Breakthrough Updates You Need to Know on Vitamin D

The compound we call vitamin D can no longer properly be considered a vitamin. For most mammals, it is not in any sense even a nutrient. Nevertheless, vitamin D resembles true vitamins inasmuch as humans -- who are cut off from the critical solar ultraviolet wavelengths by reason of latitude, clothing, or shelter -- depend on an external source of the substance, just as they do for the true essential nutrients.

What is Vitamin D?

Vitamin D, calciferol, is a fat-soluble vitamin. It is found in food, but also can be made in your body after exposure to ultraviolet rays from the sun. Vitamin D exists in several forms, each with a different activity. Some forms are relatively inactive in the body, and have limited ability to function as a vitamin. The liver and kidney help convert vitamin D to its active hormone form.

The major biologic function of vitamin D is to maintain normal blood levels of calcium and phosphorus. Vitamin D aids in the absorption of calcium, helping to form and maintain strong bones. It promotes bone mineralization in concert with a number of other vitamins, minerals, and hormones.

Without vitamin D, bones can become thin, brittle, soft, or misshapen. Vitamin D prevents rickets in children and osteomalacia in adults, which are skeletal diseases that result in defects that weaken bones.

What are the sources of vitamin D?

Food sources

Fortified foods are the major dietary sources of vitamin D. Prior to the fortification of milk products in the 1930s, rickets (a bone disease seen in children) was a major public health problem in the United States. Milk in the United States is fortified with **10 micrograms (400 IU) of vitamin D per quart,** and rickets is now uncommon in the US.

Exposure to sunlight

Exposure to sunlight is an important source of vitamin D. Ultraviolet (UV) rays from sunlight trigger vitamin D synthesis in the skin.

Season, latitude, time of day, cloud cover, smog, and suncreens affect UV ray exposure. For example, in Boston the average amount of sunlight is insufficient to produce significant vitamin D synthesis in the skin from November through February.

Sunscreens with a sun protection factor of 8 or greater will block UV rays that produce vitamin D.

Vitamin D supplements are often recommended for exclusively breast-fed infants because human milk may not contain adequate vitamin D.

Vitamin D and Bone Health

Diabetes

Vitamin D deficiency has been associated with insulin deficiency and insulin resistance. (1-3) In fact, last year it was shown that vitamin D deficiency is likely to be a major factor for the development of type one diabetes in children. (4)

Heart Disease

Insulin resistance is also one of the major factors not only leading to the cancers mentioned above, but also to the number one killer in the US, heart disease. Northern countries have higher levels of heart disease and more heart attacks occur in the winter months. (5,6)

Arthritis

Progression of degenerative arthritis of the knee and hip is faster in people with lower vitamin D concentrations (33-34)

Infertility and PMS

Infertility is associated with low vitamin D(7), and PMS has been completely reversed by addition of calcium, magnesium and vitamin D.(8)

Fatigue, Depression and Seasonal Affective Disorder

Activated vitamin D in the adrenal gland regulates tyrosine hydroxylase, the rate limiting enzyme necessary for the production of dopamine, epinephrine and norepinephrine.

Low vitamin D may contribute to chronic fatigue and depression. (9-10) Seasonal Affective Disorder has been treated successfully with vitamin D. In a recent study covering 30 days of treatment comparing Vitamin D and 2 hour daily use of 'light boxes', depression completely resolved in the D group, but not in the light box group.(11)

Autoimmune Disorders

Multiple Sclerosis, (12) Sjogren's Syndrome, rheumatoid arthritis, thyroiditis and Crohn's disease have all been linked with low vitamin D levels.

Single, infrequent, intense, skin exposure to UV-B light suppresses the immune system and causes harm.

However chronic low-level exposure normalizes immune function and enhances immune cell production. This reduces abnormal inflammatory responses such as found in autoimmune disorders, and reducing occurrences of infectious disease. (14-18)

Obesity

Vitamin D deficiency has been linked with obesity. (18, 19) Vitamin D has recently been shown to lower leptin secretion. (20) Leptin is a hormone produced by fat cells and is involved in weight regulation. It is thought that the hormone signals the brain when fat cells are "full," but exactly how the hormone controls weight is not entirely clear.

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VITAMIN D SUPPLEMENTATION IN THE FIGHT AGAINST MULTIPLE SCLEROSIS

Ashton F. Embry

INTRODUCTION

Many different supplements are recommended for people with MS and it is worthwhile to examine the science and logic behind any given supplement recommendation. Vitamin D, the sunshine vitamin, is not often strongly advocated for MS, although small dosages (~200-400 IU) are usually part of a total vitamin recommendation. I have recently read a number of papers on the relationship between vitamin D and MS and the best summary of this topic is by Hayes et al (1997). This information has convinced me that persons with MS could possibly significantly benefit from a substantially higher supplementation of vitamin D than is currently proposed in various self help books (e.g. Graham, 1989) or suggested by clinicians.

In this essay I will present a brief discussion of vitamin D and follow that with the scientific evidence which supports the concept that vitamin D likely plays an important role in controlling autoimmunity and MS. Such evidence consists of epidemiological data, animal experiments, immunological analyses, genetics and the results of small clinical trials which used vitamin D or a metabolite as the therapeutic agent. When all the data are considered as a whole, it becomes apparent that adequate supplementation of vitamin D may well be beneficial and, given the very low cost and safety of such a therapy, persons with MS might want to make sure they are receiving sufficient amounts each day.

The key questions of, how much vitamin D is needed, is this amount safe and how can one best obtain this amount, are also addressed. Vitamin D is a fat- soluble vitamin and can be toxic in large dosages. Thus it is very important to examine current data in regards to vitamin D safety and reasonable sources of the vitamin. In the final part of the essay, vitamin D intake is examined in an evolutionary perspective and a summary on how vitamin D fits in the overall "Paleolithic Prescription" for MS concludes the essay.

VITAMIN D

A detailed discussion of the chemistry of vitamin D is far beyond my capabilities and the scope of this essay. For those wanting such information, DeLuca and Zierold (1998) provide a very good overview of the chemistry of vitamin D and its receptor. A few points are worth mentioning to help one gain an appreciation of what vitamin D is, how it is activated in the body, and the role it plays in health and illness. The primary source of this nutrient is not from diet but rather from a chemical photolysis reaction in the skin. When UV light from the sun penetrates the epidermis, it is absorbed by a metabolite of cholesterol (7-dehyrocholestrol) which is then converted into vitamin D (calciferol). Notably Vitamin D is biologically inert and is metabolized in the liver to produce 25 (OH)D (calcidiol) which is the main form of circulating vitamin D. Although this substance is also inactive, its concentration in the blood provides a good assessment of a person's vitamin D level and the relationship of various levels of 25(OH)D to health will be discussed later. The final step in the vitamin D story is that 25(OH)D is converted to an active hormone, 1,25(OH)2D (calcitriol), in the kidneys.

The main role of vitamin D, through the actions of its metabolized hormone, calcitriol, is to regulate the amount of calcium and phosphorous in circulation. In this way it has a major impact on bone growth or lack thereof (rickets, osteoporosis) and, when most people think of vitamin D, they think of it in this context. When calcium levels are low (usually due to insufficient vitamin D and

5. Inhibits the production of NO (nitric oxide) by immune cells (Garrion et al, 1997). NO has been identified as one of the most destructive products of the immune system and is an important factor in demyelination.
6. Inhibits the proliferation of activated and memory T cells (Muller and Bendtzen, 1992). Such cells are the main mediators of the inflammatory autoimmune reactions of MS.
7. Exerts immunomodulating effects in the CNS by inducing a profound downregulation of antigen expression by both infiltrating and resident antigen presenting cells (e.g. macrophages) (Nataf et al, 1996).

In summary, vitamin D hormone has numerous effects on the immune system and acts within the CNS. All of these effects have the combined result of significantly reducing inflammatory autoimmune reactions from occurring and they readily explain why vitamin D hormone is so effective in suppressing a variety of animal autoimmune diseases including EAE (animal MS) (Hayes et al, 1997).

On the basis of the impressive immunomodulating effects of vitamin D, Schwartz (1993) hypothesized that the well established reduction of MS attacks during pregnancy and their increased occurrence following pregnancy was due in part or whole to the natural large increases in production of vitamin D hormone during pregnancy and its rapid decline afterwards. Such a hypothesis seems very plausible and hopefully will be followed up.

Genetic data also implicate vitamin D in MS and Fukazawa et al (1999) demonstrated an association between vitamin D receptor genes and MS.

Vitamin D has been used as a therapeutic agent in only a few small clinical trials. Notably Goldberg helped to organize a small trial in the early 80s (Goldberg et al, 1986). Ten subjects took 5000 IU/day of vitamin D along with about 1000mg of Ca and 600mg of Mg for two years. The subjects acted as their own controls with the exacerbation rates during the trial compared with the subjects' historical rates of exacerbation. A notable decline in exacerbation rate was noted, although the small size of the trial makes the results equivocal. Despite these results and all the scientific data showing that vitamin D would be a good therapeutic agent, no follow-up, better controlled trials have ever been done for vitamin D and MS.

v Rheumatoid Arthritis

A small clinical trial for RA and a vitamin D metabolite was recently done by Andjelkovic et al (1999) over a three-month time period. The results were positive: "Therapy showed a positive effect on disease activity in 89% of the patients (45% with complete remission and 45% with a satisfactory effect). Only two patients (11%) showed no improvement, but no new symptoms occurred". Another relevant study was a large-scale investigation of the effects of vitamin D supplementation in infants and the associated risk of type 1 diabetes (Eurodiab Study Group, 1999). This study clearly demonstrated that supplementation with vitamin D was associated with a decreased risk of type 1 diabetes.

In summary, a variety of data, from epidemiology, animal experiments, immunological investigations, genetics and small clinical trials indicates that vitamin D can have a suppressant effect on autoimmune reactions and help to slow autoimmune disease. Thus its use as a supplement by persons with MS or other similar autoimmune diseases, such as rheumatoid arthritis and Crohn's, seems warranted.

SUPPLEMENTATION AND SAFETY

The above scientific data suggest that it is important for persons with cell-mediated autoimmune diseases, including MS, to have sufficient intake of vitamin D. In this section the questions of, how much, where to get it and is it safe, are addressed. The best reference for the answers to these

changes are in part responsible for a myriad of "genetic-environmental" diseases including heart disease, stroke, type 2 diabetes and various forms of cancer. As discussed in Cordain (1999) and Cordain et al (in press), this concept can be readily applied to autoimmune diseases. In this context it is useful to examine changes in vitamin D intake during the two million year evolution of human beings and how such changes are related to the rise of MS.

Humans lived in hot climates throughout most of their development and thus they experienced a relatively large intake of vitamin D from sunlight. Natural selection would have ensured that the human genome became very compatible with such an intake, estimated to be in the range of 10000 IU a day. This would have resulted in circulating concentrations of 25(OH)D of between 100 and 140 nmol/litre which can regarded as the optimal level of vitamin D. Such a concentration supplied all the vitamin D hormone required for a variety of functions including the maintenance of a strong skeletal structure and the control of autoimmune reactions induced by foreign antigens derived mainly from infectious agents. The importance of adequate vitamin D for human health is underscored by the fact that evolution produced a very simple and seemingly fail-safe method for its attainment.

As humans migrated out of Africa into temperate areas, less sun-derived vitamin D became available and daily intakes likely fell somewhat. However, because long periods were spent outside hunting and gathering, most Paleolithic people still obtained sufficient vitamin D (>4000 IU/day) and readily maintained an adequate serum concentration of 25(OH)D throughout the year.

With the advent of agriculture about 8000 years ago and the ensuing population explosion, maintaining adequate levels of vitamin D and its metabolites started to become a problem for the first time in human history. Population pressures forced humans to migrate into even more hostile areas in terms of cold climates and low sunlight. They also tended to eat less fish and spend much more time out of the sun. Significantly, two of the main foods of agriculture have an adverse effect on the action of vitamin D. Grains, which are the number one food of agriculture, contain phytate or phytic acid which counters the action of vitamin D (Willis and Fairney, 1972). Cordain (1999) also discusses the role of grain consumption in vitamin D deficiency. Goldberg (1974a) raised this point and showed that areas where grains were grown in Norway tended to have the highest rates of MS. Notably, the only common grain with a very low phytate content is rice.

Another food introduced into the human diet by agriculture is milk. Milk may also have an adverse effect on vitamin D by affecting the vitamin D receptor on cells. Perez-Maceda et al (1991) demonstrated that part of the bovine albumin protein of milk is a molecular mimic of the vitamin D receptor. Thus an immune reaction against that milk protein can potentially result in an autoimmune reaction against the vitamin D receptor. This would significantly lower the effectiveness of vitamin D hormone to bind with a variety of cells (including immune cells) and carry out its important functions.

Our modern lifestyle has only exacerbated the problem of vitamin D deficiency and large populations now inhabit low annual sunlight areas. The consumption of fish is very low in many agricultural areas where diets are completely dominated by high phytate, gluten grains and dairy products. A dominance of indoor jobs, fears of skin cancer and the use of sunscreens have reduced exposure times to sunlight further such that, even in summer, many people do not get anywhere near the required vitamin D intake from sunlight. Thus it would appear that chronic vitamin D deficiency (<100nmol/litre of 25(OH)D) in large populations which live in low sunlight climates is a Neolithic problem and is caused by a variety of lifestyles factors which greatly differ from those of the Paleolithic when adequate vitamin D was readily obtained.

Notably persons with MS tend to be at the problematic end of the deficiency spectrum (<50 nmol/litre 25(OH)D). The reasons for this higher than normal deficiency is likely multifold and includes the tendency for persons with MS to spend less time outside doing various laborious or

most common in areas where the dietary regimen contains a dominance of pro-inflammatory food types and a paucity of anti-inflammatory nutrients. The common deficiency of vitamin D is just one of numerous Neolithic nutritional factors which, in combination with the ever present infectious agents, result in a variety of autoimmune diseases in these areas. Consequently, it is just one of a number of factors which must be reversed if one hopes to successfully combat an autoimmune disease.

As discussed above, it appears the best method of reversing vitamin D deficiency is to use a supplement of 4000 IU which will result in optimal levels of vitamin D metabolites. This in turn should result in increased suppression of autoimmune reactions precipitated by food and infectious agents and help to turn the tide against uncontrolled autoimmunity. It seems only reasonable that a person's best hope of controlling an autoimmune disease is to reverse as many of the adverse Neolithic influences, including vitamin D deficiency, as possible.

SUMMARY

An abundance of scientific evidence indicates that vitamin D deficiency is associated with MS onset and progression. Such evidence includes epidemiology which demonstrates that high prevalence rates of MS closely track areas of low intake of vitamin D. Animal experiments reveal that vitamin D hormone can suppress a variety of animal autoimmune diseases including EAE, the animal equivalent of MS. Furthermore, associated immunological studies have shown that vitamin D hormone has a number of immunomodulating functions, all of which contribute to the suppression of inflammatory autoimmune reactions. Small clinical trials have suggested that vitamin D has some efficacy in slowing autoimmune disease progression although no properly controlled trials have been conducted.

Vitamin D can be readily attained from exposure to sunlight and studies have shown that the optimal intake of vitamin D is about 4000- 6000 IU a day. This results in a circulation concentration of 25(OH)D (a vitamin D metabolite) of 100-125 nmol/litre and this level seems to be required for the proper functioning of all vitamin D-dependent systems. In colder, low sunlight areas such an intake from the sun is impossible for most of the year and it is important to use supplements to makeup the shortfall in vitamin D supply. Currently suggested supplement levels of 200-400 IU are much too low. A daily supplement of 4000 IU of vitamin D3 seems warranted for people who do not get a lot of exposure to sunlight throughout the year. This amount is well below the no observed adverse effect level which is conservatively placed at 10000 IU/day and thus such supplementation is safe for anyone who is not hypersensitive to vitamin D.

Throughout most of the two million years of human development, humans had a relatively high intake of vitamin D (~5000-10,000 IU/day) from the sun. Major environmental changes brought on by the agricultural, industrial and technological revolutions have resulted in large populations in northern climates experiencing a subclinical and chronic vitamin D deficiency and this deficiency is more pronounced in persons with MS. Vitamin D deficiency is just one of a number of nutrient-related factors which play a role in MS. Notably the dietary regimens which contain the most pro-inflammatory food types (e.g. gluten, dairy, saturated fat) and the least anti-inflammatory nutrients (vitamin D, omega 3 fats) occur in areas in which MS and other autoimmune diseases are most common. To combat MS, a person must change their lifestyle with diet revision being perhaps the most useful modification. As part of this change, it is important to ensure that sufficient vitamin D (4000 IU/day) is acquired through sun exposure and supplements.

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Vitamin D 'halves risk of cancers'

LONDON: A large daily dose of vitamin D can lower the risk of developing common cancers by as much as 50 per cent, scientists have claimed.

Researchers found that the "natural" form of the vitamin, known as D3, can sharply reduce the chances of developing breast, ovarian, colon and other cancers.

Taking 1000 international units of the vitamin daily could halve an individual's cancer risk.

Such large doses of vitamin D must be treated with caution. More than 2000 international units a day can make the body absorb too much calcium and damage the liver and kidneys.

D3 is normally produced in the skin by sunlight, but is also obtained from certain foods. Dietary sources are limited, however. A glass of milk contains only 100 international units of the vitamin.

The US researchers carried out a systematic review of 63 studies looking at the relationship between blood levels of vitamin D and cancer risk.

The papers, published worldwide between 1966 and last year, included 30 investigations of colon cancer, 13 of breast cancer, 26 of prostate cancer and seven of ovarian cancer. Analysis showed that, for at least some cancers, the vitamin D factor could not be ignored.

Cedric Garland of the University of California at San Diego, who led the review study, said: "A preponderance of evidence, from the best observational studies the medical world has to offer, gathered over 25 years, has led to the conclusion that public health action is needed."

The recommended intake of 1000 international units of vitamin D3 a day is half the safe upper limit set by the US National Academy of Sciences.

In the absence of exposure to sunshine, a beneficial level of vitamin D could be obtained from a combination of food sources and supplements, the scientists said.

"You have to work fairly hard to reach 1000 IU a day," Professor Garland said.

"Sun exposure has its own concerns and limitations. We recommend no more than 15 minutes of exposure daily over 40 per cent of the body, other than the face, which should be protected from the sun.

"Dark-skinned people, however, may need more exposure to produce adequate amounts of vitamin D, and some fair-skinned people shouldn't try to get any vitamin D from the sun."

The researchers' findings were published in the *American Journal of Public Health*.

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2007]

The common cold

Dr. John Cannell MD, who captains the Vitamin D Council, recently authored a paper which shows the winter increase in colds and flu is attributed to low seasonal vitamin D levels. Dr. Cannell cites the earlier work of R. Edgar Hope-Simpson who first proposed that variations in exposure to solar radiation explains the seasonality of influenza epidemics. [Epidemiological Infection 134: 1129-40, Dec. 2006] Dr. Cannell even has a challenge for visitors to the Vitamin D Council website. He suggests high-dose vitamin D (50,000 IU – 1.25 milligrams) be consumed for 3 days at the first sign of a cold or the flu. So far, Dr. Cannell is receiving many reports of how quickly high-dose vitamin D overpowers the common cold (this writer tried high-dose vitamin D with the first sign of sniffles this winter, and the vitamin D therapy worked rapidly both times).

How did vitamin D escape notice?

Just how vitamin D has not drawn greater attention is difficult to fathom. In winter, when vitamin D levels are low, death rates around the world rise. Winter is the season for heart attacks. The diagnosis of cancer in winter months shortens survival times. There is a decline in mood in winter months, leading to an increase in carbohydrate consumption and obesity. In older adults, low vitamin D levels are associated with mental depression. [American Journal Geriatric Psychiatry 14: 1032-40, 2006]

It's not like vitamin D hasn't been brought to center stage. Feature articles in Newsweek and US News & World Report in December of 2006 have been published. But are doctors informing their patients of the revolution underway and prescribing vitamin D? Not yet. Will they ever?

Cutting cancer rates by 30-50%, heart disease by up to 70%, may be too much of a shock now that health care is an industry that relies upon volumes of patients to treat. Prevention is anathema. Medical centers depend upon large numbers of patients to treat to pay off mortgages for building projects. Medical device and drug companies must churn high numbers not only to remain profitable, but to prop up their stock prices on Wall Street. One wonders whether modern medicine will ever let this vitamin D revolution happen? It appears health authorities have misdirected the public.

So far, there has been no response from the National Institutes of Health (NIH) regarding this breakthrough. No press conferences like the NIH typically conducts for breakthrough drugs. The reports of vitamin D's health benefits are coming from independent researchers rather than public health authorities, who are dragging their feet on this surprising development.

Sun, diet or pills?

It's difficult for most people to get optimal amounts of vitamin D. The diet, at best, will only provide a few hundred units of vitamin D. Milk is fortified with synthetic vitamin D2, which is not nearly as potent as natural D3, which is used in most dietary supplements. A glass of milk provides only 100 IU (2.5 micrograms).

Fifteen minutes of sun exposure to 40-percent of the body is suggested daily for

Shade linked to cancer

WOMEN who stay out of the sun increase their risk of developing breast cancer.

The sun-safe messages that are drummed into women may reduce their risk of skin cancer — but at the cost of increasing their risk of breast cancer.

A study published in the *American Journal of Clinical Nutrition* shows that the lower the level of vitamin D in a woman's bloodstream, the greater the risk of developing breast cancer after menopause.

Most vitamin D comes from exposure to sunlight, but in the trial it was provided by vitamin supplements. A team from Creighton University in Nebraska enrolled 1179 women, all 55 or older, who had no history of cancer. They were randomly divided into groups and given either supplements of calcium alone, calcium plus vitamin D, or a placebo, for four years.

The researchers were mainly interested in the risk of osteoporosis, but also looked at cancer risks because studies have suggested breast cancer is less common among women who live close to the equator, where sunshine is stronger.

The team found women who received the calcium and vitamin D supplements had less than half the chance of developing breast cancer than those given a placebo.

The Times

New research shows vitamin D slashes risk of cancers by 77 percent; cancer industry refuses to support cancer prevention

Friday, June 08, 2007 by: Mike Adams.

Exciting new research conducted at the Creighton University School of Medicine in Nebraska has revealed that supplementing with vitamin D and calcium can reduce your risk of cancer by an astonishing 77 percent. This includes breast cancer, colon cancer, skin cancer and other forms of cancer. This research provides strong new evidence that vitamin D is the single most effective medicine against cancer, far outpacing the benefits of any cancer drug known to modern science.

The study involved 1,179 healthy women from rural Nebraska. One group of women was given calcium (around 1500 mg daily) and vitamin D (1100 IU daily) while another group was given placebo. Over four year, the group receiving the calcium and vitamin D supplements showed a 60 percent decrease in cancers. Considering just the last three years of the study reveals an impressive 77 percent reduction in cancer due to supplementation. (The full press release of this study is included below. It provides more details about the findings.)

Note that these astonishing effects were achieved on what many

nutritionists consider to be **a low dose of vitamin D**. Exposure to sunlight, which creates even more vitamin D in the body, was not tested or considered, and the quality of the calcium supplements was likely not as high as it could have been (it was probably calcium carbonate and not high-grade calcium malate, aspartate or similar forms). What does all this mean? It means that if you take high-quality calcium supplements and get lots of natural sunlight exposure or take premium vitamin D supplements (such as those made from fish oil), **you could easily have a greater reduction than the 77 percent reduction recorded in this study**.

American Cancer Society opposes vitamin D

This research on vitamin D is such good news that the American Cancer Society, of course, had to say something against it. An ACS spokesperson, Marji McCullough, strategic director of nutritional epidemiology for the American Cancer Society, flatly stated that nobody should take supplements to prevent cancer.

If it seems surprising to you that the American Cancer Society -- which claims to be against cancer -- would dissuade people from taking supplements that slash their cancer risk by 77 percent, then you don't know much about the ACS. In my opinion, the ACS is an organization that actually *prevents prevention* and openly supports the continuation of cancer as a way to boost its power and profits. The ACS is the wealthiest non-profit in America and has very close ties to pharmaceutical companies, mammography equipment companies and other corporations that profit from cancer. Notice the name, too: It isn't the

When one studies the massive scientific documentation on tests carried out by world recognized scientists, one has to almost conclude that there has been a ***conspiracy*** to maintain the myth that vitamins and minerals can be harmful to your health. To present this information in a form that the public could understand would take several books. However, a discussion is warranted because of the importance of vitamin-D in the prevention of disease and aging, and because of the fact that, except for health stores, it basically remains off of the shelves, and when found, it is only in tiny amounts too small to be effective. Examples of such studies will be given and comments will be included where warranted for clarification.

VITAMIN-D TOXICITY

After vitamin-D was removed from the market following the toxic effects that massive doses had on seven medical students, the public, who commonly took mega doses (millions of I.U.s) daily and claimed dramatic health benefits, demanded a fair study. One of the first and largest was done by the University of Chicago medical facility, and took nine years to complete.

1. --- ***Further Studies on Intoxification With Vitamin-D*** --- I.E. Streck, M.D., H. Deutsch, A.B., C.I. Reed, PhD., H.C. Struck, PhD., College of Medicine, University of Illinois, Chicago, **Annuals of Internal Medicine**, Volume 10, Number 7, **January 1937**. (9 year study on 64 dogs and 773 people).

" Early experience with *impure preparations of vitamin-D* has lead to *a great deal of* **misunderstanding** and fear of over-dosage on the part of those who have little acquaintance with the fundamental mechanisms involved. Suffice it to say that ***most of the earlier work must be*** **disregarded.** "

" With eight exceptions, all of the 43 dogs receiving more than 20,000 I. U. per day per kilogram of body weight died spontaneously. " (between 8 and 120 days and an average of over 26 days). **Note:** this minimum dosage was equivalent to 14,545,000 I.U for a 160 pound man which is ***over* 36,000 times *the current RDA***. The maximum dosage was 500,000 I.U per kg or over 36,000,000 I.U. for a 160 pound man which is ***over* 90,000 times *the current RDA***.

" Among the 20 dogs receiving less than 20,000 units/kilogram (equivalent to 14, 545,000 I.U. for a 160 pound man), there was **no evidence of cell injury**, insignificant weight loss, very little evidence of toxic symptoms, and with the exception of two dogs that died from distemper, **all *were in good condition***. "

" From these experiments it appears that dogs may recover from extreme stages of toxicity and that whatever tissue injury occurs may be repairable. "

There were **no deaths** among the 773 human subjects whose " doses routinely given ranged upward from 200,000 I.U. total daily dose for periods ranging from seven days to ***five years***. "

" One of the authors took 3,000,000 I.U. total daily **(7,500 times *the current RDA*)** for 15 days ***without any evidence of disturbance of any kind***. "

" Both human subjects and dogs generally **survive** the administration of 20,000 I.U. per kilogram (14, 545,000 I.U for a 160 pound man) per day ***for indefinite periods* without intoxification.** "

" ***Intoxification for short periods*** **does not result in any permanent injury** that can be recognized by the methods employed in this investigation. "

" In view of the extensive experience in administration of vitamin-D to human subjects with a relatively low incidence of toxicity, and the correlation of the results of animal experiments with the observations on human subjects, we believe that **the burden of proof now rests on those who maintain the undesirability of the use of this form *(high daily doses of vitamin-D)* of therapy.**"

Shortly after this massive study (which found large dosages of vitamin-D to be both ***non-toxic*** and ***beneficial to***

health, and which was ignored by the American Medical Association) was concluded, the drug companies responded by introducing a new class of ***drugs***, such as Dalsol, Deltalin, and Drisdol. These
drugs were nothing more than vitamin-D (over 50,000 I.U) with a filler. These expensive drugs consisting of inexpensive vitamin-D were so effective that the deceived public were impressed with these ***"new drugs"***.

2. --- ***Effect of Massive Doses of Vitamin-D on Calcium and Phosphorus Metabolism*** --- Karl P. Klassen, M.D., George M. Curtis, M.D., *Archives of Internal Medicine*, Ohio State University College of Medicine, **1939**.

" An adequate intake of vitamin-D ***is essential*** for the optimal utilization of calcium and phosphorus in the normal metabolism of the human body. "

" During four three-day periods, vitamin-D was given beginning with a dose of 200,000 I.U. per day. This was increased by 200,000 I.U. during each of the two succeeding three day periods. During the last period, each patient received 1,000,000 I.U. per day (**2,500 times *the current RDA***). **None** of the patients showed signs of toxicity. During the last three days there ensued an increase in appetite and the patients had less discomfort. There was neither loss of weight nor marked change in the clinical picture. The blood pressure remained normal."

This study found that giving over ***500 times*** to ***2,500 times*** the RDA of vitamin-D, was ***not toxic***.

3. --- ***A Preliminary Report on Activated Ergosterol*** --- (*A form of High Dosage Vitamin-D in the Treatment of Chronic Arthritis),* G. Garfield Snyder, M.D., F.A.C.P., Willard H. Squires, M.D., F.A.C.P., *New York State Journal of Medicine*, **May 1, 1940**, pp 708-719.

" We started our (four year) experiment by giving only 50,000 I.U. a day. This dosage was gradually increased. Finally ***we came to the conclusion that is was fairly*** **safe** ***to start a dose of 150,000 I. U. a day (375 times the RDA).*** During

the past two years we have increased our dosage from 100,000 I.U.to a general average of 300,000 I.U. (**750 times *the current RDA***) In some instances we have gone as high as 500,000 and 600,000 I.U. In most cases this average dose of 300,000 I.U. was maintained throughout the entire period of treatment. "
"We are inclined to agree with Reed Struck and Streck that **the hazards *of toxicity in high dose vitamin-D therapy* have been greatly exaggerated.** "

" The question of relative degree of toxicity of the various vitamin-D preparations in the treatment of chronic arthritis assumes great importance in the final determination of the value of high-dosage vitamin-D. The **original technic** of irradiation of ergosterol, followed by extraction of vitamin-D by means of alcohol, **was not designed** to obtain a product intended **for massive doses.** With the **new Whittier method,** the ergosterol is brought to a boil and the vapor is subjected to the activating influence of an electric current. This vapor is subsequently conducted off and crystallized. The manufacturer ***claims that ergosterol manufactured in this manner will prove*** **nontoxic** ***if used in massive doses for the treatment of arthritis.*** "

" The results indicate that the administration of vitamin-D, prepared by the Whittier method, in the high dosage of this study benefited the great majority of these patients in varying degrees. In a relatively high percentage of cases, ***the degree of clinical improvement has been*** **marked and sustained.** "

" ***No serious toxic manifestations were encountered.*** "

Once again, a sustained study, four years, of consuming levels of vitamin-D up to ***1,500 times*** the RDA, was both ***non-toxic and beneficial to health***, and that the hazards had been ***greatly exaggerated.***

4. --- ***Follow-up Study of Arthritic Patients Treated with Activated Vaporized Sterol*** --- R. Garfield Snyder, M.D., F.A.C.P., Willard H. Squires, M.D., F.A.C.P., *New York State Journal of Medicine,* **December, 1941.**

" There is no consistent change in the Blood calcium. "

" Most of the cases showed an increase in weight. One of the early signs of activated vitamin-D administration is a **markedly improved** sense of well-being and a definite improvement in nutrition".

" We believe that ***the use of high doses of activated vitamin-D is not associated with any more danger than is usually encountered with other accepted forms of therapy.*** "

Once again, high doses of the activated vitamin-D were found to be ***non-toxic***.

5. --- *Comparative Therapeutic Value and Toxicity of Various Types of Vitamin-D* --- Chapman Reynolds, M. D. , Louisiana State University School of Medicine, *The Journal Lancet,* Minneapolis, **October, 1942,** Vol LXII, No. 10, page 372.

" It may be concluded beyond little doubt that **massive doses**, quantities **exceeding by a thousand times** or more the minimal requirement (note this is not the current RDA of 400 I.U.; but rather the minimum requirement of 10,000 I.U required to treat arthritis), of ***irradiated ergosterol***, manufactured in Germany in the late 1920s and early 1930s, may result in considerable impairment of nutrition, loss of weight, pronounced hypercalcemia, and abnormal calcium deposits in certain tissues and organs. There are **contrasting expressions** from users of the **electrically stimulated ergosterol (Whittier process)**, which reported **favorable results with no toxic reactions** and the serum calcium not elevated above the normal. "

" A study of the administration of vitamin-D leads to the belief that contradictory findings indicate that various workers were using different types of preparations. It is strikingly evident that massive doses of irradiated ergosterol bring about the development of toxic effects without clinical improvement, while use of electrical-discharge activated heat-vaporized ergosterol (Whittier process) has consistently been followed by clinical improvement with frequent rehabilitation, and with negligible or **no toxic** manifestations even over prolonged periods of intensive treatment.

This study shows that the original toxic effects that resulted from taking thousands of times the minimal requirement (over 250,000 times the current RDA), were not caused by the vitamin-D, but were caused by the impurities of using the solvent extracted and irradiated procedure to produce the vitamin-D. It also concluded that the same amounts of the newer and cleaner form of vitamin-D produced by the Whittier process was both ***non-toxic and beneficial to health***.

6. --- *The Therapeutic Value of Electrically Activated Vaporized Ergosterol* --- Cornelius H. Traeger, M.D. F.A.C.P., Willard H. Squires, M.D., F.A.C.P., Emmanuel Rudd, M.D., Arthritis Clinic Hospital for Special Surgery, New York City, *Industrial Medicine*, 14:3, **March 1945.**

" Electrically activated vaporized ergosterol treatment given once weekly in doses of 1,000,000 to 1,500,000 I.U (**3,750 times *the current RDA***) proved beneficial in the majority of the patients treated. "

" **The safety** of electrically activated vaporized ergosterol (Whittier process) when administered orally **has been established** and its effectiveness as an anti-arthritic means of therapy has been repeatedly shown. The previous findings have been confirmed and extended. "

Once again, the ***effectiveness and safety*** of the vitamin-D produced by the Whittier process was proven.

7. --- *The treatment of Arthritis By Electrically Activated Vaporized Ergosterol,* --- G. Norris, M.D., *Rheumatism*, **July 1947**, pages 56-60.

" For vitamin-D produced by the electrically activated vaporized process it is widely claimed that **in massive dosage it is of great value in the treatment of arthritis**, and that **toxic effects are so rare or so temporary as to constitute no obstacle to its use.** In a series of 164 cases treated at Cook County Hospital the blood-calcium level was determined before vitamin-D therapy was started, and then at six-month intervals: **no persistent hypercalcemia developed.** "

" A clinical trial has been started with a series of 40 patients. After 6-12 months (50,000 to 300,000 I.U. per day), a survey gives the following results:

Reduction in pain joints..... 23 patients (58%)
Reduction in swelling & stiffness in joints.... 18 patients (45%)
General improvement (feeling splendid)..... 31 patients (78%)

Of evidence of toxicity, the only ones observed were gastric disturbances in 16 of the 40 patients which ranged from a feeling of "fullness" or " a lump" in the stomach through varying degrees of "feeling of sickness" with the bigger doses.

Once again, the ***effectiveness and safety*** of the vitamin-D produced by the Whittier process was proven. One wonders with all of this evidence, what do the negative studies say. Well, the next study is a perfect example of a flawed evaluation.

8. --- ***Intoxification With Vitamin-D*** --- John Eager Howard, M.D. and Richard J. Meyer, M.D., John Hopkins Hospital, Baltimore, *The Journal of Clinical Endocrinology,* Volume 8, Number 11, **November 1948.**

" The age of the 10 patients given the drug (vitamin-D) as a therapeutic measure against arthritis varied from 33 to 68 years. The highest daily dose was 600,000 I.U.; the lowest daily dose was 150,000 I.U.. (each patient received one of four different drugs, and one patient received a combination of two different drugs). Duration of therapy prior to the onset of toxic symptoms was highly variable, ranging from two months to eighteen months. One patient received a quart of milk daily and another had been given calcium phosphate wafers coincident with vitamin-D therapy. "

" Eight of the ten patients had severe gastro-intestinal symptoms, namely, anorexia, nausea and vomiting. Weakness, fatigue and lassitude were prominent complaints of all ten. All our patients were given ***diets very low in calcium*** on recognition of their condition: yet hypercalcemia was slow to regress. It seems likely that the bones were the major source of the excess calcium in the serum."

" Seven of the ten arthritic patients ***insisted that their joint symptoms were improved*** during the period of vitamin-D administration. The patients reported that ***the discomfort in their joints had decreased*** within two weeks after

beginning to take the drug. After withdrawal of the drug, several patients complained of sharp increases in arthritic discomfort."

NOTE:

1. This study had ***only 10 participants***, compared to the previous studies with up to hundreds of participants, to which ***five different drugs*** were given.
2. Five of the patients were given the ***impure, alcohol-extracted ergosterol*** which ***had already been demonstrated*** in numerous studies to cause ***discomfort***, which was ***reversible***. This, in effect, reduces the study down to only five significant patients who were taking different drugs.
3. ***The removal of calcium from their diet*** at the onset of toxic symptoms (headaches and stomach aches) probably resulted in a dramatic aggravation of the symptoms as their arthritis was ***caused*** by calcium deficiency in the first place, and, by the authors' own admissions, "***the bones were the major source of calcium in the serum***" and not the dietary calcium.
4. Two of the ten patients ***(20%)*** were taking calcium supplements (wafers and milk). Their symptoms were never separately identified. Were they in the "impure ergosterol" group ? With so many factors, including the fact that the five indivduals taking the pure vitamin-D were all on different drugs, and with so few participants, it is ***impossible to draw any valid conclusions***.
5. Although the authors reported toxic effects, the patients ***all insisted*** that their arthritic conditions had ***dramatically improved***.
6. In this study with so many variables on so few patients, ***the results*** have to be, at best, ***inconclusive***, especially since they are in contradiction to the much larger studies where the variables were controlled.

9. --- *A Ten Year Report on the Use of Natural Food Diet With Vitamin-D* -- Roger T. Farley, M.D. and Herbert F. Spierling, M.D., *Medical Times*, **October 1948.**

" The diet in arthritis treatment is based on the concept of fundamental physiology of nutrition: natural raw food, *unprocessed.* In all cases of arthritis, the use of white flour in any form is prohibited, and there should be no scorched fats, no creamed foods, no well cooked meals, no breaded meats, no fried foods, and no refined sugar. Patients may have the following: all vegetables, all fruits, unroasted nuts and honey, all meats, all sea food, eggs, aged cheese, whole wheat or rye bread, and butter."

" In the management of arthritis, one of **the most dependable and powerful agents** on speeding the arrest and recovery **is vitamin-D.** We began treatment (100 patients) with a daily dosage of 50,000 I.U., increasing at 3 to 5 day periods 50,000 I.U. until indications of improvement became clear. In the hospital, under strict management and research, we have run from 50,000 to 500,000 I.U. daily for periods of three weeks. On reduction of dosage, the ***kidneys seem to have*** **suffered no permanent damage,** ***the urine showing no casts, no blood. In this research there has been*** **no showing of hypercalcemia.** "

Once again, the ***effectiveness and safety*** of the vitamin-D, using amounts ***1,250 times*** the RDA, produced by the Whittier process was proven

10. --- ***Vitamin-D: Too Much of a Good Thing*** --- K.A. Fackleman, *Science News*, **May 1992.**

"In the United States, milk has been fortified with vitamin-D since the 1930s, a policy that has greatly reduced (from 80% to practically 0%) the incidence of rickets."

" Ellen W. Seely and her colleagues identified 7 adults and a 15 month old girl with unexplained vitamin-D poisoning. Too much vitamin-D results in **undesirably high** concentrations of the mineral calcium in the blood which **can cause** fatigue, weight loss, and in severe cases, irreversible kidney and cardiovascular damage (no proof provided). The scientists traced the problem to milk produced by a local dairy. The Food and Drug Administration recommends

that milk contain 400 I.U. of vitamin-D: however, at least one batch contained 232,565 I.U. per quart. Eleven additional cases of vitamin-D toxicity were not included in the study. However, **the vast majority** ***of people who drank the milk (tens of thousands)*** **showed no sign of ill health** ***caused by vitamin-D.***

NOTE: This is a typical scare tactic report which only " ***suggests***" that vitamin-D "***can cause***" toxic symptoms (symptoms that are disputed as incorrect by the studies previously presented), and in this case did so (the amount consumed was ***never discovered***) with 19 people, while causing ***no effect*** on ***tens of thousands*** of others. Also the toxic effects induced by the vitamin-D were never described. They were probably head aches and stomach aches that stopped right after the faulty milk products were removed.

11. --- ***Production of 1 , 25-dihydroxy vitamin-D by Hematopoietic Cell*** --- Helmut Reichel, H, Philipp Koeffler, and Anthony W. Norman, **Molecular and Cellular Regulation of Calcium and Phosphate Metabolism,** Alan R. Liss Inc, 1990, pages 81-97.

" Vitamin-D is synthesized in the epidermis (skin) under the influence of UV light. Alternatively, vitamin-D is provided by dietary sources. In order to become ***biologically active,*** vitamin-D must undergo metabolic transformation. First, vitamin-D is hydroxylated in the liver at carbon 25 to form 25-hydroxy vitamin-D, (25 (OH)D3). The next metabolic step occurs in the kidney at the 1 alpha position to yield 1, 25-dihydroxytvitamin-D, (1, 25(OH)2D3), which is the biologically active vitamin-D metabolite with ***a potency that is*** **100 to 1000 fold** ***higher than its precursor.*** Research by many investigators have established that 1, 25(OH)2d3 is an important hormonal regulator of calcium metabolism."

" The human **vitamin-D receptor, VDR,** is present in the classical **vitamin-D target intestine, bone and kidney** as well as in the parathyroid glands. VDR is also found in the melanoma cells, breast carcinoma cells and osteosarcoma cells where 1, 25(OH)2D3 **inhibits proliferation;** in the pancreas where 1, 25(OH)2D3 enhances the production of insulin; in the heart muscle where 1, 25(OH)2D3 enhances ventricular contractility; and in many other organs where it plays a **crucial biological role.**"

" In addition to the homeostatic function of vitamin-D, there is an increasing amount of evidence that vitamin-D has important effects on tissues and organs other than those concerned with calcium homeostases."

" With regard to the intestinal epithelia system, the genomic effect of 1, 25(OH),D was shown several years ago when the *de vovo* synthesis of a specific vitamin-D induced calcium-binding protein (calbindin-D) was demonstrated. In our view this appears to be an essential factor in the well documented enhancement of calcium absorption by vitamin-D"

Although this study did not evaluate the potential toxicity of massive doses of vitamin-D, it did point out some crucial roles that vitamin-D plays in human health. Also, it introduced the **VDRs,** vitamin-D receptors, especially the VDR's in the stomach, which allow ***consumed vitamin-D*** with its attached mineral nutrient, to pass through the small intestine wall and therefore be absorbed by the body.

12. --- ***The Effects of Light on the Human Body*** --- Richard J. Wurtman, *Scientific American*, July 1975.

" The formation of vitamin-D3 or calciferol in the skin and subcutaneous tissues is the most important beneficial effect known to follow exposure to sunlight. Vitamin-D3 is formed when ultraviolet radiation is adsorbed by a precurser, 7-dehydrocholesterol. Vitamin-D2 can be found in milk and other foods and can cure rickets in children who are deficent in vitamin-D3. Investigators at the Washington University School of Medicine have concluded that **sunlight is vastly more important than food as a source of vitamin-D3**".

Although this study also did not evaluate the potential toxicity of massive doses of vitamin-D, it did point out that ***sunlight*** is ***crucial*** to the production of the more usable type of vitamin-D and therefore ***sunlight is crucial to human health***. An example is ***endocytosis***, which is the process that allows nutrients to be absorbed or "swallowed" by the small intestine which is covered with thousands of negatively charged, fingerlike projections called ***villi***. The positive end of vitamin-D is sucked between the negative villi fingers leaving the negative tail of the

vitamin-D exposed at the surface where the positive calcium ion can attach itself, thereby neutralizing the charge. With no negative charge left to repel the negative villi, the villi now can wrap itself totally around the calcium-rich vitamin-D and draw the calcium deep into the base of the villi where it can be absorbed. Once this happens, the negative end of the vitamin-D becomes exposed and is repelled to the surface by the negatively charged villi, where it is free to entrap another calcium ion and repeat the process.

And finally, a 1997 study by the North California Cancer Center concluded that "***because the skin uses ultraviolet rays from the sun to make vitamin-D*** (which has been linked to protection against breast cancer in other studies which confirmed that woman from states in the tier south of Kansas tend to get significantly less breast cancer), that the ***risk of breast cancer is lowered by 40%, perhaps even more, by exposure to sunlight.***"

Despite all this massive scientific evidence, the average doctor still believes the myth of vitamin-D toxicity. Recently, it was brought to my attention by medical pioneer, Carl Taylor, M.D., Edmonton, Canada that the medical community was constantly being bombarded with technical information ***suggesting*** that vitamin-D was toxic. Dr Taylor sent me an article entitled ***"A Brief History of Vitamin-D Toxicity"***, Journal of Applied nutrition, Volume 49, Numbers 1& 2, 1997, James C. Moon, Ph.D., FACN, CNS.

Although I found the article a treasure trove of information, the article was basically "misinformation" as the only proof presented about the toxicity of vitamin-D was in reality ***"toxicity by insinuation."*** No where did the article provide proof or provide statements on vitamin-D toxicity such as ***"concludes that ..."*** Instead, referring to vitamin-D toxicity, it used words such as ***"suggests that ..."***, ***"may lead to ..."*** and ***"may result in***

...". These words by themselves demonstrate the lack of proof in this article of the toxicity of vitamin-D. By using the phrase "excessive vitamin-D ***may lead to hypercalcemia***", vitamin -D is then held responsible for the damage to health caused by hypercalcemia, when in fact, just the opposite is true. High serum calcium levels are a direct result of decalcification of the bones for the purpose of supplying calcium to the organs which are desperate for calcium. It is also due to a lack of sunshine, resulting in low calcium regulating calcitonin production and calcium storage inisotol triphosphate production. Calcium deficiency, due to lack of calcium in the diet, along with lack of exposure to sunshine, are responsible for hypercalcemia. Vitamin-D, produced by sunshine, allows the body to absorb large quantities of calcium and therefore helps to prevent hypercalcemia. Also, the sunshine that produces the vitamin-D also causes the pituitary gland to instruct the parathyroid gland to produce the hormone calcitonin, which prevents the decalcification of the bones. Thus vitamin-D ***actually prevents the health problems that it is accused of causing***. The scientific studies that "suggested" otherwise did not include the other numerous health factors that play a major role in hypercalcemia. None of these studies meet the basic requirement of being ***"multi year, phase 1, 2 and 3, double blind, and massive studies done on large numbers of individuals"***, that are requirements to scientifically determine toxicity.

Typical of articles attempting to perpetuate the myth that God's nutrient, vitamin-D, is toxic, the article not only provides misinformation, it also uses arguments that are not true. For example it states that "there have been no systematic studies to determine vitamin-D toxicity for humans". In the previous pages I have provided 12 such studies, ***"all"*** of which ***"conclude that vitamin-D is not toxic."*** Many of these were ten year studies done on hundreds of animals and humans. Studies that were carried out by our best scientists and doctors at our best scientific research establishments. For example, the Streck Report of 1937, ***"Further***

Studies on Intoxification With Vitamin-D", which was done at the University of Chicago Medical Facility and took dozens of doctors and scientists nine years to complete, concluded that they found large doses of vitamin-D to be non toxic and, because of the correlation of their animal studies to their human studies, they concluded that ***"the burden of proof rests with those who claim the undesirability of vitamin-D therapy"***. This study was followed up by other massive studies which all concluded the "non toxicity of vitamin-D".

Finally, this article did provide information that proved that vitamin-D, in the amounts such as 1200 IU and 2000 IU which they claimed were toxic, just simply could not possibly be toxic. It is simple because all one has to do is apply grade 8 math to the numbers provided in the article. The article refers to a paper ***"Cholecalciferol Production"***, P.C. Beadle, where Beadle measured the vitamin-D production in the epidermis (skin) to be 163 IU per square centimeter in ***light skin*** per day and 69 IU per square centimeter in ***dark skin*** per day. The human body has about 20 square feet of skin or 18,600 square centimeters. This means that the human body can produce over ***3,000,000 IU of non toxic vitamin-D per day***. Also, the article suggests that 30 minutes of sunshine per week produces enough vitamin-D for the human body. Assuming this to be true, and also assuming 12 hours of sunlight per day, the amount of vitamin-D produced in 30 minutes is 128,000 IU which calculates to "18,300 IU per day". This means that they are advising that "18,300 IU of vitamin-D are required by the human body per day" (which this author wholeheartedly supports), while saying, at the same time, that 1200 IU "may be toxic". Which is it, 18,000 or 1,200 ? The latter is ludicrous as the healthiest people in the world, the Hunzas in Pakistan, the Bamas in China, the Georgians in Russia, the Titi Cacas in Peru and the Okinawans in Japan, all of whom have virtually no diseases, all get about 7 hours of sunshine each day and therefore produce about 500,000 IU of Vitamin-D each day (their skin is dark). Thus the

logic of the Ph.D.'s who apparently cannot calculate, lies in the ruins of grade eight math.

Other interesting studies have been done. *The Lancet*, Garland et al, February 9, 1985 issue reported that a long study had shown that men with the highest vitamin-D in the blood had 1.42% colon cancer whereas those with the lowest had 3.89 % (or 273% more cancer). *The Lancet*, Garland et al, November 18, 1989 issue reported a study of 25,000 in Maryland showed that there was 80% more colon cancers in the fifth of the population with the lowest vitamin-D in the blood. In a report from England, *The Lancet,* March 23, 1991 stated that 3 of 14 women who were treated with topical vitamin-D experienced a reduction of 50% in their malignant breast tumors. A report in *Cancer*, 70, 1992, pp2861-9, by C.C. Hanchette and G.G. Schartz entitled *"Geographic Patterns of Prostate Cancer mortality, Evidence for Protective Effect of Ultraviolet Radiation"* notes that areas in Northern latitudes, such as Iceland, Denmark and Sweden have far more prostate cancers than found in areas of more intense sunlight. A report from M. Frydenburg of the Urology Department in the Royal Melbourne Hospital in *Cancer Forum,* Vol.19, No 1, March 1995, pp 15-18, states that high vitamin-D in the blood may be protective for prostate cancer.

In conclusion, medical doctors are reading and believing the thesis that vitamin-D is toxic, and as a result, are ***"perpetuating disease"***. Ironically, I know medical doctors who claim to have treated patients suffering from vitamin-D toxicity. This only proves to demonstrate the medical fact that ***"at least 50% of all medical diagnoses are incorrect"***. The use of vitamin-D with calcium supplementation could make a major impact on the war against disease. All be to read **The Calcium Factor.**

Glossary of Names

THIS WILL SHOW YOU HOW IMPORTANT IT IS TO BECOME ALKALINE. *

that is not in the genetic code, in place of one of the A, C, G, or T nucleotides. Thus, a ***mutant*** may be born.

The question therefore arises as to what conditions within the cell are necessary to produce this mutation receptor ? The early work of Nobel Prize winner Otto Warburg, some seventy-five years ago, (***Cause and prevention of Cancer***; Biochem, Zeits, 152: 514-520, 1924), showed clearly that cancer was associated with ***anaerobic (deficiency of oxygen) conditions,*** resulting in fermen-tation and a marked drop in the pH of the cell (***Low pH Hyperthermia Cancer Therapy***; Cancer Chemotherapy Pharmo-cology 4; 137-145, 1980). Moreover, the production of mutation receptors cannot occur with the pH of the cell in the healthy calcium buffered 7.4 to 6.6 range, a range which assures the breakdown of glucose into the A, C, G and T nucleotide radicals that promote healthy DNA synthesis. M. Von Arenne showed that both high and low pH solutions ***can quickly kill the cell***. He was also able to show that at a pH slightly above the normal pH of 7.4, the toxic enzymes which characterize the low pH cells are neutralized and that the cancer cells will enter a ***dormant state***. Thus the success of the "***caustic solution treatment***" of tumors by the turn-of-the-century doctors could now be explained. Also, it should be noted that by definition, alkaline solutions are made up of hydroxyl (***oxygen-hydrogen***) radicals and therefore are oxygen rich. In the ***absence of oxygen*** within the acidic intracellular fluids, the ***glucose undergoes fermentation into lactic acid***, causing the pH of the cell to drop even further, thereby ***inhibiting the production of A, C, G and T nucleotides*** that allow for normal DNA synthesis. This provides the necessary conditions for toxic enzymes to produce radicals that will bond with carcinogens. The complexes they produce will bind with specific sequences of nucleotides in the DNA, causing the template to be altered, thereby setting the scene for the abnormal replication of DNA to trigger cancer.

(EXTRACT FROM THE BOOK. THE CALCIUM FACTOR.

Thus, in the healthy, calcium buffered, slightly alkaline cell environment, ***the conditions required for the propagation of cancer do not exist***. It therefore remains dormant, or dies. Dr. Reich noted that his cancer patients demonstrated: 1) lifestyle defects responsible for deficiency of one or both calcium and vitamin-D, 2) symptoms and physical signs of ionic calcium deficiency syndrome, and 3) a greater than normal incidence of these ionic calcium deficiency diseases. Thus, he considered cancer as the ultimate adaptation to ionic calcium deficiency, "***tailor made***" to survive and to thrive in an ionic calcium deficient environment. Dr. Reich found that the cancer in many of his patients seemed to go into remission once their calcium deficiency was rectified, by a change of lifestyle including diet and with mineral and vitamin supplements that raised the pH of their cellular fluids. Their associated ionic calcium deficiency diseases were also suppressed.

Another interesting fact is that cancer is virtually unknown to the ***Hopi Indians*** of Arizona and the ***Hunza*** of Northern Pakistan, so long as they stay in the same environment; this strongly suggests that something they are consuming is protecting them from cancer. The only significant difference is their water supply. The Hopi water is rich in ***rubidium and potassium***, and the Hunza water is rich in ***cesium and potassium***, making both of the water supplies rich with very ***caustically active*** metals. Researchers such as Dr. K. Brewer (***The Mechanisms of Carcenogenesis***, 1979, Journal of IAPM, Vol. V, No.2) and Dr. H. Sartori (***Cancer - ? Orwellian or Eutopian***, Life Science Universal Inc., 1985), found that, by not only addressing the calcium deficiency, but by also using these minerals to raise the pH to above the 7.4 range to a pH of 8.5, ***the cancer cells would die while the healthy cells would thrive***; thus, once again verifying the observations of both the turn-of-the-century doctors and men like Dr. Reich. Both Brewer and Sartori would treat their cancer patients with the salts of both rubidium and cesium. These