 IU vitamin-D supplement naturally derived from fish oil. (Do not attempt to obtain large amounts of vitamin D from cod liver oil alone, as this would supply vitamin A in excessive and possibly toxic amounts.)

Supplementation is safe as long as sarcoidosis, liver or kidney disease is not present and the diet contains adequate calcium, magnesium and other minerals.

Adequate calcium and magnesium, as well as other minerals, are critical parts of vitamin D therapy. Without calcium and magnesium in sufficient quantities, vitamin-D supplementation will withdraw calcium from the bone and will allow the uptake of toxic minerals. Do not supplement vitamin D and do not sunbathe unless you are sure you have sufficient calcium and magnesium to meet your daily needs. Weston Price suggested a minimum of 1,200-2,400 mg of calcium daily. Research suggests that 1,200-1,500 mg is adequate as a supplement for most adults, both men and women. (Magnesium intake should be half that of calcium.)

Two excellent sources of calcium in the human diet are dairy products and bone broths.[2] If the diet does not contain sufficient amounts, you will need to add supplements. **Bone meal, dolomite powder or calcium and magnesium tablets (Solgar or Kal)**, or **calcium carbonate or lactate (Solgar, Kal, Now or Twinlab)** are good calcium sources, inexpensive and safe.[74] All of these brands have been tested and found to be free of lead and other heavy metals.

In my experience, the forms of calcium given in supplements should be equivalent to those found in food—bone meal as in the broth, calcium lactate as in milk products and dolomite as in lime used to process cornmeal products. These forms work most efficiently and with the least cost for bone repletion and general repletion of serum calcium status.[75] If your diet is high in protein, calcium lactate or carbonate is probably a better source of calcium.

Read the label carefully to see how much elemental calcium is contained in each dose or tablet and make sure to take the right amount. If the label says a serving size is three tablets and contains 1,000 mg of calcium, you must take the full serving size to get that amount.

Higher amounts of calcium are important for anyone diagnosed with bone loss. Total daily calcium as a supplement may range from 1,500 mg to 2,000 mg depending on current bone status and your body size. Make the effort to split up your daily dose. Do not take all your calcium and magnesium once a day. A higher percentage of the calcium dose is absorbed if delivered in smaller, more frequent amounts.[82]

Expensive "chelated" calciums are not necessary if vitamin-D status is adequate. **Taking calcium without sufficient D may cause other problems**. Vitamin D controls the production of some calcium binding proteins, which are critical to normal calcium utilization.

Patients on vitamin-D therapy report a wide range of beneficial results including increased energy and strength, resolution of hormonal problems, weight loss, an end to sugar cravings, blood sugar normalization and improvement of nervous system disorders.

A paradoxical transient and non-complicating hypercalciuria (more calcium in the urine) may occur when the program is first initiated. This resolves quickly when adequate calcium and other minerals are consumed. Two other temporary side effects may occur during the first several months of treatment. One is daytime sleepiness after calcium is taken. This usually resolves itself after about one week. The other condition is the reappearance of pain and discomfort at the site of old injuries, a sign of injury remodeling or proper healing, which may take some time to clear up.

Toxicity Issues

Vitamin programs usually omit vitamin D because of concerns about toxicity. These concerns are valid because vitamin D in all forms can be toxic in pharmacological (drug-like) doses. The dangers of toxicity have not been exaggerated, but the doses needed to result in toxicity have been ill defined with the unfortunate result that many people currently suffer from vitamin-D deficiency or insufficiency.

Abnormally high levels of vitamin D are indicated by blood levels exceeding 65 ng/ml or 162 nmol/l for extended periods of time and may be associated with chronic toxicity. Levels of 200-300 nmol/l or higher have been seen in several studies using supplementation and quickly resolve when supplementation is stopped. In such cases no long-term problems have been found. Long-term supplementation, without monitoring, may have serious consequences.

Before 1993, there was no affordable and available blood test for vitamin D. Now there is. To avoid problems, anyone engaging in levels of vitamin-D supplementation above 1,000 iu daily should have periodic blood tests. Don't forget to calculate your **total vitamin-D intake from all sources—sunlight, food (including vitamin D in milk) and supplements, including cod liver oil**.

Dr. Vieth suggests that critical toxicity may occur at doses of 20,000 IU daily and that the Upper Limit (UL) of safety be set at 10,000 IU, rather than the current 2,000 IU. While this may or may not be the definitive marker for safety in healthy persons with no active liver or kidney disease, there is no clinical evidence that long-term supplementation needs to be greater than **4,000 IU for optimal daily maintenance**. This level would be somewhat lower when combined with exposure to UV-B.[3;76]

Doses used in clinical studies range from as little as 400 IU daily to 10,000-500,000 IU, given either as a single onetime dose or daily, weekly or monthly. Such large doses are given either as a prophylactic or because compliance is considered a problem. There seems to be some evidence that vitamin D works better, without toxicity, when given in lower, more physiologic doses of 2,000-4,000 IU daily rather than as 100,000 IU once a month. However, a single monthly dose of 100,000 IU did replete low levels of vitamin D in adolescents during winter.[77]

In my experience and that of other researchers, high, infrequent dosing can lead to problems. In one recent study, blood levels rose from low to extremely high, (more than 300 nmol/l) 2 to 4 hours after a 50,000 IU oral dose,[65] and then slowly returned to pretreatment suboptimal levels. Clearly this must disrupt normal feedback mechanisms in D and calcium regulation.

Vitamin A can be administered in large, infrequent doses from consumption of animal or fish liver (or injections, used in third world countries to prevent blindness) because we have storage capacity for vitamin A in our livers. Vitamin D is different. It has only a small storage pool in the liver and peripheral fat. Our ancestors most definitely did not get vitamin D in large, infrequent doses. While vitamin D is stored in body fat, storage is not

sufficient to maintain optimum blood levels during winter months.[78] A single exposure to UV-B light will raise levels of vitamin D over the next 24 hours and then return to baseline or slightly higher within 7 days. Historically our requirements for D were satisfied by daily exposure to sunlight and/or daily intake from food. Lowfat diets and lack of seafood in the diet further contribute to the current worldwide insufficiency of vitamin D.

Sunlight on the Inside

If any nutrient incorporates the properties of sunlight, it is vitamin D. The healthy "primitive" peoples that Dr. Price observed not only had broad, round, "sunny" faces, they also had sunny dispositions and optimistic attitudes towards life in spite of many hardships. Typical food intakes for peoples who have not been "civilized" range from 3,000 IU-6,000 IU. Modern intakes are paltry in comparison. The standard American diet provides vitamin D only in very low quantities.

The first step towards redressing some of the ills of civilized life—from depression to road rage, from cavities to osteoporosis—would be to get more light, inside or outside. Vitamin D adds sunlight to life from childhood through the golden years. In nonagenarians and centenarians **high levels of vitamin D in the blood and normal thyroid function were the strongest markers of health and longevity**.[79]

Whether in the form of sunlight or dietary vitamin D from food and fish oils, optimal levels of the sunshine vitamin allow your body and mind to thrive, even during periods of stress.

About the Author

Krispin Sullivan, CN is a researcher and clinical nutritionist in practice in Woodacre, California. She is currently working on a book, *Naked at Noon: The Importance of Sunlight and Vitamin D*, to be published in 2001.

Instructions for physician monitoring of vitamin D, calcium and magnesium repletion are available from www.sunlightandvitamind.com or by contacting Krispin at krispin@krispin.com or 1-415-488-9636.

References

Vitamin D Update, Winter 2000

by Krispin Sullivan, CN

Note: This update appeared in *Wise Traditions in Food, Farming and the Healing Arts*, the quarterly magazine of the Weston A. Price Foundation, Winter 2000.

Since the publication of "The Miracle of Vitamin D" in the last issue of *Wise Traditions*, some clarification is necessary. The action of vitamin D, whether from food, supplements or sunlight conversion, is that of a "pro-hormone," rather than of a vitamin.

According to the dictionaries, a hormone is a substance, usually a peptide or steroid, produced by one tissue and conveyed by the bloodstream to another. Hormones affect physiological activity, such as growth or metabolism. More generally, a hormone is one of various similar substances found in plants and insects that regulate development. By contrast, vitamins are various fat-soluble or water-soluble organic substances essential in minute amounts for normal growth and activity of the body. They are obtained naturally from plant and animal foods.

Hormones are powerful regulators that can have both good and bad effects. With progesterone, DHEA, estrogen, thyroid or any other hormone, including vitamin D, there can be a profound cellular response when levels are altered by supplementation. Vitamins and minerals are elements used by the body to make enzymes, bone, immune fractions and other substances in the human body, but they are not regulators.

As a pro-hormone, vitamin D can be dangerous because too much has the potential for great harm as does too little. That is why testing is important for those on vitamin-D therapy. When you take thyroid hormones, you are instructed to test first and retest to make sure the amount you are taking is correct. So, too, with vitamin D. The rule is test, treat (if necessary) and retest until you find the right amount to meet your daily need. According to our current levels of knowledge, there are no obvious symptoms of vitamin D overdose until the overdose is nonreversible. Testing can alert us not only to deficiency but also toxicity. Fortunately, we now have tests for vitamin D status that are not expensive.

If you are using supplements of vitamin D (natural or synthetic) or are light skinned and have had significant sun exposure in tropical or subtropical areas and haven't done so before, it is very important to test your blood levels of D.

Optimal values of 25(OH)D are 40-50 ng/ml
Acceptable values of 25(OH)D are 35-55 ng/ml
Levels above 55 ng/ml will be toxic for some individuals.

There is no good reason to maintain levels of D in this higher range and strong evidence showing potential harm.

You need to TEST. The correct test to order is 25(OH)D, also called 25-hydroxyvitamin D. Make sure this is the test you get. Labs often give the test for 1,25-dihydroxyvitamin D, the active hormone. This test is the wrong test as it offers no meaningful data regarding D status.

Lab One offers the least expensive testing I have found nationwide and is available in most states. Your physician can reach them at 1-800-646-7788. The test is 25-hydroxyvitamin D. The Lab One test number, just to be sure you get the right test, is #3247. Rarely does insurance cover the cost for this test, which is about $60 including lab fees. Other labs I have queried charge $100-180 for the same test.

The important thing to remember if you are doing vitamin D therapy, or spending lots of time in the sun, is to TEST!

The original article with sidebars and references appeared in *Wise Traditions in Food, Farming and the Healing Arts*, the quarterly magazine of the Weston A. Price Foundation, Fall 2000. Updates appeared in the journal in the Winter 2000 issue and the Fall 2002 issue.

Appendix on Vitamin D

https://therootcauseprotocol.com/category/research/hormone-d/

Extra highlighted information about Vitamin D: FROM THIS LINK RCP

- Storage D rises in the summer, peaks in summer, lowest in winter
- So much promotion to get storage D to not drop in the winter
- With what we've talked about today, why would our body want more sun filters in summer and less in winter?
- When there's more SUNLIGHT - higher sun in. the sky, the body needs more sun filters
- It modulates the sun into the body
- During the winter, it doesn't need that
- Its like blinds on the windows
- We don't need as much in winter
- Active D doesn't fluctuate - it's the same unless you are sick... it's a flat line as the body doesn't need a whole lot of it (pico grams not nanograms - TINY bits are active)
- Storage is fluctuating with sunlight
- Remember... it's sunglasses! It's filtering - suppressing light
- So distracted by the measurements - they don't understand the role in immune modulation, and many other things - isn't it scary they don't understand physiology?
- Be more insistent that they know physiology of the body - what are the 2nd and 3rd order impact of the recommendations
- Training is about the downstream effects of the recommendations and why people may be struggling with their routine before the RCP
- Turn off the fear of not having enough D.. perk up your ears about what retinol does
- Oh it's regulating the nucleus? Regulating Iron? Plus others... it's not discussed!
- We've been conditioned to be fearful and anxious about our D status, and to ignore the retinol side of things
- It's a stark dichotomy - fixated and phobic about the D status, and unknowing about retinol/A status

Vitamins F and F2

By Dr. Royal Lee
https://www.seleneriverpress.com/historical/vitamins-f-f2/

Summary: Few people today have heard of vitamin F, but back in the heyday of vitamin research, this fat-based complex and vitamin D synergist was widely recognized as an essential nutrient for the human body, obtainable only from food and ideally from animal fats. In this 1949 article, Dr. Royal Lee expounds the nature of vitamin F as a complex of compounds that includes—but is not limited to—the famous "essential fatty acids' ' of today's nutrition, linolenic acid and linoleic acid. In vitamin F these two compounds work in tandem with a host of other cofactors, including the critical arachidonic acid, Dr. Lee explains, to promote such important actions as calcium transport, prostate function, immunity, and even cancer prevention. Moreover, he writes, when vitamin F combines with phospholipids (as occurs in mammalian livers), it forms a complex that exhibits *different nutritional activity* than that of vitamin F. This complex, which Dr. Lee calls vitamin F2, is intimately involved in the repair and generation of new tissue, making it vital for any therapy of "muscular dystrophies, creeping paralyses, anemic states, weakness, and atrophy." While modern science continues to underplay vitamins and minerals, articles like this remind us that these essential micronutrients are involved in the most fundamental functions of the body, and even a slight deficiency in any one of them can have catastrophic consequences on our health. From *Vitamin News*, 1949.

[*The following is a transcription of the original Archives document. To view or download the original document, click here*].

Vitamins F and F2

Vitamin F is now officially recognized as a member of the vitamin family. (See page 422 of the 1949 volume of the *Annual Review of Biochemistry*.)

Vitamin F was first so named and described by your undersigned editor in these pages, issue of June 15, 1934, as follows:

"Vitamin E from different cereal sources has been found…to have quite different characteristics. This we consider to be due to the (presence of) varying proportions of two distinct vitamins. We have taken the liberty of designating the new one Vitamin F…We consider this 'F' to be identical with Mirvish's (blood) calcium depressor found in oatmeal. It is also present in a considerable amount in rye, but there appears to be little in wheat."

It was suggested that the physiological effect of vitamin F was opposite to vitamin D on the serum calcium, and that it might be found to be a preventive of sunstroke, or an antidote for the toxic effects of overdosage of vitamin D, and a physiological synergist of D, present in natural vitamin D complexes.

On August 15, 1935, the comment was made that the main use so far developed for vitamin F was in the treatment of prostate enlargement. Later, Hart and Cooper reported more exact data on this use.[1] This has put prostate enlargement definitely into the category of a deficiency disease.
Studies in French Indochina showed the natives to be completely free of prostate disease, whereas the white population showed the usual incidence, indicating the possible effect of factors other than age in the cause.[2] Vitamin A deficiency also has been suspected to be a factor in causing prostate trouble.[3]

Prostate hypertrophy with great frequency becomes carcinomatous,[4] so it is with great interest we note that the current issue of the *Annual Review of Biochemistry* (1949) states that vitamin F destroys carcinogens and that this may be one of its functions in living tissue (page 422).

The vitamin F complex (the fatty acid group known to carry vitamin F activity) was found to prevent increased susceptibility to malarial infection, and blood fractions rich in this F complex inhibited malaria multiplication.[4–6]

These effects of stimulating resistance to infectious agents by vitamin F are in all probability the effect of the diffusible form of calcium that the F promotes.

The vitamin F effect is associated with certain fatty acids—arachidonic acid commonly being highest in activity—especially when from mammalian sources. Even then it varies from organ to organ; the liver, kidney, and adrenal fat being highest.

Recently, we have found that fatty acids in phospholipid combination (available from liver) have greater potency and a different activity than the free unsaturated acids. We have provisionally termed this new form of this vitamin complex F2.

F2 acts as a protector of certain vital tissue components, possibly as a part of the phospholipid complex in nerve structures but more definitely as a protective monomolecular layer for the determinant factors that are essential to the repair and regeneration of all tissue. (We refer the reader to *Protomorphology*, by Lee and Hanson, for detailed information on the theories of cell physiology that are responsible for the discovery of F2.)

Vitamin F2 promotes tissue repair, to judge from the clinical results. Skin, which is one tissue that must constantly be replaced, responds at once where a deficiency has caused an induration and degenerative effect.

The most spectacular results, however, are seen in some cases of atrophy of muscular tissue, commonly suspected to be of multiple sclerosis type but apparently due to a deficiency of F2. (We cannot state as yet whether all muscular dystrophies are specific results of F2 deficiency; we assume not.)

It will be noted that here we are encroaching on territory of vitamin E. Let us recall, however, that vitamins F and F2 are really members of the E complex. The tocopherols are simply antioxidizing agents and may be limited to this function. They may act mainly to prevent oxidation and destruction of the fatty acids and their linkages.

The F2 effect may be mainly in preserving the tissue determinants, without which new cells or cell repair cannot take place. These determinants seem to be the catalysts that promote the formation of the specific proteins of the cell, and [they] include trace mineral patterns that are part of the enzyme systems essential to cell metabolism.

It begins to appear that osteoarthritis is a disease that is partly, at least, a result of determinant loss, because the bone changes seem particularly of the type attributable to a determinant paucity. F2 in clinical tests seems to greatly enhance the action of other antiarthritic vitamins such as the Wulzen factor, found in unpasteurized milk and sugar cane juice.

The new adrenal gland hormone cortisone (compound E) is already known to be a determinant conserver—that may be its only function—and has been stated to be the long-sought specific remedy for arthritis. (This theory of arthritis was elucidated in *Protomorphology* two years ago, pages 219 and 298.)

The regeneration of red cells in the bone marrow seems to be dependent upon the presence of determinants too, and pernicious anemia seems to be specifically a state of erythrocyte determinant

paucity. The same adrenal factor helps in the treatment of pernicious anemia (*Protomorphology*, page 295), and a liver extract (apparently F2) was effective also (page 295). We have received some clinical reports suggesting that vitamin F2 is the missing link in liver therapy for pernicious anemia.

The effect of vitamin A concentrates from both vegetable and animal oil sources has been found to be useful in the treatment of some types of hypertension. This effect was traced to the unsaturated fatty acids in the less-refined concentrates, apparently the vitamin F fraction (Grollman and Grollman, *Recent Progress in Hormone Research*, *Vol. 1*, page 383, Academic Press, 1947). The purified vitamin A had lost the effect. (As is usual with any food product, the more refined, the less useful.)
Zaicsek and Weiser of Budapest discovered in 1934 that feeding rye to test animals caused muscular lines of development—in [contrast] to the fatty type of growth in wheat-fed animals—and attributed the difference to a hitherto unknown vitamin present in rye. That vitamin was no doubt our old friend vitamin F. For vitamin F (as the physiological combined form of F2) acts as a protector of the determinants, which are the catalytic activators of cell mitosis and which, if permitted to be enzymatically removed too freely, will [by their absence] result, theoretically, in a failure of development or of maintenance of any organ. (See *Protomorphology* for details.)

Guanidine is a fatigue poison, an end product of muscle activity, and vitamin F is known to activate the conversion of guanidine, with the help of thyroid hormone, back into the muscle component known as phosphagen (Morse, *Applied Biochemistry*, 2nd edition, p. 585, Saunders, 1927. Morse attributes the cooperative effect to the unsaturated fatty acid component of cod liver oil—vitamin F complex to us.)

Here we have the explanation of why some symptoms of F deficiency—dry skin, loss of hair, constipation, muscular pains, and eczematous tendencies—are also listed as those of thyroid inactivity. Maybe vitamin F is the missing link in getting the conversion of fat to muscle that we so long have expected the thyroid to accomplish. No wonder we got toxic reactions instead of what we wanted.

Many users of vitamin F tell us that it eliminates the aftereffect of stiff muscles that often follow unusual muscular activity. It should if it aids in the reconversion of muscular waste products that are as toxic as guanidine.

Remember, the Finns habitually eat rye bread, and they walk away with first place regularly in the Olympic games. In 1924 Finns took the ten first places in the distance races. “Men of Iron,” said Alfred McCann in his book *The Science of Keeping Young* (published in 1926 and now suppressed by the copyright owner, we believe by reason of McCann’s clear indictment of white flour).
The new vitamin found in sugar cane and raw milk known as the anti arthritis factor or the Wulzen-Van Wagtendonk factor seems to have a parallel effect to F2. It promotes the availability of easily hydrolyzable inorganic phosphorus to form phosphagen and adenosine triphosphate (*Journal Biol. Chem.*, 165:449, 1946, and United States Patent #2439914). It should probably be considered a special form of vitamin F as found in the milk complex, with vaccenic acid, and in sugar-bearing plant juices.

The clinical experiences with the antiarthritic factor in treating arthritis are parallel with results of tests with our F complex—some are benefited, and some report an aggravation of symptoms. At the moment we are inclined to believe those that find aggravation of the arthritic symptoms are low in phosphorus and need to get their phosphorus-calcium balance adjusted before relief is possible. Low phosphorus states in test animals are uncommon because the animals are not fed refined sugar products or white flour. That may be the reason the animal tests do not apply here to the human subject.
The clinical uses of vitamin F complex as Cataplex F and the new vitamin F2 may be tabulated as follows.

Uses of Cataplex F

- As a synergist of vitamin D, to ensure delivery of calcium to bones, teeth, muscle, nerve, or phagocytes in a form that is diffusible—probably as calcium bicarbonate.
- Chalky teeth in children usually become hard and translucent if the F is supplied with calcium lactate (one tablet of Cataplex F and three tablets of 5-grain Calcium Lactate, taken upon arising in the morning, fifteen minutes before food). Vitamin C aids this effect. A sixty-day treatment will demonstrate this reaction.
- As a palliative (and often affording complete relief) in cases of prostate enlargement. Apparently this disorder is a deficiency state, for it very consistently clears up under treatment with [Cataplex] F—three tablets per day. Vitamin C again is synergistic, probably by its promotion of capillary circulation.
- All states requiring more diffusible calcium in the tissues.
- Uses of Vitamin F2 (For Experimental Use—A New Product)
- Diseases where there is a definite failure of tissue regeneration—muscular dystrophies, creeping paralysis, anemic states, weakness, and atrophy. To be used in connection with all known physiological remedies, such as vitamin E, amino acids, and special diets, with definite restrictions on refined foods, processed cereals, soft drinks, and all white sugar products and favoring raw foods, rare meats, and vegetable juices.

Written and edited by Dr. Royal Lee. Vitamin News, October 1949. Published by the Vitamin Products Company, Milwaukee, Wisconsin.

Bibliography

1. Lee Foundation for Nutritional Research, Milwaukee. Report 1, 1942.
2. Le Roy des Barres, A. *Bulletin Academy de Medicine* (Paris), 117:367, 1937.
3. Moore and Mark. *Journal Experimental Medicine*, 64:1, 1936.
4. Trager, W. *Proc. Soc. Exper. Biol. & Med.*, 64:129-34, 1947.
5. Axelrod et al. *J. Biol. Chem.*, 175:265–74, 1948.
6. Trager, W. *J. Exper. Med.*, 85:663–83, 1947.

Vitamin F and Carbamide in Calcium Metabolism

By Dr. Royal Lee
https://www.seleneriverpress.com/historical/vitamin-f-and-carbamide-in-calcium-metabolism/

Summary: An important article about two of the most overlooked nutritionally and biochemically essential substances in the human body. The roles of *carbamide* (a.k.a. urea) in denaturing proteins—and thus reducing their antigenicity—and of *vitamin F* (fatty acid complex) in defusing calcium bicarbonate (ionized calcium) into the cell fluids are virtually lost on orthodox medicine. Yet holistic doctors have repeatedly discovered this article since its publication in 1946 and been amazed at the clinical efficacy of the applied knowledge it presents.From *Journal of the National Medical Society*, 1946. Lee Foundation for Nutritional Research reprint 20.
[*The following is a transcription of the original Archives document. To view or download the original document, click here.*]

Vitamin F and Carbamide in Calcium Metabolism

Carbamide, otherwise known as urea , is a physiological constituent of all body fluids which has heretofore been mistakenly considered a waste product. Its presence in urine in considerable amounts has been responsible for this conclusion. Sodium chloride, too, is a constant constituent of urine, and is no more a waste product than carbamide. Both are necessary blood and lymph salts, but carbamide is made by the cells for use as an osmotic regulator, and either carbamide or sodium chloride must be available to promote water output in kidneys or sweat glands, where an aqueous solution of waste products is to be thrown off by osmosis. A deficiency of salt in hot weather is a serious matter for the body, but a deficiency of carbamide has, heretofore, not been recognized as possible or probable. I believe the evidence is clear to show that such may be and often is the case.
Carbamide is made only in the liver, and is a product of the splitting of arginine by arginase to yield ornithine and carbamide. Arginine is available, of course, from protein digestion; it is one of the commonest amino acids. Arginase is present in male liver in higher amounts than in female liver, according to Tauber, and in highest concentration after sexual maturity.[1]

Carbamide denatures proteins, according to various investigators. That means that it alters the affinity of the protein molecule for any mineral salts which may be conjugated with it, and we know that the calcium in the blood which is destined for bone or tooth use is carried as a nondiffusible molecule of calcium phosphate attached to a protein carrier.

Vitamin F promotes the release of calcium bicarbonate in the blood and its consequent diffusion into the tissues. How? Apparently in this way: Vitamin F is known to promote the action of the sex hormones. The extra activity of the male hormone may cause the increased promotion of arginase activity, with consequent increased blood carbamide. The carbamide denatures the protein-calcium complex, releasing into the blood free ions of calcium phosphate, which react with sodium bicarbonate always present to afford calcium bicarbonate and sodium phosphate. It is probably this same protein-calcium complex that is built up in the bloodstream by the action of vitamin D. It is obvious that without the aid of vitamin F this calcium cannot be unloaded after it reaches its destination.

The rise in blood urea also would account for the great relief of sunstroke victims experienced from the use of vitamin F, for their distress is known to be due to two reactions: 1) a stoppage of perspiration which we can now see is a consequence of depletion of both salt and carbamide, without which no sweat can be osmotically secreted, and 2) a high blood calcium from too much vitamin D which acts as a tissue poison until brought under control. We must recall that the only way excess vitamin D can cause harm is by its boosting of the blood calcium levels.

It also explains why older persons, especially women, can tolerate less sunshine than younger persons.

Chemically, carbamide is carbon dioxide combined with ammonia. As such, it must be considered a buffer salt, for while neutral in itself, it can release ammonia for neutralizing acids if urease is present, an enzyme that catalyzes this reaction [*sic*]. Now, significantly, urease is found in the stomach mucosa. As such, it should be expected to act as a protection against the tendency of the gastric acid to irritate the stomach wall, by locally providing ammonia to neutralize acid. Suppose the carbamide levels were lowered by reason of sex hormone deficiency? The natural reaction could very possibly be a tendency to gastritis and ulcers, for peptic ulcers are definitely a result of uncontrolled gastric acidity. It is not strange that one important clinical use that has developed for vitamin F is in gastritis now that we see this connection.

Vitamin F has never been actually isolated and identified. It is an associated factor found in certain unsaturated fatty acids. Its highest potency is found in arachidonic acid of kidney fat or the fat of other mammalian glandular organs. Some fish oils are 40 percent arachidonic acid, but they fail to have a vitamin F potency in proportion. It is probably the synergistic association of vitamin F in fish oils that affords the better effect of vitamin D from that source, and it is probably the high sex hormone content of the blood in pregnancy that, by its stimulation of carbamide production, prevents vitamin D from raising the blood calcium to toxic levels, it being an established fact that in pregnancy the female is immune to vitamin D toxicosis.

Do not forget that both sexes make use of both the female and male hormones; the difference is in the proportions. One of the best commercial sources of estrogen is stallion urine. It is probable that an increased intake of vitamin F promotes a normal balance between these two hormones. It is a common clinical result of vitamin F administration for a woman patient to report a falling off of a masculine hair growth. The effect seems to be a disintegration of the hair shaft at the skin surface. It seems to indicate that the female grows hair, but the shaft cells are friable. Otherwise, how [do we] explain this sudden dropping off of hair? Sometimes children and even adults report handfuls of hair dropping off on the pillow when arising. That is a disorder of the endocrine system that usually responds to a multiple vitamin treatment. Often it is ascribed to a spirochetal infection, but many cases are seen where this explanation is not probable and which promptly respond to vitamins.
One of the first indications of vitamin F deficiency is nephritis. If carbamide is necessary to osmotic discharge of toxic substances in solution (along with sodium chloride), and its production is dependent on vitamin F, then it is apparent that serious embarrassment of the kidney will inevitably result from F deficiency. **It is significant that in sunstroke not only the sweat glands but also the kidney function is paralyzed more or less.** This shows, I believe, that there is a severe deficiency of carbamide, and a vicious circle of symptoms is present, which is broken by the vitamin F. The use of carbamide along with salt as a hot weather aid to the osmosis of perspiration would seem desirable.

A mixture of salt and carbamide, equal parts, added to drinking water in small proportions seems to add thirst-quenching properties that the plain water lacks. About a quarter level teaspoonful is ample, to the glass of water.

In allergic conditions a deficiency of calcium is usually considered a contributory factor, and the tissue fluid content of diffusible calcium is usually demonstrably low. Clinically, the use of the vitamin G complex is the most successful of the schedules we have seen tested. A clue is seen here in that pyridoxine deficiency is known to cause tetanic convulsions, and pyridoxine, plus an unknown B-factor, has been found interchangeable with vitamin F in the treatment of controlled F deficiency in animals.[2]

I consider allergies a result of a combination of circumstances which includes a deficiency of vitamin G complex, a lowered level of blood carbamide (common after middle age) and reduced pancreatic

activity in which proteins are incompletely digested and antigenic fractions can get into the blood stream and produce some specific sensitization. I think carbamide is a vital link in this chain, since where it is deficient, there is a great enhancement of the tendency to sensitization. That is because carbamide is a mild denaturant in itself of proteins and probably acts as a first line of defense against sensitizing agents by destroying their antigenic power. Since the carbamide level is secondary to the sex hormone level, the beginning of allergy trouble at middle age is obviously natural. But do not forget that nutritional deficiencies of vitamins A, E, and F hasten this lowered hormone level, and also the deficiency of the G complex and calcium greatly enhance the development of symptoms.

Most patients who need calcium do not respond to its administration in the usual forms. That is no doubt because their condition is due more to their inability to assimilate the element than to its actual absence in the food. It is known that an alkaline intestine will prevent the assimilation of calcium.[3]

A deficiency of hydrochloric acid in the gastric secretions will definitely inhibit calcium assimilation. Probably one of the benefits of lactobacillus acidophilus or lactic acid yeast is the reduction of intestinal alkalinity and the promotion thereby of calcium absorption.

High phosphorus diets, which may be created by an excess of cereal foods, are stated by the same authority to exert an unfavorable effect on calcium absorption. And calcium phosphate, commonly sold for nutritional purposes, is totally useless nutritionally, according to investigators of the Ohio Experiment Station, reported in Bulletin 347, at least for promoting bone growth in pigs and cows.

The calcium of plant cells and cereal germ is in the form of phytate, an organic combination that also carries inositol, a factor of the vitamin B complex. This calcium is soluble in acids and is no doubt normally dissolved by the gastric juice. It can be also rendered soluble with citric acid, so that its assimilation is not dependent on the presence of gastric juice and it can then be taken without other foods. Calcium is best assimilated on an empty stomach because it tends to combine with foods, especially fatty foods, and remain in the intestinal tract if foods are present. So it appears that we have a complicated situation with respect to the assimilation of calcium, and it is easy to see how a patient can develop a condition of acute deficiency in spite of the universal presence in foods of at least some form of calcium.

By Royal Lee, DDS. Reprinted from the Journal of the National Medical Society, January/February 1946, by the Lee Foundation for Nutritional Research.

References

1. Tauber. *Enzyme Chemistry*, p.114, John Wiley, 1937.
2. Schneider et al. *J. Biol. Chem*., 133: LXXXIII, 1940.
3. Cantarow, Hare. *Calcium Metabolism and Therapy*. Lea and Febiger, 1933.

Reprint No. 20
Lee Foundation for Nutritional Research
Milwaukee, Wisconsin
Printed in U.S.A.

Why Sunlight Deficiency is as Deadly as Smoking

Posted on **04/25/2023** by **EraOfLight**

A groundbreaking study published in the Journal of Internal Medicine has revealed something absolutely amazing about the role of the Sun in human health: a deficiency of sunlight could be as harmful to human health as smoking cigarettes.

The study titled, "Avoidance of sun exposure as a risk factor for major causes of death: a competing risk analysis of the Melanoma in Southern Sweden cohort," was conducted by Swedish researchers on a population of almost 30,000 women. They assessed the differences in sun exposure as a risk factor for all-cause mortality, within a prospective 20-year follow up of the Melanoma in Southern Sweden (MISS) cohort. The women were aged 25-64 years at the start of the study and recruited from 1990 to 1992. When their sun exposure habits were analyzed using modern survival statistics they discovered several things.

First:

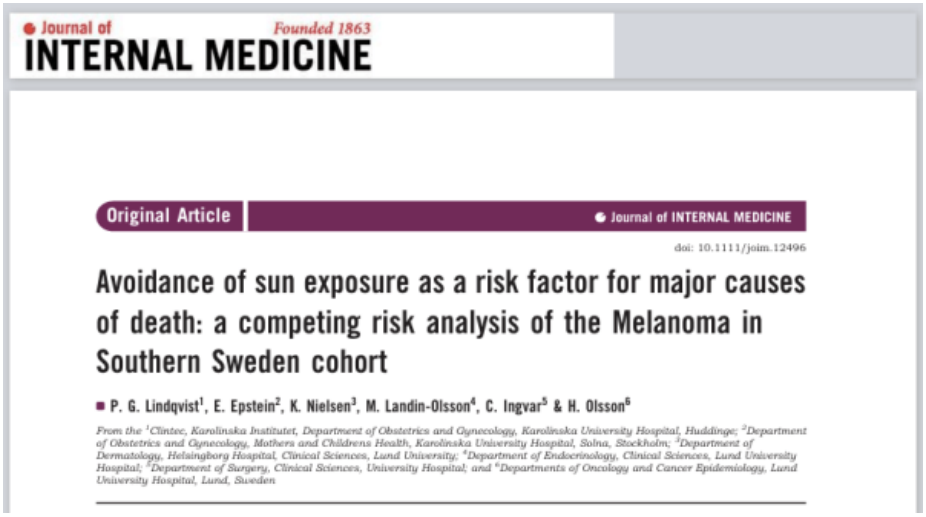
> ***"Women with active sun exposure habits were mainly at a lower risk of cardiovascular disease (CVD) and noncancer/non-CVD death as compared to those who avoided sun exposure."***

Second:

> ***"As a result of their increased survival, the relative contribution of cancer death increased in these women."***

This finding may be a bit tricky to understand, so let's look at it a little closer.

Because cancer risk increases along with biological age, the longer you live, the higher your cancer risk will be. Therefore, because increased sunlight exposure actually increases your longevity, it will also appear to increase your risk of cancer. But this does not necessarily mean that sunlight is intrinsically "carcinogenic," which is commonly assumed.



Journal of INTERNAL MEDICINE
Founded 1863

Original Article | Journal of INTERNAL MEDICINE

doi: 10.1111/joim.12496

Avoidance of sun exposure as a risk factor for major causes of death: a competing risk analysis of the Melanoma in Southern Sweden cohort

P. G. Lindqvist[1], E. Epstein[2], K. Nielsen[3], M. Landin-Olsson[4], C. Ingvar[5] & H. Olsson[6]

From the [1]Clintec, Karolinska Institutet, Department of Obstetrics and Gynecology, Karolinska University Hospital, Huddinge; [2]Department of Obstetrics and Gynecology, Mothers and Childrens Health, Karolinska University Hospital, Solna, Stockholm; [3]Department of Dermatology, Helsingborg Hospital, Clinical Sciences, Lund University; [4]Department of Endocrinology, Clinical Sciences, Lund University Hospital; [5]Department of Surgery, Clinical Sciences, University Hospital; and [6]Departments of Oncology and Cancer Epidemiology, Lund University Hospital, Lund, Sweden

Because heart disease is #1 killer in the developed world, and since sunlight reduces this most common cause of premature death, even if it increases the risk of the #2 most common cause of death (cancer), the net effect of sunlight exposure is that you will still live longer, which helps to contextualize and neutralize the "increased cancer risk" often observed. Keep in mind, as well, that a huge number of cancers are **overdiagnosed and overtreated**, without sufficient acknowledgement by the medical establishment, whose culpability is rarely addressed. These "cancers" greatly inflate the statistics. With millions of so-called early stage cancers like these — especially **breast**, prostate, **thyroid**, lung, and **ovarian** — being wrongly diagnosed and treated, the complexity of the topic makes determining the role of sunlight exposure and cancer risk all the more difficult to ascertain.

Moving on, the point about the longevity promoting properties of sunlight are driven home strongly by the third major observation:

> ***"Nonsmokers who avoided sun exposure had a life expectancy similar to smokers in the highest sun exposure group, indicating that* avoidance of sun exposure is a risk factor for death of a similar magnitude as smoking."**

This is a powerful finding with profound implications. To say that "avoidance of sun exposure is a risk factor for death of a similar magnitude as smoking," is to point out that sunlight exposure, rather than being the constant lethal threat it is perceived to be, warranting the slathering on all over the body of **synthetic sunscreens virtually guaranteed to cause harm from toxicant exposure**, is essential to our health. In fact, **according to the CDC**, smoking is responsible for 6 million unnecessary deaths a year, and the "overall mortality among both male and female smokers in the United States is about three times higher than that among similar people who never smoked." And so, sunlight exposure may be so powerful an essential and necessary ingredient in human health that it might be considered medically unethical not to provide access to it, or to advise more routine exposure to it.

The fourth and final observation of the study was that:

> ***"Compared to the highest sun exposure group, life expectancy of avoiders of sun exposure was reduced by 0.6-2.1 years."***

Sunlight Attains Its Former Status As An Indispensable Component of Health

While we can say that sunlight deficiency may contribute to lethal outcomes on par with smoking, we can rephrase the information positively by affirming that the Sun and its light may be as important to human health as is clean food or water. In fact, compelling research suggests that energy from the Sun drives the cellular **bioenergetics of the biomachinery of our bodies through non-ATP dependent processes**. Consider the work of **Gerald Pollack, PhD**, author of the "The 4th Phase of Water" (see video below), who explains how infrared energy of the Sun charges up the water molecules within our body (99% of the molecules in our bodies in number are water) like trillions of molecular batteries.

When pertaining to cardiovascular health, sunlight energy in the form of infrared charged water molecules supports the heart's job of pumping the blood throughout the blood vessels by producing a form of highly structured and energized water known as Exclusion Zone water, or EZ water, and which may actually provide over 99.9% of the biomechanical energy needed to push the 1.2-1.5 gallons of blood in the average adult body through the literally thousands of miles of blood vessels. Provocative research also suggests the body contains a variety of photoacceptors/chromophores (e.g. cytochrome C oxidase) capable of accepting and utilizing sunlight to generate so-called "extra synthesis" of ATP. Additionally, melanin may absorb a wide range of the Sun's electromagnetic spectrum, **converting it into useful energy and perhaps also biologically important information**, **even perhaps taking harmful gamma radiation and turning it into biologically useful energy**. Even something as commonplace in the human diet as chlorophyll has recently been found to act as a means to enhanced the light-harvesting properties of animal cells. In fact, **we reported recently on a study that found enhanced ATP production** (without the expected concomitant uptick in reactive oxygen species production) through intermediary of chlorophyll metabolites that end up in the mitochondria of our cells following microbiome-mediated digestive processes.

Natural health advocates have sung the praises of sunlight for health since time immemorial. While in modern times, sunlight-phobia is omnipresent, with parents of especially lighter skinned ethnicities forcing their children to don space-suit level all body protective gear, along with spraying or slathering them with **extremely toxic petrochemical derivatives** and **nanoparticle metals** with potentially cancer-promoting properties, there is a growing appreciation that we need the Sun as both a **form of food**, energy and information.

It's, of course, not all about vitamin D. To reduce the perceived health benefits of sunlight to this hormone-like compound is as reductionist as saying a orange's health benefits are solely dependent on and reducible to the molecular scaffolding of atoms that comprise the chemical skeleton of the ascorbic acid molecule. We are beginning to learn that certain wavelengths of sunlight activate a wide range of ancient, hard-wired genetic and epigenetic programs, relevant to all of our body's systems. The wavelengths of light that occur at sunset, for instance, may have been so **important to our evolution as a species that our very hairlessness, and our massive brains may not have evolved without daily exposure to them**, for hundreds of thousands and even millions of years. This phenomena, also known as bio photomodulation, opens up a radically new perspective on the role of the sun in human health and disease. If sunlight deficiency is really as deadly as actively smoking cigarettes, it could be said that those who do not experience regular natural light exposure are no longer truly human, or capable of experiencing the optimal expression of their biological, mental, and spiritual blueprint. A

fundamental right, and health practice, would be daily outdoors exposure. How many of us have considered the state of office workers, institutionalized educational systems without windows, night shift work, and prisons? Sunlight deprivation, in light of these new findings, could be considered a significant violation of human health rights.

This study may pave the way for a deeper understanding of what humans need to be truly healthy, with sunlight deficiency being a prime example of what is most wrong about our modern incarnation as a primarily indoors focused creature, leading to our physical and psychospiritual degeneration. As new models of cellular bioenergetics emerge, taking into account the ability of the body to directly or indirectly harvest the various light wavelengths of the Sun, direct daily exposure to sunlight may be looked upon as at least as an important step as “taking your vitamins,” or exercising, for maintaining our health. Conversely, sunlight deficiency and/or deprivation will be likely be viewed to be as dangerous or lethal as smoking.

**By GreenMedInfo

**Source