THE VITAMIN D NEWSLETTER

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This is a periodic newsletter concerning vitamin D published by the Vitamin D Council, a non-profit described at the end of this newsletter. You are on the this mailing list either because you have a research interest in vitamin D, a general academic interest in vitamin D, a financial interest in vitamin D, are a professional health or science writer, a health care provider, an employee of the NIH or IOM, a politician, a Black activist or an interested citizen.

VITAMIN D TOXICITY, FACT, FICTION OR RACISM?

This edition is a short quiz to test your knowledge of vitamin D toxicity. In a few days we will repeat the questions and discuss the answers.

We all know cholecalciferol is a fat soluble vitamin occurring naturally in the body as a result of UVB sunlight striking the skin. It can also cause toxicity in overdose by raising serum calcium and causing widespread deposition of calcium in body tissues (calcinosis). Like Coumadin, toxic amounts of cholecalciferol are occasionally used as a rodent poison. Given together with nicotine, large doses of vitamin D are also used to induce rapid hardening of the arteries to create animal disease models of arteriosclerosis.

However, exactly how much cholecalciferol would we have to take to cause toxicity? In other words, how toxic is vitamin D and how does it compare to other substances in the home? Test your knowledge.

1. IF AN OTHERWISE HEALTHY ADULT TRIED TO KILL HIMSELF BY TAKING AN ENTIRE BOTTLE (250 CAPSULES) OF 1,000 IU CHOLECALCIFEROL, WHICH OF THE FOLLOWING WOULD HAPPEN?

a) The person would die within 24 hours from severe hypercalcemia and widespread calcinosis.

b) If the person received intensive treatment for hypercalcemia he may survive.

c) Hypercalcemia would be severe but require only supportive treatment.

d) Such doses are called "Stoss" therapy and are occasionally used therapeutically although they do not replicate normal physiology. As most Americans are vitamin D deficient, such a one-time dose would probably be a health benefit for the majority of Americans.

2. ACUTE POISONING LEADING TO RAPID DEATH FROM INGESTION OF VITAMIN D CAPSULES (SUCCESSFUL SUICIDE ATTEMPT),

a) Has frequently been reported in the literature.

b) Has occasionally been reported in the literature

c) Has never been reported in the literature.

3. TRUE OF FALSE: WATER HAS A HIGHER (SAFER) THERAPEUTIC INDEX (THE MEDIAN LETHAL DOSE DIVIDED BY THE MEDIAN EFFECTIVE DOSE) THAN CHOLECALCIFEROL?

a) True

b) False

c) About the same

4. IF A PERSON TOTALLY AVOIDED THE SUN AND REGULARLY TOOK TWO STANDARD MULTIVITAMINS A DAY FOR SEVERAL YEARS, EACH CONTAINING 400 IU OF ERGOCALCIFEROL, AS HIS SOLE SOURCE OF VITAMIN D, HE WOULD,

a) Rapidly become vitamin D toxic and require medical attention for symptoms of hypercalcemia.

b) Slowly become vitamin D toxic and eventually become symptomatic.

c) Slowly develop hypervitaminosis D but remain asymptomatic.

d) Obtain a healthful vitamin D blood level.

e) Inexorably become vitamin D deficient.

5. OF THE THREE MEDICATIONS LISTED BELOW, WHICH IS THE SAFEST IN OVERDOSE?

a) Vitamin D (250 of the 1,000 IU capsules)

b) Aspirin (250 of the 325 mg tablets)

c) Tylenol (250 of the 500 mg tablets)

6. WHICH DRUG HAS THE HIGHEST (SAFEST) THERAPEUTIC INDEX?

a) Depakote

b) Lithium

c) Coumadin

d) Dilantin

e) Synthroid

f) Theophylline

g) Cholecalciferol

7. IN 1997, ADAMS AND LEE WROTE A WIDELY PUBLICIZED PAPER ABOUT VITAMIN D TOXICITY IN THE ANNALS OF INTERNAL MEDICINE. THE ADAMS AND LEE PAPER WAS ACCOMPANIED BY A STERN EDITORIAL WARNING OF THE DANGERS OF VITAMIN D WRITTEN BY MARRIOTT OF THE NATIONAL INSTITUTE OF HEALTH. THE THREE AUTHORS,

a) Correctly diagnosed all five of the patients

b) Were thanked by nationally acclaimed vitamin D scientists for their contributions to understanding vitamin D toxicity.

c) Showed frightening ignorance about vitamin D toxicity and appeared not to know the difference between the two standard deviation upper limit of a Gaussian distribution and levels known to reflect vitamin D toxicity.

8. BY SUNBATHING FOR A FEW MINUTES IN THE NOONDAY SUMMER SUN, ONE CAN EASILY OBTAIN FIVE TIMES THE VITAMIN D TOXICITY WARNING (LOWEST OBSERVED ADVERSE EFFECTS LEVEL OR LOAEL) OF THE INSTITUTE OF MEDICINE'S FOOD AND NUTRITION BOARD.

a) True

b) False

9. IF HUMANS ARE TWICE AS SENSITIVE AS THE MOST SENSITIVE MAMMAL TESTED (MALE RATS), THEN A 110 POUND HUMAN WOULD HAVE TO INJEST 88,000 CAPSULES (352 BOTTLES CONTAINING 250 OF THE 1,000 IU CAPSULES) OF CHOLECALCIFEROL IN ORDER TO HAVE A 50% CHANCE OF DYING (LD50) FROM AN ACUTE OVERDOSE.

a) True

b) False

10) AS MOST AMERICAN BLACKS SUFFER FROM VITAMIN D DEFICIENCY, SOME BLACK ACTIVISTS FEEL UNWARRANTED FEAR AND SCARE TECHNIQUES ABOUT VITAMIN D TOXICITY MAY BE RACIALLY MOTIVATED. THAT IS, RACISTS MAY BE INTENTIONALLY REPEATING AND PROMULGATING VITAMIN D TOXICITY SCARES IN ORDER TO PREVENT RELEVANT GOVERNMENT AGENCIES FROM DEALING WITH THE PROBLEM OF WIDESPREAD VITAMIN D DEFICIENCY IN THE BLACK COMMUNITY.

a) True

b) False

11. IN THE MOST RECENT CASE OF VITAMIN D TOXICITY DESCRIBED IN THE LITERATURE, A MAN RECOVERED UNEVENTFULLY AFTER TAKING A HEALTH SUPPLEMENT EVERY DAY FOR TWO YEARS THAT CONTAINED MORE THAN 156 OF THE 1000 IU CHOLECALCIFEROL CAPSULES.

a) True

b) False

12. ONE OF THE WORLD'S FOREMOST AUTHORITIES ON VITAMIN D METABOLISM AND PHYSIOLOGY RECENTLY SAID, "WORRYING ABOUT VITAMIN D TOXICITY IS LIKE WORRYING ABOUT DROWNING WHEN YOU ARE DYING OF THIRST."

a) True

b) False

The next newsletter will discuss the answers to these questions while the one after that will discuss vitamin D, mood and major depression.

THE VITAMIN D SCIENTISTS LISTED BELOW ARE WRITING AND SPEAKING OUT ABOUT THE PROBLEM OF VITAMIN D DEFICIENCY. ALL ARE WILLING TO SPEAK WITH THE PRESS. NONE ARE MEMBERS OF THE VITAMIN D COUNCIL.

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ABOUT VITAMIN D:

Vitamin D is a vital nutrient that is unique, both in terms of its physiology and because humans rely on both endogenous skin production and exogenous sources to meet biological requirements. Vitamin D is commercially available as vitamin D2, (ergocalciferol) made from plant products, and vitamin D3, (cholecalciferol) made from animal products. Cholecalciferol is also made naturally in the skin by the action of a specific wavelength of ultraviolet light (UVB) interacting with precholesterol. Cholecalciferol is then transported to the liver and turned into calcidiol [(25(OH)D]. In turn, the calcidiol is transported to the kidney and transformed into the steroid calcitriol which is excreted into the blood to help regulate calcium in the body. This is the main endocrine function of vitamin D.

Meanwhile, many tissues other than the kidney turn calcidiol into calcitriol to help regulate gene expression locally; this is the newly discovered autocrine (inside the cell) and paracrine (surrounding the cell) functions of vitamin D. This autocrine and paracrine function is impaired in vitamin D deficient subjects and all studies show many Americans are vitamin D deficient, especially Blacks. This use of calcitriol by other tissues as an autocrine and paracrine hormone is a relatively new discovery that explains its role in human development as well as the many health benefits of vitamin D in

other illnesses such as diabetes, hypertension, heart disease, autoimmune illness, various cancers and, perhaps, some mental illness, to name a few.

The single most important scientific fact about vitamin D is that young adult Whites make about twenty thousand units of vitamin D in their skin within minutes of whole-body, summer-sun. This is one-hundred times the Adequate Intake (AI) recommended by the Institute of Medicine's Food and Nutrition Board for young adults. Therefore, many Americans greatly exceed the IOM's safety recommendations by simply spending a few minutes outside in their swimming suits! This extraordinary rate of natural vitamin D production in the skin (20,000 IU) leading to the production of a potent endocrine, paracrine and autocrine steroid hormone leads one (as T.S. Eliot once said), "to an overwhelming question." Why did Nature design such a complex system resting on bountiful natural skin production of cholecalciferol? Answer, "Probably for a very good reason."

Because low calcidiol [25(OH)D] levels (less than 35 ng/ml) are associated with so many chronic illnesses, calcidiol levels are an important part of any laboratory health evaluation and should be routinely checked by physicians. Unfortunately, few physicians are aware of this so perhaps as many as 70% of the U.S. population has calcidiol levels below 35 ng/ml. Even when asked to check vitamin D levels, physicians often order calcitriol levels, instead of calcidiol levels, an error which greatly misleads both the physician and the patient.

Healthful blood levels of calcidiol [25(OH)D] are between 35 and 60 ng/ml although commercial labs usually report "normal" or Gaussian distributions of between 8-72 ng/ml depending on the latitude of the lab's population. Therefore, commercial reference laboratories also mislead physicians and their patient by reporting "normal" (Gaussian distributions of a deficient population) instead of healthful calcidiol levels. Patients need to know these facts before asking their physician for the calcidiol [25(OH)D] blood test. Until the medical profession becomes educated on this matter, patients need to become educated, educate their physicians, get the proper blood test and then take steps to raise your calcidiol level if it is less than 35 ng/ml.

Persons with low levels have three choices: the sun, a sun lamp or vitamin D supplements. At most latitudes in the USA, little or no vitamin D is made in the skin in the late fall and early winter. In our most northern states the vitamin D blackout lasts for about six months. In the spring and summer, Whites can make large amounts (20,000 IU) by sunbathing on both sides, without sunblock, for a few minutes (about 1/3 the time it takes for you skin to begin to slightly redden). Darker skinned persons need 5 to 10 times longer depending on the amount of melanin pigment in the skin. Vitamin D production occurs within minutes and is maximized long before your skin turns red or begins to tan. One does not have to get repeated blood tests when using sun exposure to obtain vitamin D because toxicity does not occur even with heavy and continuous sunbathing. Ultraviolet light begins to degrade vitamin D after making about 20,000 IU, thus reaching a steady state. Overexposure, especially sunburns, is damaging to the skin, dangerous, and should be entirely avoided.

Some sunlamps contain significant amounts of UVB and have been shown to raise calcidiol levels into the healthful range and have the added benefit of not having to worry about toxicity or obtaining repeated blood levels. Again, care must be taken not to overexpose the skin. Sunburns must be avoided. One manufacturer with some vitamin D data is Sperti. (http://www.sperti.com/products.htm)

Many people are beginning to rely on supplements to raise their calcidiol levels as they have been told (usually erroneously) to avoid the sun entirely. However, in the absence of any sunlight, one must consume 3,000 to 5,000 IU of cholecalciferol a day to maintain healthful calcidiol levels. Similar studies have not been done with ergocalciferol but current data indicates that even more ergocalciferol would be needed. Vitamin D repletion is best done under a physician's care so calcidiol levels (and perhaps calcium levels) can be monitored. Persons diagnosed with sarcoidosis, other granulomatous disease, cancer (especially lymphoma) or hyperparathyroidism should not take vitamin D unless they are under the care of a knowledgeable physician (and would be well advised to find one). Patients with these conditions may develop a vitamin D hypersensitivity syndrome which is different than vitamin D toxicity.

Persons who do not want to have blood tests would be best advised to rely on prudent sun exposure. If such persons choose to avoid the sun, they should never exceed 2,000 IU of cholecalciferol a day which is the Institute of Medicine Food and Nutrition Board's NOAEL (No Observed Adverse Effects Level).

Cholecalciferol can be obtained at most health food stores and on the internet. (http://www.lef.org/newshop/items/item00251.html) Cod liver oil contains about 1200 IU of vitamin D per tablespoon but also contains about 14,000 IU of vitamin A. Therefore, persons with no sun exposure may exceed safe intakes of vitamin A in order to replete the vitamin D system. (We know omega-3 nutrition is very important but believe fish oil to be a safer alternative than cod liver oil).

Vitamin D can be toxic in overdose (probably more than 20,000 IU a day over a prolonged period of time). We are not aware of any reports in the literature of deaths from acute overdose, such as a suicide attempts, leading to death. In fact, a 150 pound human would have to take more than 100,000 capsules of the 1,000 IU cholecalciferol capsules to approach the LD50 for the most sensitive mammal (the male rat at 40 mg/kg). Such patients would be more likely to die from gastric bloating leading to asphyxiation than from vitamin D toxicity. In mammals, signs of toxicity short of death can first be seen at .5mg/kg (20,000 IU/kg or 1,400 capsules at one time for a 150 pound adult human). We are unaware of any reports of vitamin D toxicity from supplements except when manufacturing errors occurred. Most of the reported toxicity is industrial (dairies putting in the wrong amount into milk or the concentrated oil being used for cooking). However death from chronic poisoning has been described and is possible. If you believe "a little is good then a whole lot is better," then you may prove the association between judgment and natural selection.

ABOUT THE VITAMIN D COUNCIL:

The Vitamin D Council is a group of citizens concerned about vitamin D deficiency and the diseases associated with that deficiency. (We have recently changed our name from the Cholecalciferol Council to The Vitamin D Council after finding out most people cannot pronounce "cholecalciferol," and after learning that cholecalciferol is not kosher). The Vitamin D Council will attempt to draw attention to the problem of vitamin D deficiency through the education of professionals, the media, government officials and average citizens. The Vitamin D Council is a nonprofit entity incorporated under the laws of California under the name Cholecalciferol Council. We are in the process of applying for tax-exempt, non-profit [501(c)(3)] status as an educational organization under the laws the United States. We currently have no funding but will apply for grants if our [501(c)(3)] status is granted. We will not accept donations or grants from individuals or organizations whose goals may conflict with ours. The president of The Vitamin D Council is John Jacob Cannell, MD, the vice-president is Olga Cebanova, MD, the secretary is Tatiana Cannell, MD, and the treasurer is Andrei Gutsu, MD. Details of Dr. Cannell's background are available on the Council's web site, http://www.cholecalciferol-council.com/ or via email at jjcannell@charter.net.