Vitamin D is vital. It plays a significant role in the human body's calcium and phosphate metabolism. It is, amongst other health benefits, important for the immune system, the cell growth and in the treatment of cancer. Vitamin D receptors are located in more than 30 target tissues.

Vitamin D is a combination of fat-soluble secosteroids, which are essential for maintaining the homeostasis of minerals. The early stage of Vitamin D is called cholecalciferol or Vitamin D3. Cholecalciferol is biologically inactive and will be converted by the body to active Vitamin D, which is also known as calcidiol.

**Health effects of Vitamin D**

In old age, a deficiency leads to falls and bone fractures. In children, vitamin D develops a strong and well-shaped skeleton as well as healthy teeth. Recently, there has been increased evidence that vitamin D has a favourable effect on the treatment of chronic and severe illnesses.

In the body Vitamin D works like a hormone. It is vital for healthy teeth, bones and muscular system. Furthermore, Vitamin D regulates the concentration of calcium and phosphate in the bloodstream, controls the storage of calcium in the bones and protects bones from demineralisation after climacteric, thus preventing so called osteoporosis. Vitamin D is important for cell growth and it inhibits certain cancer cells from cell differentiation. In addition, it also effects the immune system.

**Sources of Vitamin D**

Our bodies can produce vitamin D. When we are in the sun, vitamin D3 is formed in our skin, which is subsequently converted to vitamin D. On a sunny day, we receive far more than the daily recommended requirement – at least in theory. The light intensity and therefore the formation of vitamin D3 on the skin is dependent on a number of factors such as the angle of the sun, its height over the sea, the weather, etc. Window glass absorbs almost all the necessary UV-B components in sunlight. Sun screen lotion inhibits the vitamin D3 production from a light protection factor of 97%. Anything that comes between the sun's rays and our skins reduces and prevents the formation of vitamin D in our skin. Because of our modern lifestyles, many people spend too little time in the sun or use too much sun screen to allow sufficient formation of vitamin D.
The situation is obviously worsened in winter. For the sunlight to contain sufficient UV-B rays for vitamin D synthesis, the sun’s rays must reach the earth at an angle of more than 35°. In Switzerland this only occurs between March and mid-October. In the winter months, any vitamin D reserves in the body and food are the only natural sources. About 20% of the daily requirement can be found in the foods we eat. Vitamin D is found in some of the fat-rich foods e.g. oily fish, offal, eggs and to a limited extent also in dairy products.

Widespread deficiency

In recent years, it has been increasingly recognised which civilisation illnesses are associated with the widespread lack of sunlight in modern societies. It can be assumed that at least 70% of the Swiss population have a deficiency of vitamin D. The following risk groups are particularly vulnerable:

- People who are rarely in the sun.
- People who are overweight (due to a higher uptake of vitamin D in the adipose tissue)
- The elderly (the skin forms less vitamin D)
- Pregnant and breastfeeding mothers (Increased need)
- Newborns
- People with darker skin tone (more UV exposure necessary)
- People on certain medication e.g. cortisone
- Patients with malabsorption, chronic renal insufficiency or chronic hepatic disease
- People who are veiled for religious or cultural reasons

Official recommended doses are insufficient

The current recommendations for the daily requirements of vitamin D are considered by many experts to be either irrelevant (for those with sufficient UVB exposure), or insufficient (for the majority of the population in civilised societies at higher latitudes). The official recommendations have been increased in recent years and are now 800 IU (international units) or 20 micrograms per day for adults. My experience, however, is that a dose of close to 4000 IU or 100 micrograms is more effective in most cases. In winter, 5000 IU can safely be taken, while in summer it can be reduced to 3000 IU per day. There is no risk of vitamin D poisoning in doses of up to 5000 IU per day. In order to maintain the vitamin D level in the blood, 2000 IU per day are required. Study Holick M.F et al., J.Clin. Endocrin. Metabol., Published ahead of Print, June 6, 2011).
For the following indications, vitamin D may have a preventative or curative effect

- Allergies
- Eczema
- Auto immune disorders
- Bowel disease
- Inflammation of the joints
- Neurological diseases
- Common infections
- Osteoporosis
- Cancer

Vitamin D in Osteoporosis

Osteoporosis is a disease where decreased bone strength increases the risk of a broken bone. It is the most common reason for a broken bone among the elderly. This condition can be treated (or avoided) by consuming Vitamin D (3000-4000 I.U.) daily. It is recommended to combine this with Vitamin K2 (200 Microgram) as this combination enhances the absorption of Calcium into the body. It is also advisable to make sure sufficient Magnesium is consumed and a check is done of hormone levels. It is unnecessary to consume extra amounts of dairy products as we consume adequate amounts of Calcium in our normal diet.

Vitamin D in old age

As we age our skins ability to produce Vitamin D decreases, combined with the fact that many elderly people avoid direct exposure to the sun. The result is many elderly people have a deficiency of Vitamin D (generally 50% of the elderly and 80% of hip fracture patients) Vitamin D not only strengthen bones, it also improves co-ordination, balance and muscle tone. As sufficient amounts of Vitamin D are consumed both the damage to bones from falls is reduced (bones are stronger) and reduced frequency of falls (improved balance and co-ordination) is observed. (Basler Sturzstudie, Bischoff HA et al, J Bone Miner Res 2003; 18; 343-351). Vitamin D thus becomes an important Community Health issue as the resultant prevention of bone fractures and accidental falls of the elderly is significantly reduced.

Vitamin D and cancer

If the blood level of Vitamin D (25-OH-Vitamin D3) is continuously maintained at 100 nmol/l (preferably at 150-200 nmol/l) the risk of cancer developing is reduced by 60%! Vitamin D inhibits the grow of Cancer cells in various parts of the body and so can be used effectively in the treatment and prevention of Cancer. Please note such treatment of cancer should always be done by medical professionals to control the correct dosages and progress of a patient. The best results have been shown to be in patients with breast, large intestine and pancreatic cancer. Results in the treatment of prostate cancer have been less successful.