

# Focus on Nutrition : Vitamin D

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## What is the relationship?

by Jacqueline Allan,

It has been proposed that there is a relationship between vitamin D deficiency and Type 1 (and sometimes Type 2) Diabetes. One only has to look at the clinical trials database from the US National Institute of Health to see that research into the link is ongoing with 207 trials recorded. The research aggregator service PubMed also provides details of over 700 articles relating to the subject.

### Diagnosis

One of the most interesting threads of research investigates the link between levels of vitamin D and rates of T1D diagnosis in the population. There is a general consensus that at diagnosis levels

of vitamin D deficiency are higher than would be expected and higher than those without Type 1.

### Why?

There may be many mechanisms through which Vitamin D affects the environment needed for type 1 to develop. A team from Pakistan recently found that mutations in the Vitamin D receptor gene, which affects both pancreatic insulin secretion and immune response was linked to T1D development. (Mukhtar et al 2017). There is further evidence that vulnerability for these mutations may be heritable (Penna-Martinez 2017).

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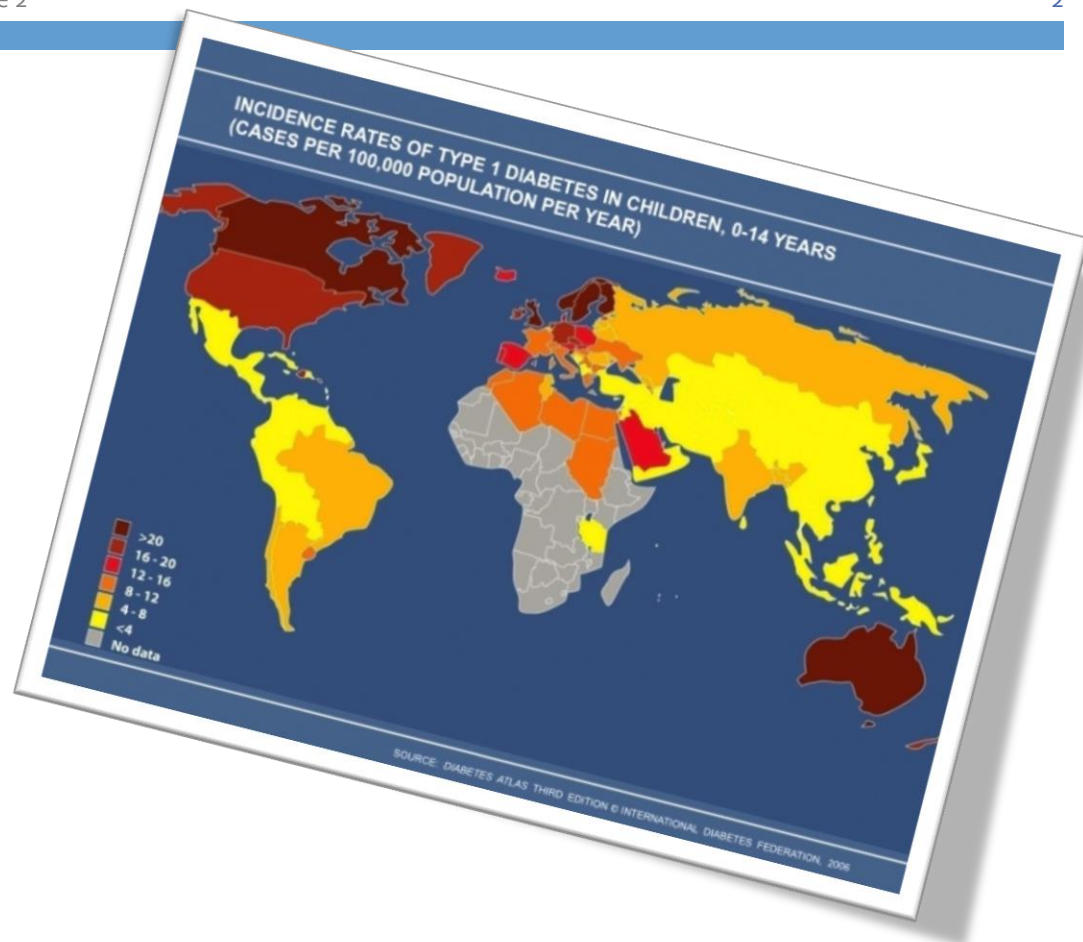
## Scientists Cure Type 1 Diabetes for a Year Without Side Effects - Good News Network

There is evidence that if high doses of Vitamin D are administered at diagnosis the honeymoon period can be massively extended (Gregoriou et al 2017)

As with many illnesses seen in childhood much research is focused on the condition of the mother and the prenatal, gestational and neo natal environment. There is conflicting evidence regarding whether or not maternal and in utero vitamin D environment affects the development of Type 1 Diabetes with large scale studies providing

arguments for and against this stance (Miettinen et al 2017; Thorsen et al 2017). There is evidence that supplementing Vitamin D in infancy may be protective for T1D development.

Finland has been recognised as having some of the highest rates of T1D globally but in 2006 the Finnish government decided to supplement milk products with vitamin D. At first there appeared to be a halt in the rising levels of those diagnosed but this eventually led to a decrease suggesting that vitamin D has an important role to play (Papadimitriou 2017). This coincides with other research also focusing on intervening with Vitamin D early in life (Awadalla et al 2017).



#### WARNING



Any changes you make in effort to help manage T1D should be done so in collaboration with your clinical team.

### Blood Sugar Management

There are inconsistent reports of the benefits of vitamin D supplementation on blood sugar control however some researchers have concluded using animal models that this

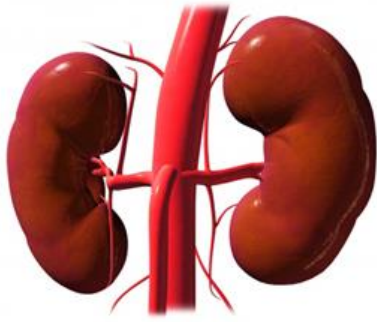
## Are Supplements Beneficial?

treatment could assist with insulin regulation (Derakhshanian et al 2017). Research in children has produced similar but somewhat weaker results, however the authors still suggest that 'Low vitamin D concentrations are fairly prevalent in children and adolescents with T1DM, treatment of which, can potentially improve glycaemic control.' (Giri et al 2017). Another research team found similarly low levels of vitamin D in their sample of T1 children and despite failing to produce a reduction in HBA1c still state. 'Oral Vitamin D may

serve as an adjunct to insulin therapy for children with T1DM by augmenting residual beta-cell function and improving insulin secretion.' (Sharma et al 2017).

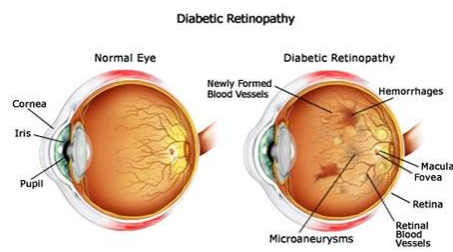
Adult models may suggest a stronger case for supplementation with a recent team showing that supplementation reduced glucose variability and hypoglycemia risk, however this study utilized a small sample size so results should be interpreted with caution. (Felicio et al 2017)

## Nephropathy



A recent study using T1D rats fed on whole eggs found that their diet had a protective effect for kidney damage. The authors argue that the eggs maintain vitamin D levels. The effects are three fold as they found that 'Whole egg consumption attenuated polyuria, proteinuria, and renal hypertrophy' (Saande et al 2017). In humans there also seems to be a link. Felicio et al (2017) found that in T1Ds with Diabetic Kidney Disease, 62% improved after a programme of high dose vitamin D supplementation. A robust meta-analysis of the research literature conducted in 2014 found a significant relationship between mutations in the vitamin D receptor gene and kidney disease in T1D (Lui et al 2014)

## Retinopathy



A recent study in Japan investigating the relationship

between vitamin D and Diabetic Eye Disease found that alongside duration of T1D, deficiency was an independent predictor of retinopathy. (Shima et al 2014). It should be noted that there are other studies which suggest that there is no link between retinopathy severity, maculopathy and vitamin D levels (Alam et al 2016)

# The Research literature is conflicted in the role of vitamin D in relation to Diabetes complications

## Neuropathy



It has been found that levels of Neuropathy are higher in those with T1D and vitamin D deficiency and there is also a correlation between vitamin D and Nerve Growth Factor (Ozuguz et al 2016)

## Cardiovascular



There have been suggestions in the research literature that early vascular complications can be halted or slowed down in T1Ds who are suffering from vitamin D deficiency via supplementation. (Deda et al 2017). Other researchers have concluded that while vitamin D is associated with vascular stiffness, other factors such as BMI and lipid profile must be considered (Lieberman 2013)

## Bone Density



Although Calcium is the micronutrient normally most commonly associated with bone issues such as osteoporosis it has been found that vitamin D may compound the low bone mass that is more common in T1D than in the general population. (Dutta et al 2016; Dhaon & Shah 2014)



# Vitamin D & Mental Health

## Serotonin

Vitamin D is very important for the synthesis of Serotonin in the brain. Serotonin is massively important in a number of mental health conditions. Under or over production of this neurotransmitter has been implicated in several processes that maintain mental illness. Imbalances have been associated with social behaviour, impulse control, sensory gating, decision making, emotional regulation, anxiety, depression, aggression and memory function. Serotonin deficiency is also related to abnormal brain development in infancy and has been implicated in the development of autism.

There is also data suggesting that low levels of vitamin D are partly responsible for premature aging and associated cognitive decline.

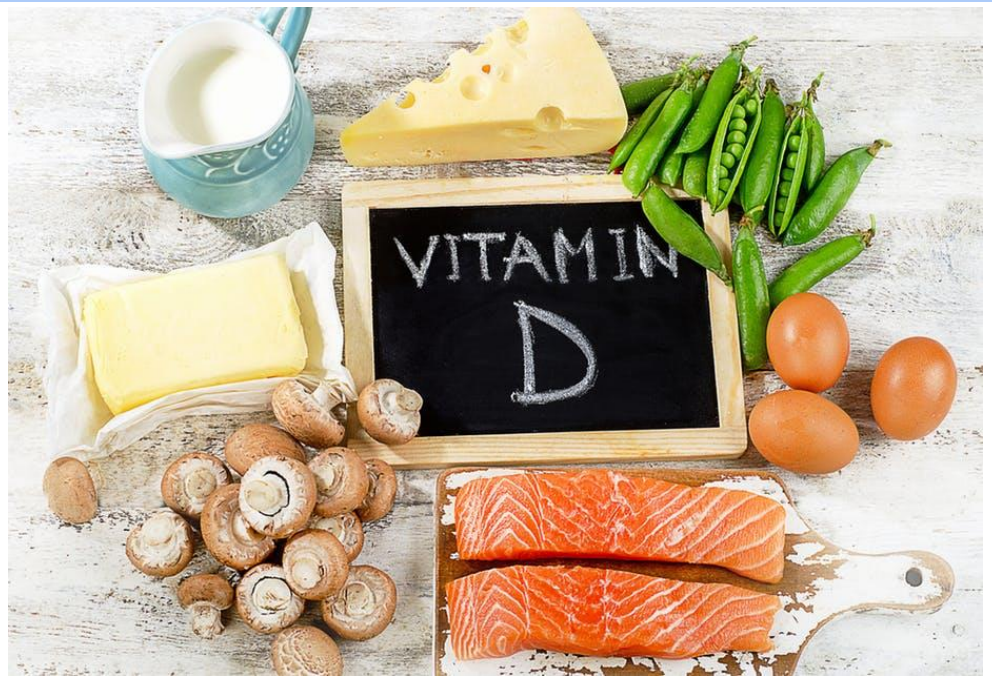


Alzheimer's has also been linked with low levels of vitamin D. (Patrick 2016).

## Seasonal Affective Disorder

Given that we create vitamin D naturally in the sun it is probably somewhat unsurprising that Season Affective Disorder (SAD) occurs. This happens when we feel down during the months with no sunshine. This is partly attributed to the lack of vitamin D in our systems. Supplementation has been shown to improve symptomology in many sufferers.

You Can Get  
your Vitamin D  
Level Tested by  
Asking your GP



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