Project Actions

What's needed to solve the vitamin D deficiency and T1D epidemics?

- Measure 25-hydroxyvitamin D serum levels, Omega-3 Index with AA:EPA Ratios, hsCRP as a measure of inflammation, HbA1c as a precautionary measure, along with T1D autoantibody status
- Provide education about supplementation, diet, UVB exposure, to get vitamin D levels to 40-60 ng/ml (100-150 nmol/L) and improve omega-3 status with an Omega-3 Index of >8 and AA:EPA ratio of <3

D*action Type 1 Diabetes Prevention Project

- D*action is an international study to assess the health effects of large populations who have vitamin D levels in the 40-60 ng/ml (100-150 nmol/L) range.
- This project will help identify potential changes in T1D diagnosis that may result from vitamin D and omega-3 fatty acid testing and education, as well as provide additional education about islet autoantibodies, inflammation, and other T1D related information.
- Provide health information and do vitamin D, Omega-3 Index and AA:EPA ratio, hsCRP, HbA1c, and T1D autoantibody testing every 5-6 months for a period of 2 years or for as long as the participant chooses.
- Physicians, clinics, research groups and other health interested groups are encouraged to enroll those at risk of developing T1D, identified as having tested positive for one or more of the known islet autoantibodies for T1D. Individuals who are concerned about developing T1D can also enroll in the project.
- Cedric F. Garland, Dr. P.H., F.A.C.E., Moores Cancer Center, University of California San Diego is the D*action study's principal investigator. Dr. Camillo Ricordi, MD, FNAI is the sub-principal investigator for the Type 1 Diabetes Prevention Project.

Get your blood levels tested, take action!
Join the D*action T1D Prevention Project at
grassrootshealth.net/t1d
Questions? Email jen@grassrootshealth.org

- Scholarships are available to those who have been identified as being at risk for developing T1D, by having tested positive for one or more of the known islet autoantibodies for T1D.

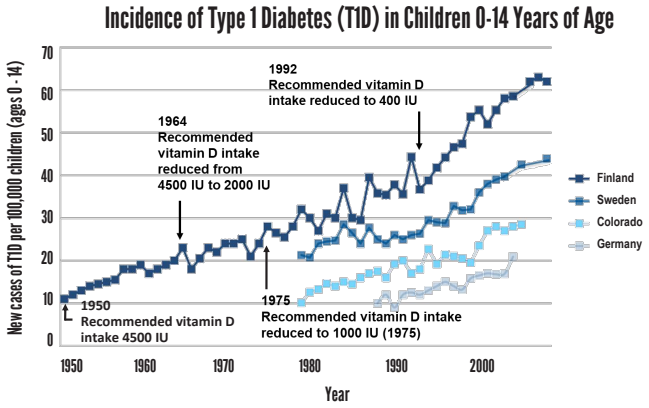
This is a project of GrassrootsHealth &
the Children with Diabetes Research Foundation

Vitamin D and Type 1 Diabetes?

It is known that progression to many forms of diabetes, including T1D, can be predicted by measuring levels of inflammation. Research has also shown that vitamin D3 and long-chain omega-3 fatty acids (such as DHA and EPA) are both anti-inflammatory, therefore, progression of T1D could be predicted by measuring levels of inflammation using such blood spot tests as 25(OH)D (25-hydroxyvitamin D, the most commonly studied vitamin D compound in the blood, used to measure vitamin D status) and the Omega-3 Index with the ratio of Arachidonic Acid (AA) to Eicosapentaenoic Acid (EPA) (the AA:EPA Ratio, both of which are used to measure omega-3 status).

48 leading vitamin D researchers have recommended a 25(OH)D level of 40-60 ng/ml (100-150 nmol/L) for the prevention of many chronic diseases, while an AA:EPA ratio of <3 is a target for reduced rates of chronic inflammation.

Evidence suggests a role of vitamin D and omega-3 in possibly reversing or stopping progression from developing autoantibodies to a T1D diagnosis. The chart below illustrates the increase in incidence of T1D over the last several decades, as the recommended intake of vitamin D decreased.



Mohr SB, Garland FC, Garland CF, Gorham ED, Ricordi C; Am J Prev Med. 2010; Atkinson MA, Eisenbarth GS, Michels AW; Lancet 2014.

Studies have also examined the incidence of T1D in countries at different latitudes, and found that countries further away from the equator, where there is less UVB available to produce vitamin D in the skin year-round, have a higher incidence of T1D. (see chart on front)

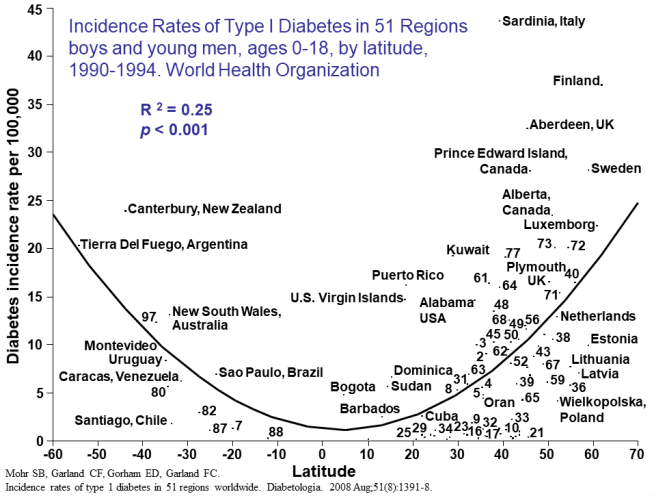
Join the D*action T1D Prevention Project at
grassrootshealth.net/t1d

Vitamin D*action

A Consortium of Scientists, Institutions and Individuals
Committed to Solving the Worldwide Vitamin D Deficiency Epidemic

Vitamin D & Type 1 Diabetes

Frequently Asked Quetions



Mohr SB, Garland CF, Gorham ED, Garland FC.
Incidence rates of type 1 diabetes in 51 regions worldwide. Diabetologia. 2008 Aug;51(8):1391-8.

GrassrootsHealth
Moving Research into Practice

Vitamin D & Type 1 Diabetes Frequently Asked Questions

What is type 1 diabetes?
Type 1 diabetes (T1D) is an autoimmune disease in which the insulin producing cells in the pancreas are suppressed or destroyed by the body's immune system, causing insulin production to diminish. Insulin is a hormone needed for the production of energy within cells; individuals with T1D may be dependent on injected or pumped insulin in order to survive.

T1D has been diagnosed in approximately 1.3 million people in the U.S., including about 200,000 young people under 20 years old. The incidence continues to increase 3-5% annually. By 2050, the expected prevalence of T1D is estimated to be 5 million people in the U.S., including 600,000 young people. Expected lifetime medical expenses and income loss due to diabetes total approximately $643 billion in the U.S. (2016).

Who is at risk of developing T1D?
Family history is an indicator of T1D risk, however, other factors are associated with the development and progression of T1D, such as inflammation, autoantibodies, vitamin D3 deficiency, even viral infection. The presence of islet cell autoantibodies (such as IAA, GADA, IA-2A, ZnT8, and ICA) indicates an autoimmune response against the cells of the pancreas, and is strongly associated with development of T1D. Improved vitamin D3 and long-chain omega-3 status, as well as decreased inflammation, have been associated with lower levels of these antibodies and therefore lower risk of T1D development.

What is vitamin D?
Vitamin D3 is one of the chemicals that the tissues of our body use to unlock the DNA blueprints which each tissue contains and which are needed for our cells to produce the many biochemical products required for their day-to-day functioning.

What is the mechanism of Type 1 diabetes where vitamin D3 is involved?
T1D can be triggered by vitamin D3 deficiency, which is common. An extremely delicate membrane in the pancreas separates the endocrine cells that produce insulin (beta cells) from the exocrine cells that secrete pancreatic enzymes. The beta cells reside in fluid compartments, and are protected there by the membrane that surrounds them.

When a child is deficient in vitamin D3, this membrane is weak and easily penetrated. Viruses that occur in the GI tract can pass through it and infect the beta cells. Beta cells don't regenerate easily, and can't restore their population following autoimmune attacks. In response to viral infection, the beta cell displays an antigen on its surface that is detected by the immune system. The cells also release cytokines, causing migration of killer lymphocytes across the membrane. These immune cells target and suppress or kill infected beta cells. Since beta cells are the sole source of insulin, the amount of insulin produced by the pancreas is cut. As more beta cells are infected, their population of insulin producing beta cells drops, and the patient develops T1D.

The material that holds many cells and possibly some membranes together is called E-CaDherin. E stands for epithelial, Ca for calcium, and D for vitamin D. Herin is derived from adhaerere, a Latin word for sticking. E-cadherin acts like glue, possibly holding cells that produce the together and keeping it safely intact. It is believed that vitamin D3 supplementation enhances intercellular adherence and function of the membrane-producing cells, helping to prevent diabetes. Vitamin D3 reduces the intensity of the immune attack on beta cells as well, due to its tendency to raise the concentration of dentritic lymphocytes, the powerful peacemakers of the immune response. We assert that these mechanisms work hand in glove to prevent T1D.

Are vitamin D3 and omega-3 safe?
Vitamin D3 is safe, if consumed in reasonable quantities. Vitamin D is an extremely potent compound, and if taken in abnormally high doses, can produce severe toxicity leading even to death. However, there have been no reported cases of vitamin D toxicity at serum levels of 25(OH)D below 200 ng/ml (500 nmol/L) no reported cases of vitamin D poisoning at daily oral doses below 30,000 IU. If a person chooses to use vitamin D supplements to raise their vitamin D levels, the IOM has indicated that 10,000 IU/day is currently considered the 'no observed adverse event level'.

There are similar positive findings regarding the safety of the essential fatty acids DHA and EPA. However, EPA can have a blood thinning effect at very high levels. DHA is available in an algal form, commonly used in maternal vitamins, infant formulas and foods for infants and toddlers, and for those who do not desire to use the DHA and EPA combination. This form of DHA is not harvested from the marine environment, and so there is no potential risk of mercury to the pregnant mother or infant.

How much vitamin D should I give my children?
Vitamin D intake should be determined by the measure of 25(OH)D in the blood, with a target level of 40-60 ng/ml (100-150 nmol/L). To attain this, 35 IU/pound of body weight (75IU/kg) meets the needs of the majority. For this project, testing of vitamin D levels is done every 3 months.

At what age should vitamin D3 supplementation begin?
The American Academy of Pediatricians recommends 400 IU vitamin D3 per day, starting at birth, although some scientists suggest that 1,000 IU per day would be more effective. The tolerable upper level intake at birth is 1,000 IU, according to the National Academy of Medicine. Be sure to consult with your pediatrician before deciding on vitamin D dosing for infants and children.