

VITAMIN D AND FLU PREVENTION

Flu virus exists in people year-round, and new strains seed a population during the “off-season.” In the northern and southern temperate zones, flu epidemics occur in the cold part of the year, October-March and April-September respectively. Flu epidemics occur in the tropics during the rainy season.

Explanations for why flu epidemics occur in the winter when it is cold – people being indoors in close contact, drier air dehydrating mucus and preventing the body from expelling virus particles, the virus lingering longer on the exposed surfaces, like doorknobs, with colder temperatures – do not explain why flu epidemics occur in the tropics.

Something that can explain why flu epidemics also occur both in warm and cold climates is this: During a flu epidemic, wherever it may be, the atmosphere blocks ultraviolet B (UVB) radiation from the Sun. In the temperate zones above latitude 35 degrees North and South, the sun is at a low enough angle in the winter that the ozone layer in the atmosphere absorbs and blocks the short-wavelength (280-315 nanometers) UVB rays. In the tropics during the wet season, thick rain clouds block UVB rays.

Skin contains a cholesterol derivative, 7 dehydrocholesterol. UVB radiation on skin breaks open one of the carbon rings in this molecule to form vitamin D. The activated form of vitamin D (1,25 – dihydroxyvitamin D) attaches to receptors on genes that control their expression, which turn protein production on or off. Vitamin D switches on genes in macrophages that make antimicrobial peptides, antibiotics the body produces. Like antibiotics, these peptides attack and destroy bacteria; but unlike antibiotics, they also attack and destroy viruses.

Vitamin D also expresses genes that stop macrophages from overreacting to an infection and releasing too many inflammatory agents – cytokines- that can damage infected tissue. Vitamin D, for example, down regulates genes that produce interleukin – 2 and interferon gamma, two cytokines that prime macrophages and cytotoxic T cells to attack the body’s tissues. In the 1918-19 Spanish flu pandemic that killed 500 000 Americans, young healthy adults would wake up in the morning feeling well, start drowning in their own inflammation as the day wore on, and be dead by midnight, as happened to my 22-year – old grandmother and my wife’s 24-year-old grandmother. Autopsies showed complete destruction of the epithelial cells lining the respiratory tract resulting, researchers now know, from a macrophage – induced severe inflammatory reaction to the virus. In a terribly misguided way, these victims’ own immune system attacked and killed them, not the virus, something in future pandemics vitamin D, in appropriate doses, can prevent.

A credible hypothesis that explains that explains the seasonal nature of flu is that influenza is a vitamin D deficiency disease. Cannell and colleagues offer this hypothesis in “Epidemic Influenza and Vitamin D” (Epidemiol Infect 2006;134:1129-40). They

quote Hippocrates (circa 400B.C.), who said, “Whoever wishes to investigate medicine properly should proceed thus: in the first place to consider the seasons of the year. “ Vitamin D levels in the blood fall to their lowest point during flu seasons. Unable to be protected by the body’s own antibiotics (antimicrobial peptides) that this gene-expresser engineers, a person with a low vitamin D blood level is more vulnerable to contracting colds, influenza, and other respiratory infections (e.g., respiratory syncytial virus).

Studies show that children with rickets, a vitamin D – deficient skeletal disorder, suffer from frequent respiratory infections; and children exposed to sunlight are less likely to get a cold. Given vitamin D’s wide ranging effects on gene expression, other studies, for example, show that people diagnosed with cancer in the summer have an improved survival compared with those diagnosed in the winter (Int J Cancer 2006;119:1530-36).

A growing body of evidence indicates that rickets in children and osteomalacia in adults (both a softening of bones due to defective bone mineralization) are just the tip of a vitamin D-deficiency iceberg. Tuberculosis and various autoimmune diseases, such as multiple sclerosis, lupus, and type I diabetes have a casual association with low vitamin D blood levels. Vitamin D deficiency plays a causal role in hypertension, coronary artery disease, congestive heart failure, peripheral vascular disease, and stroke. It is also a risk factor for metabolic syndrome and type II diabetes, chronic fatigue, seasonal affective disorder, depression, cataracts, infertility and osteoporosis. At the bottom of the vitamin D iceberg lies cancer. There is good evidence that vitamin D deficiency is a causal factor in some 15 different common cancers. (NEJM 2007; 357:266-81.)

The increased number of deaths that occur in winter, largely from pneumonia and cardiovascular diseases, are much more likely due to vitamin D deficiency than to increased prevalence of serologically-positive influenza virus (which also results from vitamin D deficiency).

A light skinned person will synthesize 20,000 IU of vitamin D in 20 minutes sunbathing on a tropical beach, at which point vitamin D synthesis shuts down for the day (it takes a dark-skinned person 6 to 10 times longer to make this amount). Human breast milk does not contain vitamin D, since, from an evolutionary standpoint, our African ancestors’ infants, reared near the equator, could readily synthesize this gene regulator from sunlight in their skin. Food contains very little vitamin D. (The highest concentrations are in wild salmon, mackerel, sardines and cod but one would have to drink 200 glasses of milk to obtain the amount of vitamin D a light-skinned person can make in 20 minutes sunbathing.

The majority of Americans are vitamin D deficient, with a 25-hydroxy D blood level less than 20 ng/ml, or insufficient, with a level of 20-30 ng/ml. Cheap vitamin D supplements (D3, not D2) provide the only way most of us can maintain a year-round vitamin D blood level greater than 50 ng/ml. That requires taking 4-5000 IU of vitamin D a day (50,000 IU every ten days or 150,000 IU a month)

Taking vitamin D in these doses is safe, far safer than a flu shot with all the bad chemicals it contains. Concerns about vitamin D toxicity are overblown. One can take a 10,000 IU vitamin D supplement on a daily basis without any adverse effects. In healthy persons, long-term consumption of more than 40,000 IU a day is necessary to cause an elevation in the blood calcium level (hypercalcemia), the first manifestation of vitamin D toxicity (Am J Clin Nutr 2006;84:694-97). Check your vitamin D (25-hydroxy D) blood level. People with granulomatous diseases like sarcoidosis should also check their blood level of 1,25-dihydroxyvitamin D, The active form.

Can a shot (or tablets) of vitamin D prevent influenza better than a flu shot? There is good reason to believe that it can.

Doctors in India and Canada give people a once-yearly injection of 600,000 IU of vitamin D (MJA 2005;183:10-12). That would be better, and safer, than having a flu shot. Daily, weekly, or monthly vitamin D tablets work just as well. For more on this subject see my article "[Vitamin D in a New Light](#)" and visit Dr. Cannell's Vitamin D Council [website](#).

Investigators have completed one double-blind, randomized, placebo-controlled trial that shows vitamin D prevents colds and influenza significantly better than a placebo pill (Epidemiol Infection 2007;135:1095-6). A large multi-center randomized trial conducted over multiple flu seasons comparing vitamin D to a flu shot can show conclusively which is better, and safer. But given the financial stakes underpinning flu shots, and unpatentable vitamin D, who will fund it?

In the meantime, considering what is most likely to be the outcome of such a trial, if it is ever conducted, I recommend that you avoid flu shots and take vitamin D instead.

NOTES

Influenza virus Flu viruses are classified into types A, B, and C. Type A viruses cause most influenza epidemics. They exist, replicate, and mutate in swine and horses; seals, dolphins, and whales; migratory water birds, geese and ducks; domestic birds chicken and turkeys; and humans. Type B and D viruses exist only in humans and only type B causes (relatively mild) infections. Influenza A viruses are further categorized into subtypes on the basis of two surface antigens (proteins): hemagglutinin (H) and neuraminidase (N). There are 15 different H and 9 different N antigens. The 1918-19 Spanish flu pandemic was caused by an H1N1 Type A virus. Subtypes of influenza viruses are further classified by the names of cities, states or countries, along with the year they were discovered. For the 2008-09 (northern temperate zone) season, officials predict and have directed vaccines to be made against A/Brisbane/59/2007 (H1N1), A/Brisbane/10/2007 (H3N2), and B/Florida/4/2006. In an unusual departure, they are all different from the previous season, which often an influenza-like illness caused by a respiratory virus other than the flu. Serologic tests are necessary to prove that one's respiratory illness is actually caused by the flu virus.

Other things to do to prevent the flu – Avoid sugar. It suppresses immunity. Avoid Omega – 6 vegetable oils (corn, safflower, peanut, canola and soybean oil). Americans consume 50 times more of these oils than are necessary for good health. In this amount they are powerful immune suppressants. Take a well – balanced multivitamin/mineral capsule on a daily basis. Eat garlic. Manage stress. Exercise. Get enough rest. And wash your hands. Viruses spread most often from touching contaminated objects, like doorknobs, phones, shared computer keyboards, and shaking hands.

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