# POWER OF VITAMIN D

New Scientific Research Links Vitamin D Deficiency to
Cancer
Heart Disease
Diabetes
High Blood Pressure
Kidney Disease
Fibromyalgia
Chronic Fatigue
Osteoporosis
Arthritis
Lupus, M.S.
Asthma
Thyroid Diseases
Dental Problems
Depression

**Learn How You Can Reap The Miraculous Health Benefits Of Vitamin D!**

**Sarfraz Zaidi, MD**

**Power of Vitamin D**
New Scientific Research Links Vitamin D Deficiency to Cancer, Heart Disease, Diabetes, High Blood Pressure, Kidney Disease, Fibromyalgia, Chronic Fatigue, Osteoporosis, Arthritis, Lupus, M.S., Asthma, Thyroid Diseases, Dental Problems and Depression.

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# Introduction

For years, Evelyn suffered from body aches and pains as well as lack of energy. She consulted several physicians. One specialist gave her the diagnosis of Fibromyalgia. Another physician told her she had Chronic Fatigue Syndrome. Someone else told her, "It's all in your head." She was told to just live with it.

This advice didn't satisfy Evelyn. "There has to be a better answer," she said to one of her coworkers, who happened to be my patient and had been on the same dreadful road herself until she consulted me. She told Evelyn that her body aches, pains and chronic fatigue had vanished after she finally got the right diagnosis and treatment. Evelyn immediately made an appointment to see me.

"You're my last hope, Doc," Evelyn said during her visit. I could sense utter frustration in her voice. I tested her vitamin D level which turned out to be very low. With proper treatment of vitamin D deficiency, Evelyn was relieved of her symptoms in just three months.

I see patients like Evelyn every day in my practice. What amazes me is that physicians run numerous expensive and complicated tests, but don't think to order the one simple test that could clinch the diagnosis. Sad!

Here's the plain truth. Most physicians don't have adequate knowledge about vitamin D deficiency and its serious consequences. What little they do know about vitamin D deficiency is based on outdated and inaccurate data.

My own journey to "enlightenment about vitamin D" started about ten years ago. I vividly remember the day at a medical conference in the Boston area when an old professor gave an amazing talk about vitamin D deficiency. Not only are humans affected, he brilliantly explained, but even animals can develop vitamin D deficiency and its awful complications. For example, in nature, iguanas spend most of the day sun bathing. In captivity however, they can develop severe deficiency of vitamin D and consequently, their back bones melt away.

This lecture definitely left a mark on me. Like most other doctors, I was taught that vitamin D deficiency occurs primarily in older folks, people living in cold, northern areas and patients on kidney dialysis. However, the professor made it very clear that it is quite prevalent in young active people, as well.

On my flight home, I kept thinking about it. I wondered, "What about people living in warm, sunny places like my hometown in southern California? Are they low in vitamin D?" I was taught that people living in sunny places like California and Florida don't develop vitamin D deficiency. Like a true scientist, I wanted to figure it out myself.

I decided to start checking vitamin D levels in my patients. Was I in for a big surprise! Almost 90% of my patients were low in vitamin D. Most of my patients are active people. They are often involved in all sorts of outdoor activities over the weekends. They are proactive in taking care of their health. They take multivitamins, calcium and vitamin D. They are not elderly shut-ins or kidney dialysis patients. And they live in weather charmed, sunny Southern California.

I started to give my vitamin D deficient patients a dose of vitamin D higher than the recommended dose, while closely monitoring them for vitamin D toxicity. I checked their vitamin D level periodically and adjusted the dose of

vitamin D accordingly. I was surprised to find that most people required about five to ten times the recommended dose to achieve a good level of vitamin D.

With proper replacement of vitamin D, I started seeing some amazing results in my patients. Body aches and pains simply disappeared. People who were tired all the time and didn't want to do much made a U-turn. Now they had plenty of energy to participate in their favorite activities. Women with osteoporosis did very well. Their bone density got better and fractures were rare. Diabetics achieved excellent control of their blood sugars. Diabetics are at particularly high risk for heart disease, stroke and cancer, but in my patients, these medical catastrophes were rare occurrences. Patients with thyroid disease felt much better.

I'm not attributing all these great results simply to vitamin D replacement because I have developed my own effective strategies in treating diabetes and thyroid diseases. However, proper vitamin D replacement has been a significant factor in achieving these great results.

In the last few years, many researchers have done excellent work in the field of vitamin D and their findings are in line with my own clinical experience. The relationship of vitamin D deficiency to bone pains, osteoporosis, immune disorders, heart disease, high blood pressure, depression and cancer is well established now. There is also strong evidence to support that vitamin D deficiency may play a significant role in the development of diabetes.

Over the last ten years, my patients have benefited from my strategy of diagnosing and treating vitamin D deficiency. It's time to spread this important knowledge. That's why I decided to write this book.

# Chapter 1

## Why is Vitamin D important?

In the last 20 years, there has been tremendous research in the field of vitamin D. The findings are astounding! We now know that vitamin D affects almost every organ system in the body.

***We now know that***:

1. Vitamin D plays a vital role in the health of *muscles and bones*. It not only helps in the absorption of calcium and phosphorus from the intestines, but it also exerts a direct effect on the muscles and bones. Therefore, vitamin D can prevent as well as treat muscle aches, bone pains, chronic fatigue and osteoporosis.
2. Vitamin D plays a vital role in the normal functioning of the *immune system*. Therefore, vitamin D can prevent as well as treat immune disorders such as asthma, rheumatoid arthritis, Type 1 diabetes, Hashimoto's thyroiditis, Graves' disease, Crohn's disease and Multiple Sclerosis (MS). By boosting up your immunity, it can also protect you against infections such as common colds and tuberculosis. By boosting the immune system, Vitamin D can prevent as well as treat common colds, flu and other infections.
3. Vitamin D controls the growth of normal as well as *cancerous cells*. Hence, vitamin D can play an important role in the prevention as well as treatment of various cancers especially cancer of the colon, prostate, pancreas and breast.
4. Vitamin D stimulates the production of *insulin* from insulin - producing cells in the pancreas. It also reduces *insulin resistance*. Therefore, vitamin D can help in the prevention as well as treatment of Type 2 diabetes.
5. Vitamin D inhibits the Renin Angiotensin Aldosterone System (RAAS). Renin is a chemical normally produced in the body. It leads to the production of another chemical, called Angiotensin which is responsible for maintaining your blood pressure. Angiotensin also causes release of another chemical called Aldosterone, which is also involved in maintaining your blood pressure. Together, this system of inter-related chemicals is called Renin Angiotensin Aldosterone System (RAAS). If RAAS becomes overactive, it causes high blood pressure (hypertension), kidney disease and heart failure. Now consider this: *Vitamin D inhibits RAAS*, and therefore, it can prevent *hypertension, kidney disease and heart failure*.

6. Vitamin D can prevent *coronary heart disease* through a number of mechanisms which include inhibition of RAAS, reduction in insulin resistance and reduction of inflammation in the blood vessel wall.
7. Vitamin D affects the normal function of the skin and therefore can be helpful in the treatment of skin disorders such as *Psoriasis*.
8. Vitamin D affects the health of the teeth and therefore can play an important role in preventing many dental problems.
9. Vitamin D affects one's mood and therefore can play an important role in the prevention and treatment of mood disorders such as *depression*.

Isn't it obvious that vitamin D plays a crucial role in maintaining our health? It's a breakthrough discovery! Now we can truly prevent and treat a number of diseases through proper vitamin D supplementation.

**"Why hasn't my Doctor told me about all the beneficial effects of Vitamin D?"**

Unfortunately, this exciting new knowledge hasn't reached the radar screen of most physicians, nor has it reached the curriculum of medical schools. Why? Because no drug company is behind it. It's not a drug. It's cheap and you can obtain it over the counter. Unfortunately, most of our medical research, medical guidelines for practicing physicians and medical knowledge in text books is dependent upon drug companies in one way or another. Sad but true!

It may take years before this revolutionary knowledge finds its way into medical books and physician's offices. But you don't have to wait that long. Get involved in taking charge of your health. Reading this book is a step in the right direction.

In the following chapters, you'll find detailed information on:

A. The remarkable benefits of vitamin D
B. The symptoms and diseases you may have if you are low in vitamin D
C. How to accurately diagnose vitamin D deficiency
D. How to properly treat vitamin D deficiency without worrying about toxicity.

# Chapter 2

# What is Vitamin D?

Most people, including doctors, don't really understand what vitamin D truly is. Why do we have such a limited understanding about vitamin D? In order to answer this question, we need to trace the historic background of our understanding of vitamin D.

### The Long Journey to Understanding Vitamin D

Let me take you back to post-Industrial Revolution Europe in the late nineteenth century, when physicians began to notice a *new* disease among children living in big industrial cities such as London and Warsaw. These children had stunted growth, muscle wasting and deformed legs. Physicians named this new disease ***rickets***, but no one understood the cause of this crippling disease.

Now we look back and realize that these children had little exposure to sunshine. They lived in inner cities in over-crowded congested dwellings with narrow alleys. Prolonged winters as well as pollution from burning coal and wood further decreased sunrays from reaching the Earth, causing severe deficiency of vitamin D. Children were particularly affected as their developing bones suffered severely from the consequences of vitamin D deficiency. Moving like a shadow across the land, rickets erupted in Northeastern U.S. as big industrial cities popped up in this country. By 1900, approximately 80% of children living in Boston suffered from rickets.

By the 1930's, the link between rickets and vitamin D deficiency was well established. This remarkable discovery led to the fortification of milk with vitamin D. In the countries which adopted this practice of vitamin D fortification, rickets was mostly eradicated.

With the elimination of rickets, medical science mostly *forgot* about vitamin D until a few decades ago when it was discovered that <u>vitamin D is really not a vitamin, but a hormone</u>.

*What is a hormone?* A hormone is a substance that is produced in one part of the body, enters the blood stream and exerts its effects at sites distant from the original site of its production. For example, thyroid hormone is produced in the thyroid gland. It then travels through the blood stream and exerts its actions on the heart, muscle, brain and almost every other organ in the body.

## Vitamin D: a Hormone

Vitamin D is produced in the skin from 7-dehydrocholesterol (pro-vitamin D3) which is derived from cholesterol. Here is evidence that cholesterol is not all bad, contrary to what most people think these days. The fact is that cholesterol is a precursor for most hormones in your body.

Type B Ultraviolet rays (UVB) from the sun act on pro-vitamin D3 and convert it into pre-vitamin D3, which is then converted into vitamin D3. Medically speaking, we call it cholecalciferol. Vitamin D3 then leaves the skin and gets into the blood stream where it is carried on a special protein called a vitamin D-binding protein.

Through blood circulation, vitamin D3 reaches various organs in the body. In the liver, vitamin D3 undergoes a slight change in its chemical structure. At that point, it is called 25, hydroxy cholecalciferol or 25 (OH) Vitamin D3 (or calcifediol). It is then carried through the blood stream to the kidneys where it goes through another change in its chemical structure. At that point, it is called 1,25 dihydroxy cholecalciferol or 1,25 $(OH)_2$ vitamin D3 (or calcitriol). This is the active form of vitamin D. It gets in the blood stream and goes to various parts of the body and exerts its actions. That is why vitamin D is really a hormone.

With the discovery that vitamin D is a hormone, scientists found the main effect of vitamin D was on calcium and phosphorus absorption from the intestines.

It was also realized that people with kidney failure cannot convert 25 (OH) vitamin D into 1,25 $(OH)_2$ vitamin D. Therefore, people with chronic kidney failure on dialysis were placed on a synthetic supplements of 1,25 $(OH)_2$ vitamin D which is also called calcitriol. Drug companies saw an opportunity and started manufacturing calcitriol (brand name Rocaltrol). Soon, it became a standard of medical practice to prescribe calcitriol to every patient on chronic kidney dialysis. *For most physicians, this is where their knowledge of vitamin D ends.*

In the last couple of decades, researchers discovered that vitamin D is not only involved in the absorption of calcium and phosphorus from the intestines, but also plays an important role in the normal functioning of *every system* in the body, as I discussed earlier in Chapter 1.

## Hormone D Deficiency or HDD

Scientists also discovered that vitamin D deficiency is much more prevalent than was previously thought. In fact, it has reached pandemic proportions around the world. This may partly explain the pandemics of chronic fatigue, osteoporosis, heart disease, hypertension, diabetes, cancer, asthma and other immunologic diseases. Proper vitamin D supplementation can help to prevent as well as treat most of these medical diseases. Unfortunately most physicians are *not* taking vitamin D seriously. Why? One reason is that it is mistakenly called a vitamin. And physicians are trained not to take vitamins seriously. Calling a hormone a vitamin is a serious medical mistake, which unfortunately continues to propagate in this day and age. Amazing!

It's time we correct this biggest *misnomer* in the recent medical history. I am calling vitamin D deficiency as **Hormone D Deficiency or HDD**. Please join me in spreading this accurate terminology. In an attempt to educate my fellow physicians, I wrote an article in the July-August *2010* issue of *Endocrine Practice*, official journal of the American Association of Clinical Endocrinologists (1).

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# Chapter 3

## Misconceptions About Vitamin D

There are a lot of misconceptions about vitamin D. Here are some common ones I've heard:

- "I drink milk, so I can't be low in vitamin D."
- "I take a multivitamin and a calcium supplement every day, so my vitamin D should be okay."
- "I eat healthy, so my vitamin D should be fine."
- "I play tennis outdoors twice a week. How can I be low in vitamin D?"
- "I don't want to take vitamin D because I read about vitamin D toxicity. It's quite scary."
- "I'm outdoors at least 15 minutes a day. My vitamin D should be fine."
- "I live in sunny California. How can I be low in Vitamin D?"

When people make these comments, I simply advise them to have their vitamin D level checked. They're often surprised at the results. Most people turn out to be low in Vitamin D.

Contrary to common belief, milk is a poor source of vitamin D. In the U.S., one cup of milk contains 100 I.U of vitamin D. Now imagine trying to drink about 20 cups of milk a day to get a good level of vitamin D! The usual cup of milk added to your cereal provides you with just a miniscule amount of vitamin D.

People who take multivitamins and calcium supplements are under the impression they get enough vitamin D. Not true! I check vitamin D level in my patients who are on multivitamins and calcium supplements. Almost all of them turn out to be low in vitamin D. Why?

At the root of the problem is the recommended daily dose of vitamin D, which is old and outdated. Currently, the recommended daily dose of Vitamin D is 200 - 600 I.U. (International Units). This dose of vitamin D was developed to prevent rickets, a bone disease in children.

In the last decade, scientific studies have shown that vitamin D is not only important for the health of bones, but is also vital for the health of virtually every cell in the body. However, you need a much higher dose of vitamin D than 200 - 600 I.U. a day to achieve these results.

In contrast, multivitamins and calcium supplements continue to follow the recommended daily dose. So when you read the label of a multivitamin or a calcium supplement, which claims that it meets 100% of the daily requirement for Vitamin D, you obviously assume you take the right amounts of vitamin D.

However, if you have your vitamin D level checked, you'll be in for a big surprise. Your vitamin D level will likely be low.

Sunshine is an excellent source of vitamin D. However, playing tennis or golf a couple of times a week is not enough. Neither is taking a walk 3 times a week or spending some weekends outdoors. I am amazed to see articles on vitamin D deficiency in newspapers and magazines which recommend that outdoor sun exposure for 15 minutes a day is enough to take care of your vitamin D requirement. How inaccurate!

For the last 10 years, I have checked vitamin D levels in my patients. Many of these people are active - outdoors about 30 to 60 minutes a day, playing golf or other sports two to three times a week and walking three times a week. They take multivitamins and calcium supplements containing vitamin D and yet they are still quite low in vitamin D. This is reality!

So why do people have these misconceptions about vitamin D? To answer this question, you have to answer another question. Where do people get their medical information? Usually from newspapers, magazines, TV and the internet. Unfortunately, many articles are written by people who have no real medical experience. Most of these professional writers simply gather information on vitamin D from previously published articles. In this way, inaccurate information in those previous articles simply gets recycled.

# Chapter 4

# Natural Sources of Vitamin D

Where do we get our vitamin D? A lot of people recognize that we get vitamin D from the sun: Vitamin D is the “sunshine” vitamin. But are we getting enough vitamin D from the sun?

## Sun

*The Sun is the major source of vitamin D*. How much vitamin D you get from the sun varies from person to person. There are a number of factors that determine the amount of vitamin D you can get from the sun.

**1. Geographic Location.**

Where you live determines how much vitamin D you *can* get from the sun. The farther North you live from the equator, the less is the intensity of sun rays reaching the earth. Therefore, your skin forms less vitamin D if you live in northern climates such as the North Eastern U.S., Canada and northern European countries.

**2. Season and time of the day.**

Your skin *can* form more vitamin D during summer, but less during winter. This is because fewer sun rays reach the surface of Earth during winter. Similarly, the best time for the synthesis of vitamin D is between 10 am and 3 pm.

**3. Sun Screens, Pollution, Shade, Glass Windows, Clothing**

Sunscreens, pollution, shade, glass windows and clothing all decrease the amount of UVB rays entering your skin and therefore, reduce the normal production of vitamin D by the skin. A sunscreen with a Sun Protection Factor (SPF) of 8 or more reduces the ability of the skin to form vitamin D by more than 95%. Complete cloud cover, shade and severe pollution reduce solar UVB energy by 50%.

**4. Age**

Compared to a young person, the skin of an elderly person contains much less 7-dehydrocholesterol. Therefore, the skin of an elderly person typically manufactures only about 25% of vitamin D3 as compared to the skin of a young person.

**5. Color of skin**

The color of your skin comes from a pigment in the skin called melanin. The more melanin you have, the darker your skin color. Melanin serves as a natural

sun screen and blocks sunrays from getting into deeper layers of skin. Therefore, darker skin is less efficient in synthesizing vitamin D from the sun as compared to fair skin. For example, an African American person may need more than 10 fold the time in the sun as compared to a white person in order to produce the same amount of vitamin D. However, people with darker skin are less likely to get skin cancer due to the protective effects of melanin. Nature is such an equalizer!

# Diet

*Diet is not a major source of vitamin D.* Some food items that naturally contain reasonable amounts of vitamin D include oily fish such as salmon, mackerel and blue fish. The amount of vitamin D in fish remains unchanged if it is baked, but decreases about 50% if fish is fried. Also, farm raised salmon has only about 25% of vitamin D compared to wild salmon.

Vitamin D is also present in small quantities in vegetables, meat and egg yolks. Natural milk does not contain vitamin D, but most milk in the U.S. is fortified with vitamin D and therefore, contains small amounts of vitamin D. Vitamin D is also added in small amounts in dairy products such as cheese and some yogurts.

Most cereals in the U.S. are also fortified with small amounts of vitamin D. Orange juice is also fortified with small amount of vitamin D.

**The following food items are supposed to contain the indicated amount of vitamin D:**

| | |
|---|---|
| • Salmon, cooked (3.5 ounces) | 360, I.U. |
| • Mackerel, cooked (3.5 ounces) | 345, I.U. |
| • Canned Tuna (3.0 ounces) | 200, I.U. |
| • Sardines canned in oil, drained (1.75 ounces) | 250, I.U. |
| • Raw Shiitake Mushrooms (10 ounces) | 76, I.U. |
| • Fortified Milk, one cup (8 ounces or 240 ml) | 100, I.U. |
| • Fortified Orange Juice, one cup (8 ounces or 240 ml) | 100, I.U. |
| • Fortified Cereal, | 40-80 I.U. per serving. |
| • Egg, 1 whole (vitamin D is found in the yolk) | 20, I.U. |
| • Liver of beef, cooked (3.5 ounces) | 15, I.U. |
| • Swiss cheese (1 ounce) | 12, I.U. |

* I.U. = International Units

A word of caution! You can't rely on the stated quantities of vitamin D on food labels. In one study (1), researchers found that vitamin D in milk was less than 80% of the stated amount. The vitamin D content of fish is highly variable.

## Vitamin D3 versus Vitamin D2

Natural vitamin D comes in two forms: vitamin D3 and vitamin D2. The proper chemical name for vitamin D3 is cholecalciferol and vitamin D2 is ergocalciferol. Vitamin D from the sun and fatty fish is vitamin D3 (cholecalciferol) and the one from vegetables is Vitamin D2(ergocalciferol).

Over the counter vitamin supplements are mostly vitamin D3. A prescription form of vitamin D has been vitamin D2 which comes in a large dose of 50,000 I.U. Recently, vitamin D3 has also become available in a high dose of 50,000 I.U.

Some studies (2) have suggested that vitamin D3 is superior to Vitamin D2, but a recent study (3) suggested that vitamin D2 is as good as vitamin D3.

In my clinical practice, I find both vitamin D3 and vitamin D2 to be effective. I primarily use vitamin D3 in most patients who are mild to moderately low in vitamin D. I have been using vitamin D2 in those patients who are severely deficient in vitamin D and need heavy doses to build up their vitamin D stores. After building up stores of vitamin D, I switch them from vitamin D2 to vitamin D3. Now that vitamin D3 is available in large doses of 50,000 I.U., I will start using it even in severe cases of vitamin D deficiency.

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# Chapter 5

# An Epidemic of Vitamin D Deficiency

Believe it or not, there's an epidemic of vitamin D deficiency! Ten years ago, I started investigating vitamin D levels in my patients. To my surprise, the vast majority turned out to be low in Vitamin D. My experience is in line with other researchers. For example, researchers recently analyzed the data on vitamin D status in the U.S. adult population from the 2000-2004 National Health and Nutrition Examination Survey (NHANES) (1). They were amazed to discover that 50-78% of Americans were low in vitamin D. What's alarming is that the situation is getting worse. Vitamin D levels in Americans were found to be lower during the 2000-2004 period compared to the 1988-1994 period (2). Clearly vitamin D deficiency is getting out of control.