



Riordan
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UNDERSTANDING VITAMIN D3/K2



AUTHOR

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The sun sets further and further into the south every fall, leading into winter. As a result, the days get shorter, the sun's rays diminish in duration and intensity, and we begin to see D3 — "the sunshine vitamin" — blood levels drop in sun-exposed mammals. That imperceptible signal results in profound behavioral changes easily observed in foxes, bears, and many other land roaming creatures. Their activity slows while their foraging increases. They are fattening up their calorie stores for the long winter's hibernation.

With the advent of spring, the summer sun's brighter Ultraviolet B (UVB) rays once again bathe their skin and fur. D3 is synthesized from the photo-transformation of cholesterol, slowly absorbing into the bloodstream through the liver and kidneys, where it is finally converted into the activated form of vitamin D.¹ Rising levels of activated D signal renewed growth, heightened metabolic activity, better immunity, sharpened reproductive instincts, and accelerated tissue repair and regeneration. Rising vitamin D levels have been synonymous with health, healing, and vitality in our mammalian relatives for millions of years.

Vitamin D and Rickets Prevention

By contrast, medical school teaches doctors that the only role of vitamin D is to prevent rickets, a softening and weakening of bones in children, usually due to inadequate vitamin D levels. Thus, the medical standard for fat-soluble vitamin D in children is limited to 400 IU (International Units) per day; for adults it is 600 IU.² This low dose is premised on an unfounded fear that excessive intakes of fat-soluble vitamin D could cause the build-up of calcium in the body's fatty tissues, medically referred to as hypercalcinosis. Hypercalcinosis results in the formation of kidney stones, calcified arteries, calcium in breast tissues, and other manifestations of excessive calcium in the urine, blood, and body tissues.³ That fact sheds a whole new light on why many "old school" vitamin D researchers are wary of patients getting carried away with their ultra-high doses of vitamin D3. Keep in mind that a medical prescription for vitamin D buys you a very high dose (50,000 IU) of D2, which can cause calcium build-up.⁴



Riordan Clinic is a world-renowned, academic medical center that has led the world in integrative oncology and complex chronic illness care since 1975. The Riordan Clinic was established as a 501 (c)(3) non-profit organization with missions in research, provider education, and patient education. The Health Hunter newsletter has been published since 1986 as an educational resource to providers and patients.

Continued on pages 2 & 3

Is Vitamin D3 Toxic?

Though relatively rare, toxicity and sensitivity issues can arise in the human consumption of both vitamin D2 and vitamin D3. Of the two, D3 is the safest, which allows it to be sold over the counter. Vitamin D toxicity and, more importantly, deficiency can be avoided by having your 25(OH)D level measured once a year and keeping it around 60 -100 ng/mL for optimal health.

Keep in mind that we evolved from primitive, naked humans who lived near the equator and who, like swimming pool lifeguards, regularly synthesized around 10,000 IU of D3 daily from the sun.⁵ A noted Canadian vitamin D researcher, Dr. Reinhold Vieth, has studied the question of D3 toxicity extensively and states categorically that there exists no published evidence for toxicity in adults taking 10,000 IU of a daily D3 supplement.⁶ Children can safely take around 1,000 IU for every 25 pounds of body weight.⁷

Health Conditions Impacted by Vitamin D Levels

One hundred twenty-five health conditions are carefully linked to vitamin D research and other publications. For example, more than 850 links to research⁸ show that vitamin D is exceptionally beneficial in preventing COVID-19.

Here are 35 of the 125 health conditions covered by VitaminDWiki: [SCAN HERE >](#)



- Anaphylaxis
- Anemia
- Asthma
- Autism
- Breast Cancer
- Cervical Cancer
- COPD
- Colorectal Cancer
- Congestive Heart Failure
- Coronary Artery Disease
- Dental Caries
- Depression
- Endometrial Cancer
- Esophageal Cancer
- Fibromyalgia
- Gastric Cancer
- HIV and AIDS
- Hypertension
- Inflammatory Bowel Disorder
- Influenza
- Lung Cancer
- Melanoma
- Multiple Myeloma
- Multiple Sclerosis
- Osteopenia
- Ovarian Cancer
- Pancreatic Cancer
- Parkinson's Disease
- Periodontal Disease
- Pneumonia
- Preeclampsia
- Prostate Cancer
- Renal Cancer
- Sepsis and Septicemia
- Type II Diabetes

Vitamin D3 and Vitamin K2 a Fail-safe Combo

The genius of this combo begins with proper respect for D3's function of powerfully enhancing calcium absorption. While calcium is a necessary mineral for good health, a large body of recent research has shown that excessive calcium intake, especially calcium supplements, can be harmful to the body. The additional calcium must be correctly utilized, or it can show up in the wrong places and cause disease. Vitamin D alone can lead to excessive calcium uptake, tissue deposition, and interference with normal cardiac and renal function. By conscientiously using vitamin K2 in conjunction with D3, calcium is absorbed and directed toward healthy functions in the body.⁹

What Does Vitamin K2 Do?

Vitamin K activates several essential proteins in the body. Henrick Dam, a Danish researcher, discovered vitamin K in



1939 (and won the Nobel Prize for his discovery in 1943). Because the Danish word for blood clotting was koagulation, Dam named the molecule vitamin K. Vitamin K1 is essential for the functioning of thirteen proteins involved in blood clotting.¹⁰

Vitamin K2 has another role to play. It will gather excessive calcium in the bloodstream and deposit it in your bones and teeth, which can aid in the prevention of coronary and carotid artery calcification.¹¹ This explains the 50+% reduction in heart disease in regular vitamin K2 users.¹² The same protein may also prevent bone spurs and calcium deposits in breast tissue and reduce the risk of osteoporosis and dental caries. Vitamin K2 is thus helping us age better with "hard bones and soft arteries," ... not the other way around.

Finally, like vitamin D3, strong evidence demonstrates vitamin K's fantastic ability to reduce cancer risk.¹³ For example, men taking vitamin K2 mk7 (a naturally occurring longer-acting form of K2) at 45 mcg a day can reduce their risk of prostate cancer by 60%!¹⁴

D3/K2 - Safety First

As we explore the healing power of higher doses of vitamin D3 at the Riordan Clinic, we have found it prudent to partner the safety and effectiveness of this dynamic duo. Therefore, for every 5,000–10,000 units of D3 being recommended and tested for, we recommend 100 mcg of K2 mk7 to be sure and prevent the inappropriate calcification that higher doses of D3 alone could rarely cause.

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VITAMIN D TESTING

VITAMIN D, 25-HYDROXY

The main function of vitamin D in the body deals with calcium absorption, transport, deposition, and metabolism. Decreased levels can result in symptoms involving disturbed calcium use, nerve and muscle impairment, soft or fragile bones, or if severe enough, in the classic disease called rickets. An excellent source of vitamin D is sunshine on the skin, 15 to 20 minutes a day. Other sources of vitamin D are butter, eggs, milk, cod liver oil, and cold-water fish.



Hover your phone camera over the QR code to find more information about the Vitamin D Test.



PATIENT STORIES

Back on Track with Energy

“At age 67, I found myself going downhill energy wise. Go to bed tired, get up tired. My doctor wanted me on a statin for high cholesterol and kept saying I was sick because of my sleep apnea. Started treatment at Riordan Clinic when tests showed my levels needed attention. No Vitamin C in my body, and low magnesium. Now 3 months into tests of IV Vitamin C and supplements, I am back on track with energy.” - Pam

Treatment with a Plan

“After 3 years of suffering without a treatment plan from any of her doctor’s my wife Ana saw Dr. Ron and he was able to find her core issues and put together a simple supplement program to treat those issues. Ana is already feeling so much better and most of her symptoms have dissipated, if not completely disappeared, on the path to a complete recovery. It is amazing what can be accomplished when you seek out and find the right experts to work a problem. Thank you!! Thank you!!! Thank you!!!!” - Warren

NUTRIENTS OPTIMIZE VITAMIN D



AUTHOR

Laura Vasquez, MSN, APRN, NP-C



You have probably realized the importance of vitamin D for achieving your best health. So, let's discuss the relationship between vitamin D and other nutrients, how you can enhance and monitor your vitamin D levels, and the various forms of vitamin D available to you.

What Nutrients Work with Vitamin D?¹

Nearly all micronutrients are interconnected, working synergistically to maintain the delicate balance between health and disease. In addition, these nutrients depend on each other for absorption and the chemical reactions necessary to change food into energy. Therefore, ensuring adequate levels of all components will enhance the beneficial effects of vitamin D.

Calcium. Vitamin D helps improve calcium absorption in the GI tract and regulates calcium levels in the blood. Both nutrients play a significant role in maintaining bone density.

Vitamin K2. This micronutrient may not always get the spotlight, but it plays a vital role in calcium and vitamin D for bone health. Vitamin K2 turns on enzymes that activate vitamin D proteins, to bind to calcium and transport that calcium to bones versus the soft tissues.

Magnesium and vitamin D also work cohesively to enhance one another. Vitamin D assists with magnesium absorption in the gut, and magnesium increases vitamin D receptors in the cells allowing more vitamin D to be activated.

Zinc and vitamin D are powerful protectors of our immune system as vitamin D aids in zinc absorption, and zinc activates vitamin D receptors in cells.

Boron is a mineral that turns on enzymes that make vitamin D, improve magnesium absorption, and decrease calcium loss from the bones.

Selenium increases vitamin D levels in the cells, while vitamin D activates selenium's effects on endothelial tissue, decreasing inflammation in the arterial walls. They also work together to reduce overall inflammation in the body.

What is the Right Blood Level for Optimal Vitamin D Function?

Knowing your vitamin D level and basing your optimal dose on your personal health history is imperative. The National Institutes of Health (NIH) list a general reference for vitamin D levels stating <12 ng/mL is a deficiency, 12 to <20 ng/mL is considered inadequate for overall health and bone health in healthy individuals, >20-50 is generally considered adequate for bone and overall health.² Multiple research studies show the importance of keeping vitamin D levels higher than adequate. Maintaining vitamin D levels above 30 ng/mL improves muscle strength, immune health, and has many anti-inflammatory components. If you can double your vitamin D level to 60 ng/mL, you may prevent cancer by up to 80%.³ Patients with prior or active cancer and autoimmune conditions may benefit from even suprathreshold levels ranging from 80-100 ng/mL, which stimulates the immune system and decreases inflammation.

What is the Right Form of Vitamin D?

Most people believe they will achieve adequate vitamin D levels by synthesizing it naturally from the sun's UVB rays. However, many factors determine how much vitamin D your body will make from the sun, including length of the day, time of year, clouds, individual melanin content, and wearing sunscreen.² Older and darker-skinned individuals may not absorb as much vitamin D from the sunlight.² People living in northern climates usually show an average vitamin D level in the low 30s. Therefore, they cannot absorb enough from only UVB light and will need to increase dietary sources and supplementation to boost and maintain optimal levels.

Dietary sources high in vitamin D include fish (cod, trout, tuna, sardines, salmon), fortified dairy and non-dairy milk, eggs, and mushrooms.² Supplement forms include intramuscular injection for higher doses to quickly increase your vitamin D levels. The oral forms include liquid and capsules, most commonly used as a daily dose of vitamin D. Liquid forms may be better absorbed than capsules. It is also recommended to take your vitamin D supplement with a meal since it is a fat-soluble vitamin. Dosages will vary depending on your current blood level but may range from 1,000 IU to 10,000 IU daily.²

As we have reviewed, it is not as simple as sitting in the sun or taking a dose of vitamin D to achieve your goal vitamin D level. Many factors contribute to achieving, activating, and ensuring optimal levels. The best practice is to regularly check your nutrient and mineral levels through lab testing, learn your personalized range for dosing, and establish adequate vitamin D intake daily.

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VITAMIN D IS ESSENTIAL FOR BONE HEALTH



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Vitamin D is often referred to as the "sunshine vitamin" because the body produces it when the skin is exposed to UVB rays from sunlight. It triggers the synthesis of vitamin D3 in the body. UVB rays convert a steroid in the skin called 7-dehydrocholesterol into vitamin D3.¹ Vitamin D2 is a vitamin we eat while D3 is a hormone produced by our bodies. Vitamin D is one of four fat-soluble vitamins the body needs. A fat-soluble vitamin can be dissolved in fats and oils, absorbed with fats in the diet, and stored in fat tissue in the body.² Vitamin D3 helps control how much calcium and phosphate you absorb from food. Calcium is essential for bone health. Phosphate is needed for healthy bones, teeth, muscles, nerves, and basic bodily functions.³ Vitamin D comes in two forms: Vitamin D2 (Ergocalciferol), which is naturally found in some plants, and Vitamin D3 (Cholecalciferol) in animals and fish.⁴ D3 is the preferred supplement form.⁵



There are only a few foods naturally rich in D3. The best sources of vitamin D3 are fatty fish and fish liver oils. Small amounts of D3 can also be found in cheese, beef liver, and egg yolks.⁶ In addition, the Food and Drug Administration (FDA) recommends dairy products and cereals to be fortified with vitamin D.⁶ Examples of foods high in D3 are salmon, swordfish, tuna, sardines, and cod liver oil.⁶

Virtually every organ system of the body has receptor sites for the utilization of D3.⁷

Vitamin D Has Been Shown To:

- Reduce inflammation.
- Strengthen bones and builds stronger muscles.
- Boost immunity and helps the immune system fight viral invasion and bacterial infections.
- Support autoimmune conditions such as rheumatoid arthritis, psoriasis, and Hashimoto's thyroiditis.
- Improve heart function by strengthening the heart muscle and keeping arteries flexible and relaxed.
- Improve mood by lessening depressive feelings.



Two medical conditions resulting from prolonged vitamin D deficiency are rickets and osteomalacia. Rickets is a condition in infants and children of soft bones and skeletal deformities caused by the failure of bone tissue to harden. Osteomalacia is a condition in adults of weak and softened bones that can be reversed with D3 supplementation.⁸



The FDA's Recommended Dietary Allowance of vitamin D3 for adults 19 years and older is 600 IU daily for men and women and adults over 70, 800 IU daily.⁹ The FDA Tolerable Upper Intake Level of D3 for children ages 9+ and adults is 4,000 IU.⁹

The reference range for 25 HydroxyD3 at Quest¹⁰ and LabCorp,¹¹ the two largest labs in the country, is 30 to 100 ng/ml. Riordan Clinic Bio-Center Laboratory reference range is 40 to 80 ng/ml. Achieving a level of 70 or above is considered optimal.

Most new patients at Riordan Clinic have low reference range levels or are deficient in D3 unless they are on supplementation. Patients with a D3 level in the low to mid reference range are recommended to start 5,000 IU D3/K2 daily. For overtly deficient patients, the recommendation is 10,000 IU D3/K2 daily. After three months, a recheck of the blood level is recommended to achieve the target goal.

Vitamin D3 is one of five nutrients comprising my top five supplements supporting health and longevity. It is easy to achieve a functional vitamin D level through well-tolerated supplementation. It should be a part of everyone's supplement program. The payback is significant, and the cost and effort is minimal. If you are not currently taking D3, start today!

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Vitamin D3/K2



How do Vitamin D3/K2 Capsules aid your health?

The super combo of D3 and K2 ultimately promotes bone health, supports cardiovascular health and blood sugar balance, boosts immune function and supports blood circulation. Vitamin D3's natural partner is Vitamin K2. The genius of this combo begins with proper respect for D3's function of powerfully enhancing calcium absorption.



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Riordan Clinic
NUTRIENT STORE



Watermelon Feta Salad

INGREDIENTS

- 8 cups cubed ripe seedless watermelon (5 pounds or 1/2 medium watermelon)
- 1 Tbsp olive oil
- 2 oz feta cheese, crumbled
- 4 basil or 6 mint leaves, minced
- Lemon zest (optional)
- 1 pinch kosher salt, for garnish
- Fresh ground black pepper (optional)

COOKING INSTRUCTIONS

1. Chop the watermelon and arrange it on a platter. Drizzle with olive oil. Sprinkle with feta crumbles, basil or mint, and kosher salt. Add lemon zest or black pepper if desired.
2. Serve immediately. If making ahead, refrigerate the cubed watermelon separately: it releases a large amount of water after it is cut. Then assemble the salad right before serving. Leftovers store for up to 2 days.

FAQ

HAVE QUESTIONS ABOUT THE CLINIC?

WE HAVE ANSWERS. JUST SCAN THE QR CODE TO VISIT OUR FREQUENTLY ASKED QUESTIONS WEBPAGE FOR ANSWERS TO OUR MOST COMMON QUESTIONS.



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Kelsey Webb
Editor

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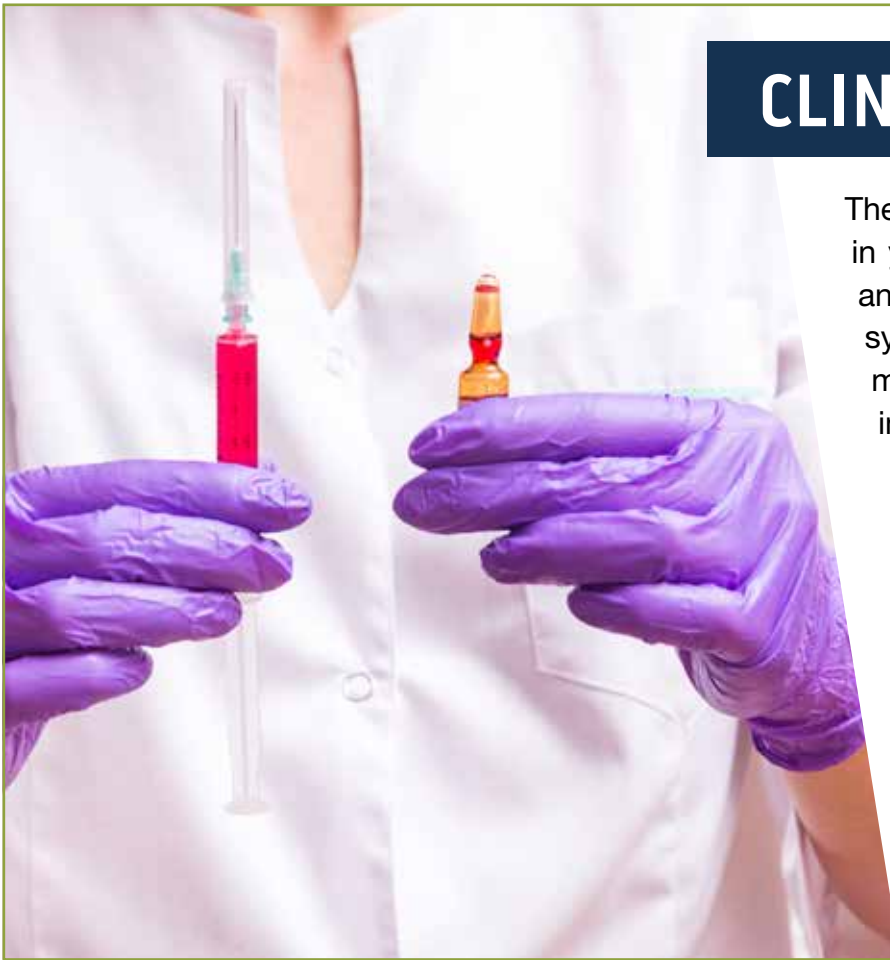
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CLINIC: B12 INJECTIONS

The optimal way to get vitamins and minerals in your diet is by eating a wide range of fruit and vegetables. If you still experience symptoms such as fatigue, muscle pain, memory fog and low energy, nutrient injections may be beneficial to you.

Benefits of Nutrient Injections

- Better absorption than oral supplements
- Achieve optimal nutrient levels quickly
- Improve energy levels
- Muscle pain relief



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EPISODE 33 CRYOABLATION

Dr. Jeanne Stryker, MD, DABR

In this episode, host Dr. Lucas Tims, ND, FABNO, welcomes Dr. Jeanne N. Stryker, MD, DABR. Dr. Stryker specializes in Cryoablation, Embolization, and Immunotherapy. This episode focuses on what Cryoablation is and how it is used to treat cancer. Dr. Lucas and Dr. Stryker also discuss how the future standard of care for personalized individuals is working in collaboration with Naturopathic Doctors, Integrative MDs, and DOs to help heal patients diagnosed with cancer from all angles.



EPISODE 32 DR. V - MY BREAST CANCER JOURNEYS

Dr. Véronique Desaulniers

In this episode, Dr. Ron Hunninghake, MD, welcomes back Breast Cancer Conqueror, Dr. Véronique Desaulniers, or as many people know her, Dr. V. Dr. V first began her journey with breast cancer after she found a lump in her left breast in 2004. She chose to take the road less traveled and explored natural treatments. Having celebrated victory over breast cancer twice, she has become extremely passionate about teaching women how to properly conduct a breast self-exam.

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