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ENDOCRINOLOGY

Micronutrients: Vitamin D

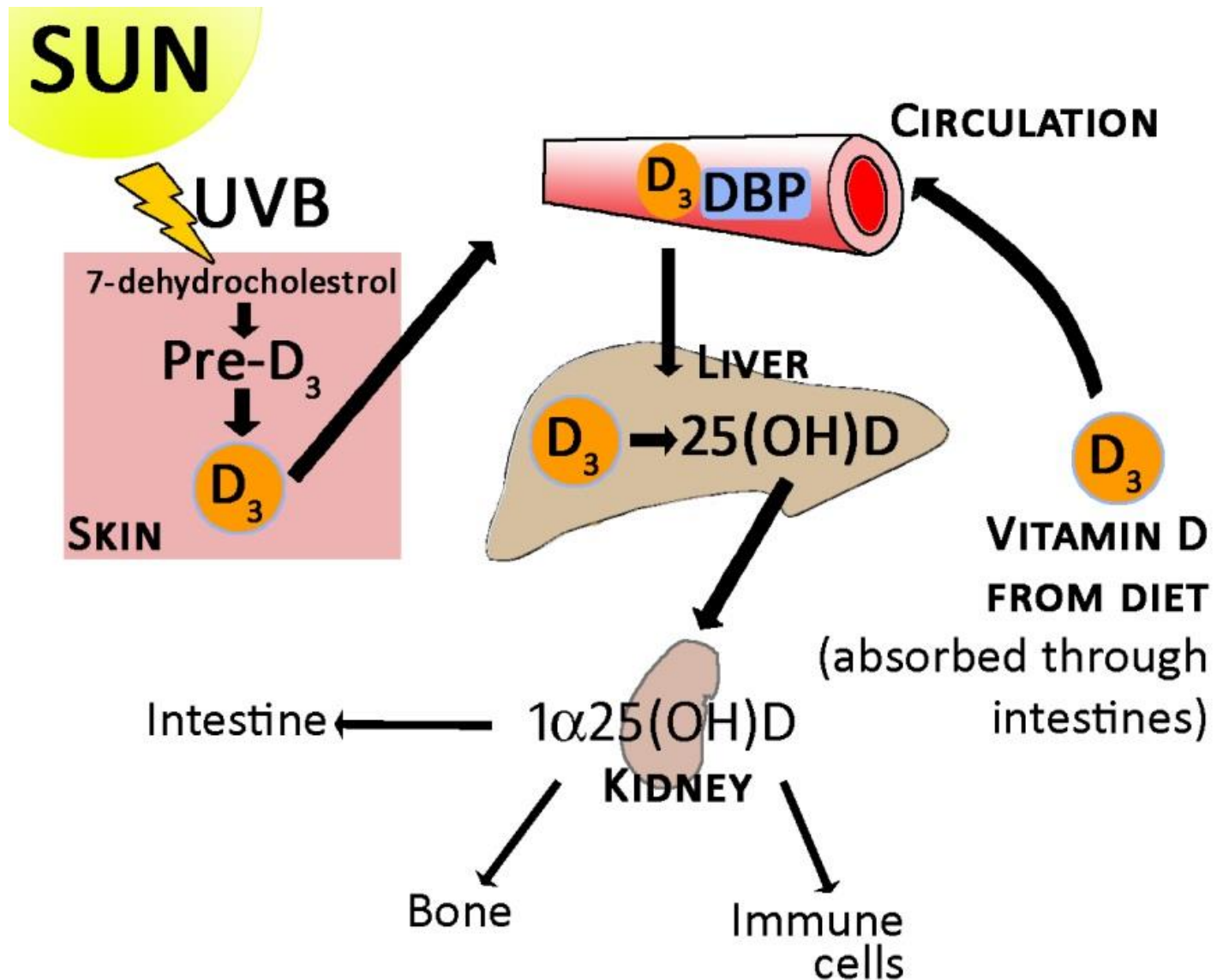
Dr. Ritamarie Loscalzo



Medical Disclaimer: The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, drritamarie.com, and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.



Vitamin D Basics



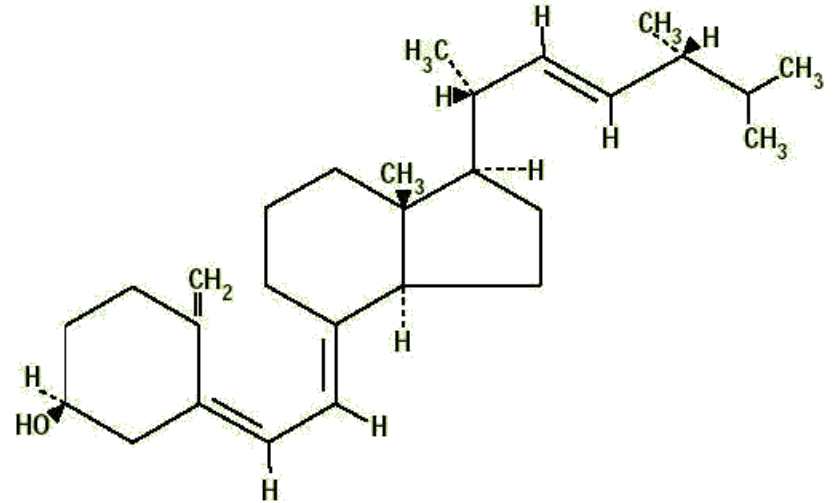
***“Sun phobia,
sunscreens, and
spending too much
time indoors have all
contributed to the
problem of Vitamin D
insufficiency.”***

**~ Zoltan Rona,
MD, MSc**



Functions of Vitamin D - Part 1

- ✓ Helps **gut absorb calcium** and phosphorus
- ✓ Regulate **calcium and phosphorus** metabolism
- ✓ **Adrenal** gland health
- ✓ **Blood sugar** control
- ✓ **Bone** metabolism
- ✓ **Brain** and nervous system development and function
- ✓ **Digestion** and nutrient absorption
- ✓ **Blood brain barrier** permeability
- ✓ **Gut** membrane permeability

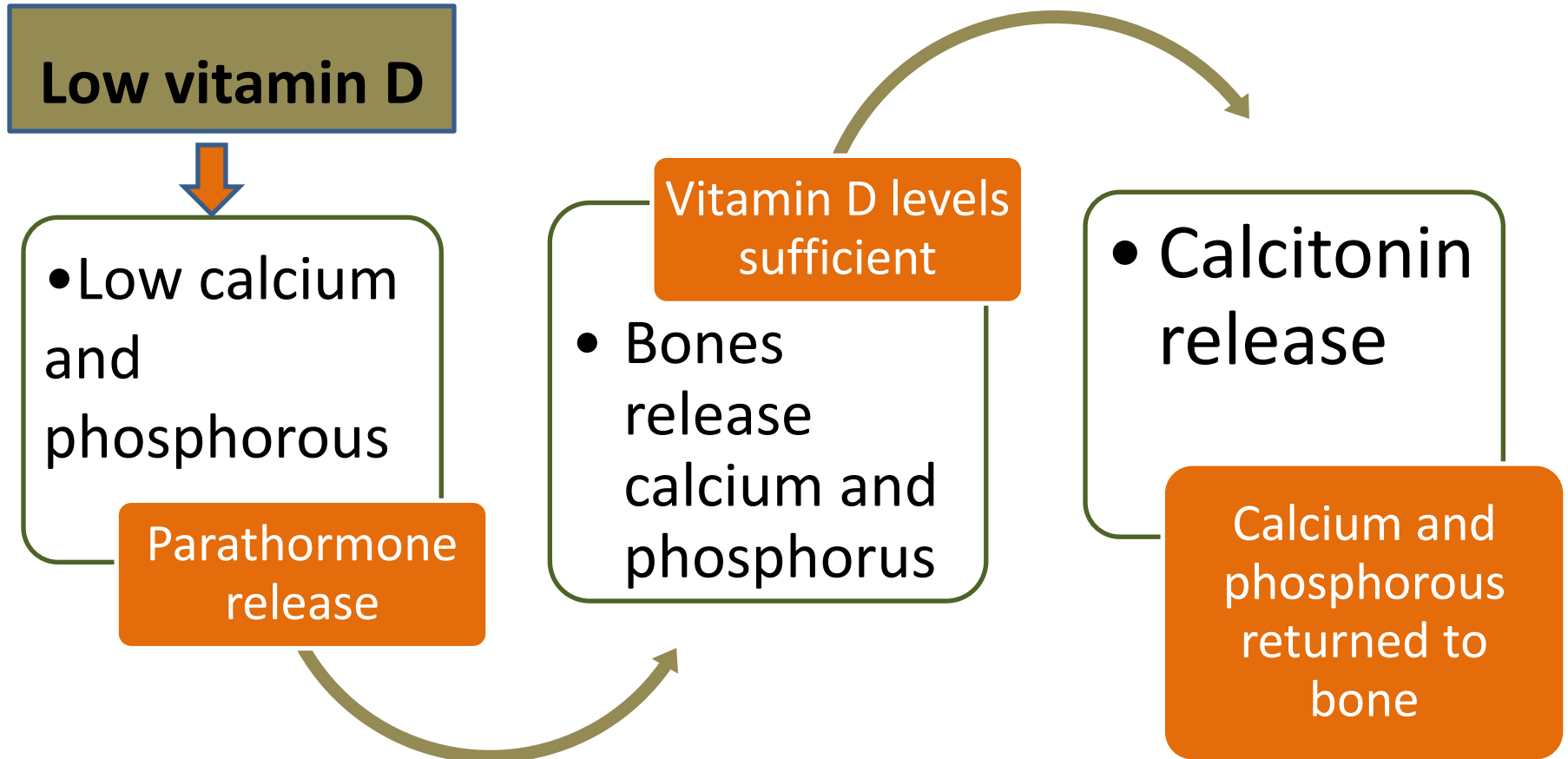


Functions of Vitamin D - Part 2

- ✓ **Immune system** health
- ✓ **Mood**, mind, memory and behavior
- ✓ **Muscle, nerve** and athletic performance
- ✓ Normal **blood pressure**
- ✓ **Pancreatic** health
- ✓ **Skin** health
- ✓ **Sleep**
- ✓ **Vision**
- ✓ **Weight** control
 - carbohydrate and fat metabolism

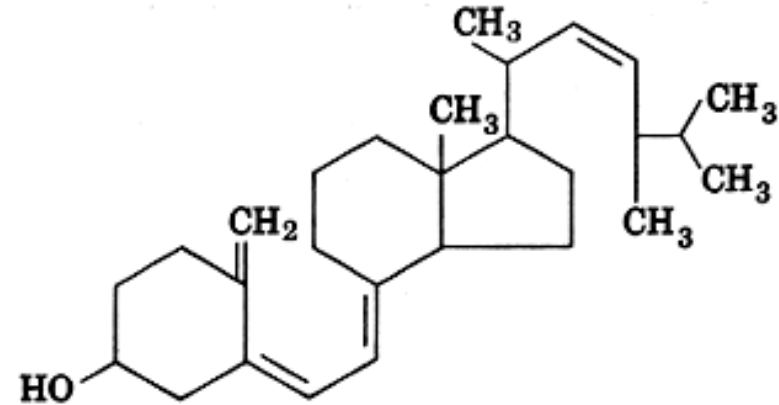


Vitamin D Homeostasis

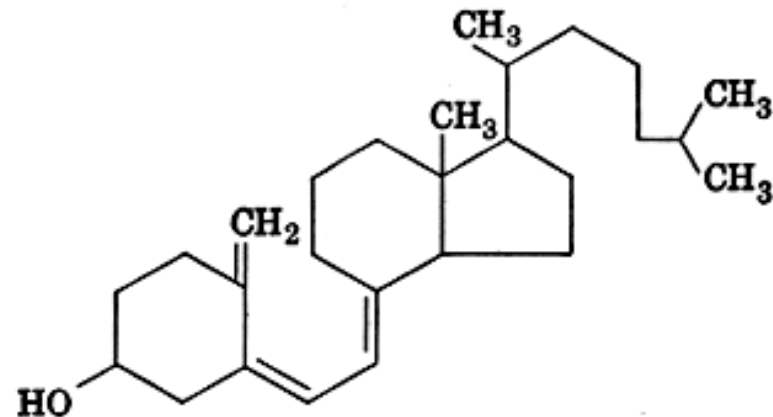


Forms of Vitamin D

- ✓ **Vitamin D3:** found exclusively in animal sources
- ✓ **Vitamin D2:** found in plant sources in small amounts
- ✓ **Synthetic Vitamin D2:** fortified products and some supplements



Vitamin D₂ (calciferol)

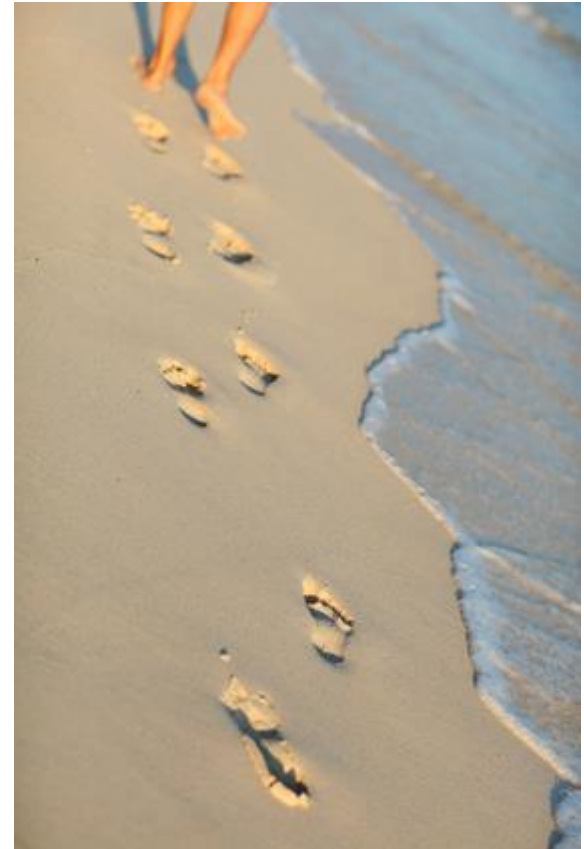


Vitamin D₃



Why We Become Vitamin D Deficient

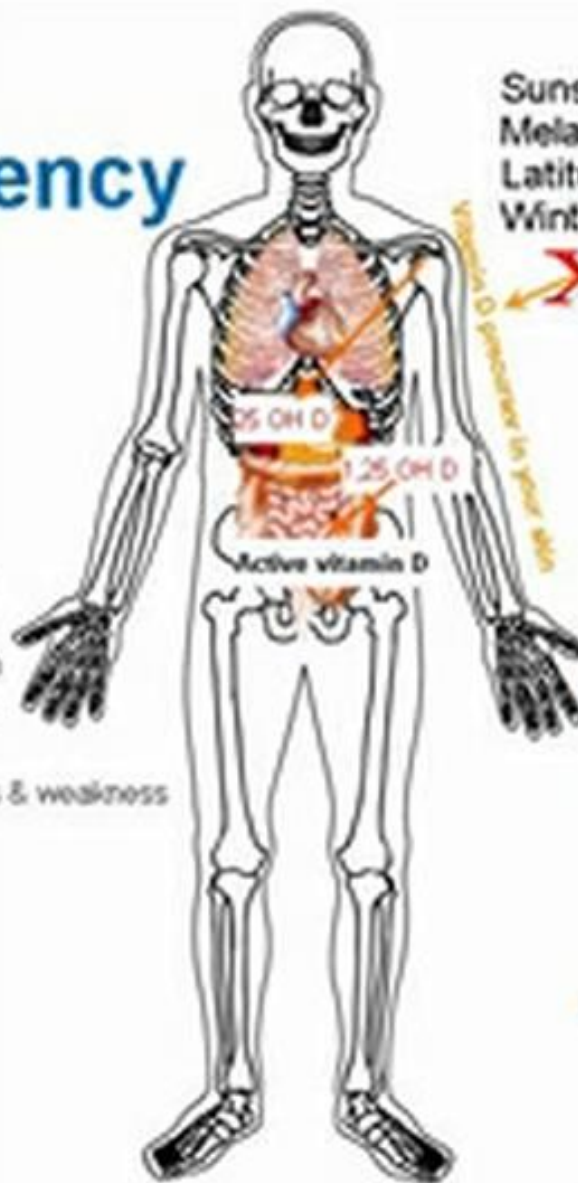
- ✓ **Sun phobia**
- ✓ Sunscreens
- ✓ Too much **time indoors**
- ✓ Poor liver function
- ✓ Poor **kidney** function
- ✓ Poor bile production
- ✓ **Food allergies** (prevent absorption)
- ✓ Northern climates / cold climates
- ✓ **Genetics**
- ✓ Showering and scrubbing with soap
- ✓ **Statin drugs**



Vitamin D Deficiency

Consequences:

- **Psychiatric**
 - Schizophrenia
 - Depression
- **Infections**
 - Urinary
 - Tuberculosis
- **Circulatory**
 - High blood pressure
 - Coronary heart disease
- **Cancer**
 - Breast
 - Colon
 - Prostate
 - Other
- **Other**
 - Diabetes
 - Syndrome X
 - Obesity
- **Pulmonary**
 - Wheezing
 - FEV1
- **Bone & Muscle**
 - Osteoporosis
 - Osteomalacia
 - Osteoarthritis
 - Rickets
 - Muscle aches & weakness



Medications & Supplements:

- Antiseizure
- Glucocorticoids
- Rifampin
- HAART
- St. John's Wort
- Malabsorption
 - Crohn
 - Whipple
 - Cystic fibrosis
 - Celiac
- Organ failure
 - Liver disease
 - Renal failure
 - Nephrotic syndrome

Vitamin D Testing

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Vitamin D Deficiency Can Result In

- ✓ Over-weight
- ✓ High blood pressure
- ✓ Osteoporosis and osteopenia
- ✓ Autism
- ✓ Autoimmune conditions
- ✓ Cancer
- ✓ Depression
- ✓ Asthma
- ✓ Migraines
- ✓ Cystic fibrosis
- ✓ Diabetes (types: 1 and 2)
- ✓ Multiple sclerosis
- ✓ Schizophrenia
- ✓ Epilepsy
- ✓ Osteoarthritis PCOS (Polycystic Ovarian Syndrome)
- ✓ Musculoskeletal pain, including joint pain and low back pain
- ✓ Muscle weakness
- ✓ Poor balance
- ✓ Systemic inflammation
- ✓ Fibromyalgia



Blood Levels of Vitamin D (US Measurements)



>100 ng/mL	Excessive vitamin D
50–70 ng/mL	Proposed optimal range
30–50 ng/mL	Suboptimal
<30 ng/mL	Deficient
<20 ng/mL	Overt vitamin D deficiency
<10 ng/mL	Seriously deficient

****** *To convert to Standard International units, multiply by 2.496*



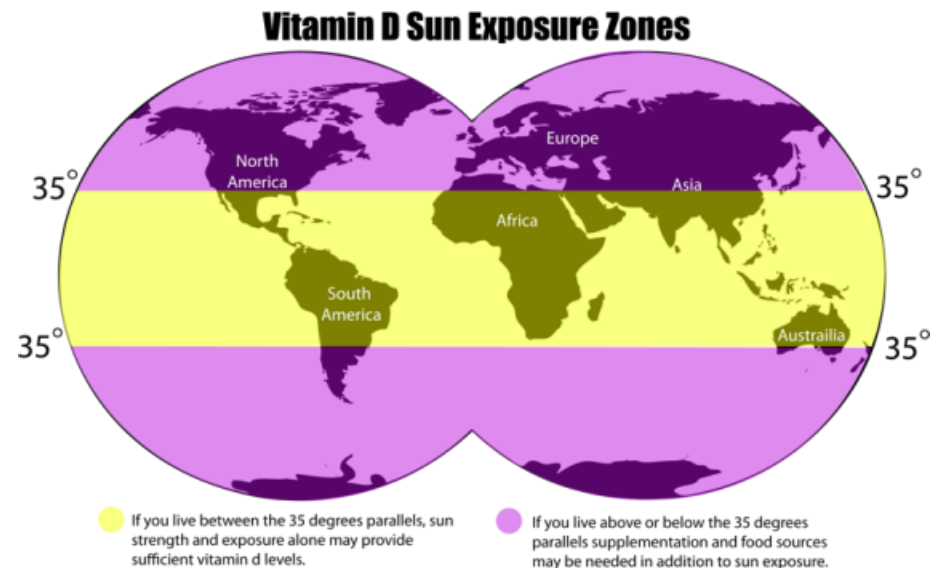
Vitamin D Deficiency Statistics

- ✓ 41% of people studied had vit. D level below 20
- ✓ 82.1% of African Americans had vit. D level below 20
- ✓ 69.2% of Hispanics had vit. D level below 20

*Nutr Res. 2011 Jan;31(1):48-54. doi: 10.1016/j.nutres.2010.12.001. **Prevalence and correlates of vitamin D deficiency in US adults.** Forrest KY¹, Stuhldreher WL.*

- ✓ 1988-1994, 45% of people studied had vit. D level greater than 30
- ✓ 2001-2004, 23% of people studied had vit. D level greater than 30

Demographic Differences and Trends of Vitamin D Insufficiency in the US Population, 1988-2004.
Adit A. Ginde, MD, MPH; Mark C. Liu, MD; Carlos A. Camargo Jr, MD, DrPH. Arch Intern Med. 2009;169(6):626-632.



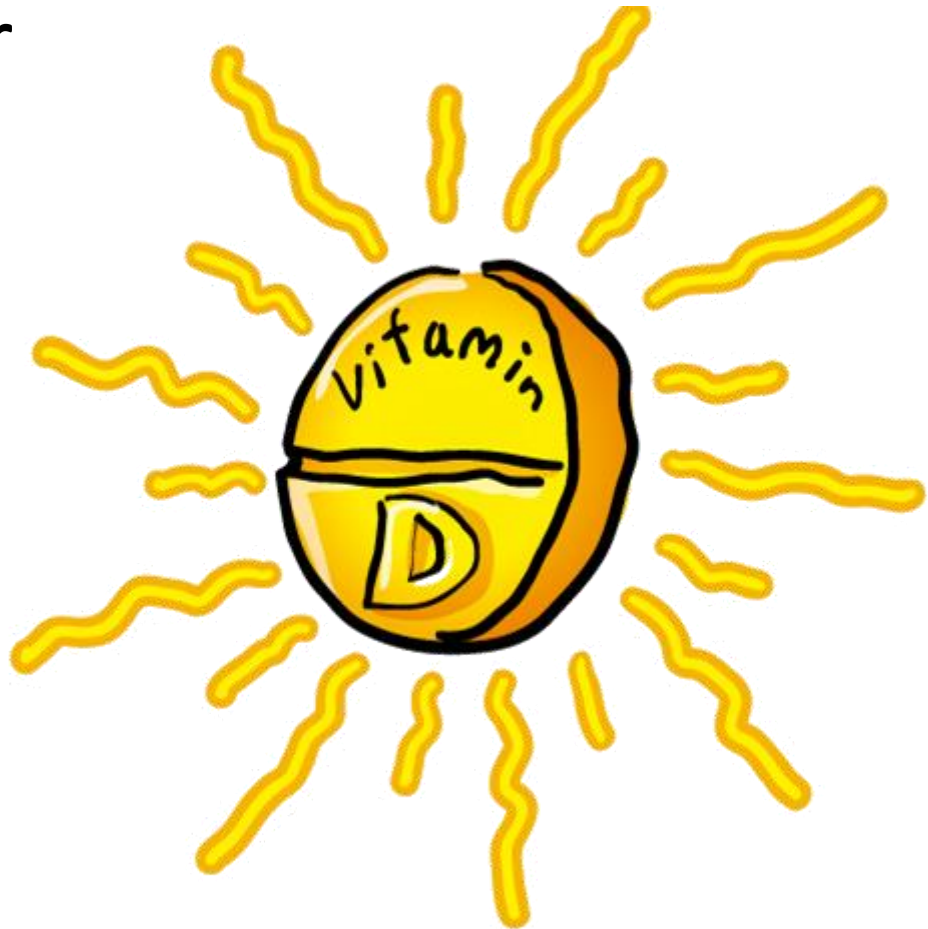
Cancer and Sun Exposure

- **Melanoma:** Most dangerous cancer of skin is not related to sun exposure; recent studies suggest it can be caused by vitamin D and omega-3 deficiency
- **Basal cell carcinoma** is benign
- **Sunscreens** are carcinogenic
- Get out of the sun when your skin starts to turn a little pink
- **Natural sunblocks** if necessary: zinc oxide, titanium dioxide



Those at Highest Risk of Vitamin D Deficiency

- ❑ **Overweight:** greater need – stored in fat
- ❑ **Pregnant women**
- ❑ **Elderly:** skin loses ability to produce
- ❑ **Dark skinned:** melanin blocks UVB rays



Vitamin D Testing



- ✓ Get a baseline test
- ✓ Supplement if indicated
- ✓ Retest every 3 months until stable, for at least a year
- ✓ Be sure to test in winter and summer



Vitamin D Supplementation

How Much is Safe?

- ✓ **University of Toronto study:**
No measurable shifts in levels until > 4000 IU
- ✓ **20,000 IU made each hour of summertime sun exposure**
- ✓ **Skin reserves**
- ✓ **10,000 IU considered optimal dose by Dr. Zoltan Rona, author of *Vitamin D: The Sunshine Vitamin***



Conditions That Benefit From Large Doses of Vitamin D

- ✓ Cancer
- ✓ ALS
- ✓ Depression
- ✓ Hashimotos
- ✓ Multiple sclerosis
- ✓ Allergies
- ✓ Flu
- ✓ Rheumatoid arthritis
- ✓ Heart disease
- ✓ Lung disease
- ✓ Osteoporosis



Dr. Joe Prendergast, endocrinologist, - 50,000 iu per day



Subset of Conditions That Respond To Vitamin D Supplementation - 1

- ✓ **The flu:** *Cambridge Journals* showed that vitamin D reduces the incidence of respiratory infections in children
- ✓ **Muscle weakness:** Michael F. Holick: Muscle weakness is usually caused by vitamin D deficiency because for skeletal muscles to function properly, their vitamin D receptors must be sustained by vitamin D
- ✓ **Psoriasis:** In a study published by the UK PubMed central, it was discovered that synthetic vitamin D analogues were found useful in the treatment of psoriasis



Subset of Conditions That Respond To Vitamin D Supplementation - 2

- ✓ **Chronic kidney disease:** Patients with advanced chronic kidney diseases unable to make the active form of vitamin D
- ✓ **Diabetes:** 10,366 children were given 2,000 international units (IU)/day of vitamin D3 per day during their first day of life then monitored for 31 years; risk of type 1 diabetes was reduced by 80 percent (Lancet.com)
- ✓ **Asthma:** Asthma attacks in school children in Japan were significantly lowered in those subjects taking a daily vitamin D supplement of 1,200 IU a day



Subset of Conditions That Respond To Vitamin D Supplementation - 3

- ✓ **Periodontal disease:** Raising their vitamin D levels increases defensins and cathelicidin and lower the number of bacteria in the mouth
- ✓ **Cardiovascular disease:** *Harvard University* - nurses study - women with low vitamin D levels had a 67% increased risk of hypertension
- ✓ **Schizophrenia and depression:** Vitamin D prenatal and during childhood - vitamin D receptor in the brain integral for brain development and mental function maintenance in later life



Subset of Conditions That Respond To Vitamin D Supplementation - 4

Cancer: *Georgetown University Medical Center* presented at the *American Association for Cancer Research* - increased doses of vitamin D linked to a **75 percent reduction in overall cancer growth** and **50 percent reduction in tumor** among those already having the disease, especially estrogen-sensitive breast cancer



High Dose Vitamin D Supplementation

- ✓ John Cannelli, head of vitamin D council, recommends **50,000 – 100,000 iu daily for cold or flu**
- ✓ Dr. Mercola recommended **90% of body weight during swine flu outbreak**
- ✓ Norm Shealy, MD takes **50,000 iu daily** – has for 18 months
- ✓ **Do not take calcium with such high doses**
- ✓ In 1930s and 1940s doctors at Johns Hopkins prescribed **600,000 iu to treat arthritis** and only 10 patients developed toxicity symptoms after 2 – 18 months



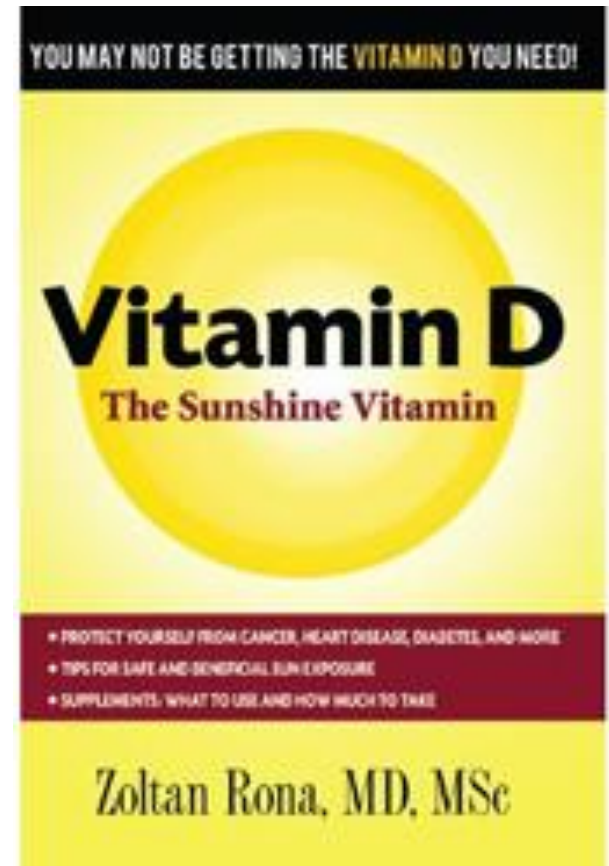
Vitamin D Toxicity Symptoms

- ✓ Weight loss and fatigue – first
- ✓ Anorexia
- ✓ Nausea
- ✓ Vomiting
- ✓ High blood calcium
- ✓ Kidney damage
- ✓ Only deaths reported were when steroids prescribed with the Vitamin D



Treatment for Vitamin D Toxicity

- ✓ Discontinue supplements
- ✓ Stay out of sun
- ✓ Drink at least **4 liters of water per day**
- ✓ Symptoms resolve in **several weeks**, calcium level normalizes in several months



Vitamin D in Foods

Food	Serving Size	Calories	Amount of Vitamin D
Cod Liver Oil	1Tbs	120	1360
Salmon	4 oz	158	511
Sardines	3.2 oz	189	175
Tuna	4 oz	147	93
Egg	1	77	43
Shiitake Mushrooms	½ cup	41	20



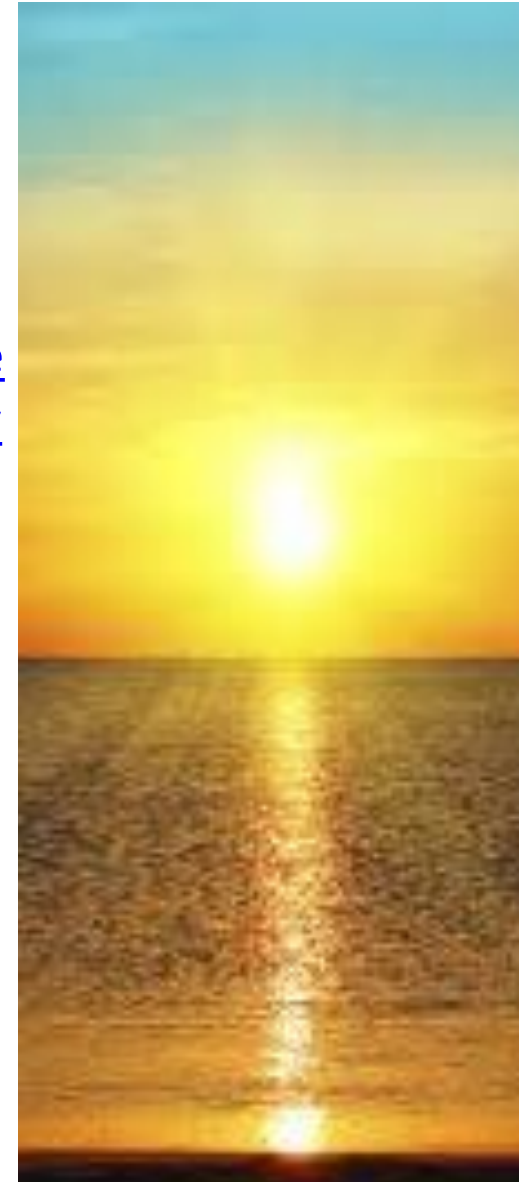
Supplementation Guidelines

- ✓ Vitamin K2
- ✓ Vitamin A
- ✓ Research drug interactions
- ✓ Limit or avoid calcium supplements with high dose vitamin D



Resources/References - 1

- ✓ <http://www.drritamarie.com/go/TrendsVitDInsufficiency>
- ✓ <http://www.drritamarie.com/go/WHFoodsVitD>
- ✓ *Vitamin D the Sunshine Vitamin*, Zoltan Rona, MD
<http://www.drritamarie.com/go/VitDSunshineVitaminRona>
- ✓ <http://www.drritamarie.com/go/DrRitamarieVitaminDVideo>
- ✓ <http://www.drritamarie.com/go/DrRitamarieSunlightDFense>
- ✓ <http://www.drritamarie.com/go/10SymptomsVitDdeficiency>
- ✓ Mercola.com “Daily Sunlight Can Keep Cancer Away”
<http://www.drritamarie.com/go/DailySunlightCancer>
- ✓ Mercola.com “Lack of Sunshine Causes One Million Deaths a Year”
<http://www.drritamarie.com/go/LackOfSunshineDeaths>
- ✓ Mercola.com “How Much Vitamin Do You Need?”
<http://www.drritamarie.com/go/HowMuchVitD>



Resources/References - 2

- ✓ Video by Dr. Joe Mercola: 1 hour video with lots of details about vitamin D
- ✓ *Annals of Epidemiology*, April 14, 2009, Dr. Cedric Garland
- ✓ *Annals of Epidemiology*, July 2009, Volume 19, Issue 7, Pages 468-483
- ✓ *Science Daily*, “New Model of Cancer Development: Low Vitamin D Levels May Have Role” May 26, 2009
- ✓ *The Journal of Steroid Biochemistry and Molecular Biology*, March 2007; 103(3-5):708-11
- ✓ *American Journal of Clinical Nutrition*, June 2007; 85(6):1586-91.
- ✓ *American Journal of Epidemiology*, October 12, 2007

