

Vitamin D receptor sites on the human genome

Posted on [December 20, 2011](#) by [Dr John Cannell](#)

People ask me all the time why I say vitamin D regulates over 2,000 genes, about one tenth of your genes. How many genes does vitamin D regulate? Dr. Sreeram Ramagopalan and colleagues at Oxford University published the latest and best paper on the subject.

[Ramagopalan SV, Heger A, Berlanga AJ, Maugeri NJ, Lincoln MR, Burrell A, Handunnetthi L, Handel AE, Disanto G, Orton SM, Watson CT, Morahan JM, Giovannoni G, Ponting CP, Ebers GC, Knight JC. A ChIP-seq defined genome-wide map of vitamin D receptor binding: associations with disease and evolution. *Genome Res.* 2010 Oct;20\(10\):1352-60.](#)

However, their findings were somewhat confusing to a psychiatrist. The authors found that 2,776 places on the chromatin have a vitamin D receptor (VDR) but only 229 genes modified the protein that the genes expressed after stimulation with activated vitamin D. However, the tissue they used was from the immune system (lymphoblastoid cell line), so I am guessing that different tissues would activate a different number of those 2,776 genes that have a VDR.



The genes I found most interesting were the genes for the trait “sensitivity to the sun.” As anyone who has taken different doses of vitamin D knows, this “sun sensitivity” trait varies with your 25(OH)D level. If you don’t believe me, take enough vitamin D this winter to get your 25(OH)D up to high normal (80-90 ng/ml) before next spring and then next spring go out when the sun is high in the sky for the amount of time it used to take you to burn. You’ll see.

The other thing is sunburn. Sunburn is a symptom of vitamin D deficiency. Ask yourself why nature selected some people to sunburn. Remember, UVB light makes pre-vitamin D, not vitamin D. The skin converts pre-vitamin D to vitamin D only in the presence of heat. What heats up your skin better than a sunburn? That’s right; sunburns serve a purpose, although I remain against them for

the increased risk of melanoma.

Finally, the genes that most strongly increased by activated vitamin D when the scientists smeared it on the plate of lymphoblastoid cell genes was chronic lymphocytic leukemia. If you know anyone with this condition, get him or her on 10,000 IU of vitamin D a day for Christmas. With luck, we can only hope they will see many more.



About Dr John Cannell

Dr. John Cannell is founder of the Vitamin D Council. He has written many peer-reviewed papers on vitamin D and speaks frequently across the United States on the subject. Dr. Cannell holds an M.D. and has served the medical field as a general practitioner, itinerant emergency physician, and psychiatrist.

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[texarc@gmail.com](#) said on January 6, 2012 at 5:26 am



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As someone who has spent his entire life in South Texas, I remember having a “dues” to pay every spring wherein I experienced a sunburn, once. Shed a layer of skin, and then I was immune to the sun for the rest of the season.

In the last 3+ years I have been aggressive about Vitamin D in my pharmacy practice, and followed my own blood level, insuring a range always between 50 and 100. I may spend 4 or 5 days in a row inside, doing 13 hour shifts in the pharmacy. Then, I’ll spend sunup to sundown outside, working on projects in the sun, or else conducting archery tournaments – I have never burned, even once, regardless of spending 10 or 12 hours of central Texas sun intensity in the middle of the summer, since bringing my vitamin D into therapeutic range. Never shed a layer of skin, never used sunscreen, a very interesting “side effect” of adequate vitamin D levels in my mind.

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