

Stress, sex, and sunlight – a different perspective on vitamin D

Low levels of vitamin D in the blood have been associated with a high risk of developing several diseases, including autoimmune diseases, cardiovascular diseases, neurodegenerative diseases, and cancer. Our study group has been working on the role of vitamin D supplements in the treatment of multiple sclerosis (MS), an autoimmune disease of the brain and spinal cord. Vitamin D is known for decades to be beneficial for the development and maintenance of healthy bones. However, vitamin D also controls the activity of many cell-types in the body, including immune cells. An important question is why vitamin D is of that much importance for that many cells and tissues in the body.

We discuss in our paper the many similarities between stress-hormones, sex-hormones and vitamin D. These three families of molecules originate from a similar source (cholesterol), are formed by similar machinery (enzymes), are transported through the blood by similar molecules, can bind to similar receptors, have similar effects on brain and immune cells, and regulate each other's actions. These molecules appear to make up an ancient system which allows an organism to limit the energy spent in specific processes to the most favorable moment. For the case of the immune system, stress-hormones for instance limit the mounting of an extensive immune response during fight-or-flight reactions, sex-hormones during pregnancy, and vitamin D during summer periods when other activities should be employed.

Understanding the actions of these molecules may help doctors to better treat patients with the earlier mentioned diseases. In MS, clinical studies with vitamin D supplements are currently being performed to assess whether this can be of benefit for patients. Stress-hormones are an effective treatments for flare-ups of MS, and sex-hormones are also being investigated. Our paper suggests that therapeutic strategies addressing the interaction between these molecules may reveal additional beneficial effects.

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[Network of nuclear receptor ligands in multiple sclerosis: Common pathways and interactions of sex-steroids, corticosteroids and vitamin D3-derived molecules.](#)

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