VITAMIN D3

Vitamin D3 is a derivative of Vitamin D formed by ultraviolet light in the skin. It is critical to bone formation and may have many other important roles in the body that are still being studied and discovered. Low Vitamin D can affect your cancer risk and Vitamin D supplementation may play a role in preventing skin, colon, prostrate and breast cancers. It may also have some role in preventing diabetes, high blood pressure, multiple sclerosis, rheumatoid arthritis and even heart disease.

Chemical Structure

Vitamin D3 is $C_{27}H_{44}O$. It is also call cholecalciferol or calciol and is different from Vitamin D2 or ergocalciferol. Vitamin D stores itself in fat and body tissues, thus blood levels do not necessarily accurately measure a person's Vitamin D level.

Function and Activity

Vitamin D3 is a steroid hormone that is important in maintaining blood calcium and phosphorous levels and in bone formation. It also binds receptors to modulate gene expression which may be how it helps prevent the formation of cancers.

Manufacturing

Vitamin D3 can be manufactured safely by taking cholesterol from wool wax alcohols and subjecting it to a four step process to make the precursor to Vitamin D3. This is then irradiated with ultraviolet light similar to how it is made in the skin producing cholecalciferol or Vitamin D3 to be taken as a supplement. Vegetarian sources are also available made from lichens instead of wool wax alcohol.

Sources of Vitamin D

Vitamin D3 is best obtained from the sun. Very few foods contain Vitamin D, although small amounts are found in liver, cheese and egg yolks. Most of the United States' milk supply is fortified with Vitamin D to avoid deficiency.

Safety and Eye Irritation

Just as in niacinamide the loose powder within the capsule can irritate eyes and the respiratory tract if inhaled.

Toxicity

Excess Vitamin D can cause weight loss and heart arrhythmias. It can also raise the blood levels of calcium which can lead to calcification of the heart, blood vessels and kidneys including increasing the risk of kidney stones, particularly if Vitamin D is taken with calcium. Most toxicity occurs in patients taking in excess of 10,000 international units of Vitamin D a day. Megadosaging of Vitamin D should be avoided. Vitamin D intake of 2,000 international units per day should be satisfactory to obtain normal levels of Vitamin D without inducing toxicity. Of course younger children should take lower dosages. The recommendation from the National Institutes of Health suggest children should have less than 4,000 units to less than 1,000 units per day depending on their age.

Vitamin D3's Effect on Humans

Vitamin D3 is critical to bone formation. A deficiency of Vitamin D causes a disease called **rickets** and osteomalacia (bone softening). This will cause failure of bone to form normally with skeletal deformities, particularly in children. People who have problems absorbing nutrients such as those with celiac disease, Crohn's disease or ulcerative colitis can become Vitamin D deficient due to lack of absorption. People with limited sun exposure, such as our skin cancer patients who avoid the sun and use sunscreens, hats, long sleeves and pants, can develop Vitamin D deficiency.

Vitamin D and Cancer Prevention

There are many studies that indicate Vitamin D plays a role in the prevention of certain skin cancers, colon, prostrate and breast cancers.

Vitamin D and Prevention of Skin Cancer

Vitamin D might help prevent cancers by decreasing cancer cell growth and reducing cancer blood vessel formation. It also promotes cellular differentiation which keeps cells healthier. Vitamin D has activities against melanoma cell lines in mice and has been used in humans to help prevent melanoma from coming back in patients who are at risk for metastasis. Vitamin D supplementation has been shown to decrease the occurrence of non-melanoma skin cancer as well.

Conclusion

Vitamin D is a critical element for a healthy lifestyle and may have very important roles in preventing skin cancer as well as other cancers. Strict sun avoidance, hats, clothing, and sunscreens) may make patients Vitamin D deficient, thus supplementation is often very important in our society. Adequate dosaging for Vitamin D is difficult to determine as blood levels are not always accurate and recommendations keep changing. We recommend 2,000 units of Vitamin D a day. **SOLDERM™** is a unique combined product

of Vitamin D and niacinamide to help facilitate adequate dosaging of both critical vitamins in the most convenient form.

References

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