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Is Vitamin D deficiency genetic? Is it epigenetic?

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Since vitamin D is known to be associated with cancers, autoimmune diseases, diabetes, cardiovascular disease, allergies, depression, as well as bone mineral density, vitamin D deficiency emerges as a serious health problem. Considering the mechanisms involved in the immune modulation of vitamin D, the role of co-activators containing Histone Acetyltransferases (HATs), which express acetylation of histones on ligand binding to the 1, 25-D VDR/RXR complex, is important. When looking at the causes of such important vitamin D deficiency, aggregate evidence from various studies has shown that the variability of vitamin D status is due to a number of environmental and genetic factors. Non-genetic determinants of vitamin D status include gender, age, skin pigmentation, exposure to sunlight, sunscreen use, season, latitude, altitude, air pollution, dietary habits, supplemental vitamin D intake, obesity and physical exercise. However, the investigation of the genetic background of vitamin D metabolism has highlighted the importance of several genes such as CG, DHCR1, CYP2R1, CYP24A1 and VDR. When the effect of nutrition on vitamin D metabolism is examined, CYP2R1 and CYP27A1(25-27A1) which play a role in vitamin D metabolism in high-fat diet and glutathione deficiency. hydroxylase) Gene-specific hypermethylation of CYP27B1 1-α-hydroxylase VDR Hypomethylation of CYP24A1 has been observed. When we look at the microbiota and vitamin D mechanism in such intertwined mechanisms, vitamin D and VDR interactions protect the intestinal microbiota by regulating the expression of Antimicrobial Peptides (AMPs) and preserving the barrier functions of the intestinal mucosa. Considering whether the microbiota has an effect on the blood level of vitamin D, studies have shown that it can regulate both commensal and pathogenic intestinal microbiota, VDR expression and localization. Probiotic treatment can increase VDR expression and activity in the host, thereby inhibiting intestinal inflammation. Observed an increase in VDR expression in human epithelial colonic cells treated with probiotics Lactobacillus rhamnosus strain gg and Lactobacillus plantarum reuteri ncimb 30242 can increase serum 25(oh)d by expanding intraluminal lactic acid production or by increasing 7-dehydrocholesterol (7-dhc) synthesis. In a study we conducted, we showed that the use of vitamin D and probiotics increased the level of vitamin D more than the use of a single vitamin D or a single probiotic. Both nutrigenetic and epigenetic mechanisms are involved in vitamin D mechanisms. I believe that both aspects should be considered in the treatment of vitamin D.

Recent Publications

1. Tunaligil V, Meral G, Dabak MR, Canbulat M, Demir SS. COVID-19 and the flu: data simulations and computational modelling to guide public health strategies. Fam Pract. 2021 Aug 27;38(Suppl 1):i16-i22.
2. Meral, G. (2018). Philosophy of Nutrition: Past-Future Nutrition. In A. Evrensel, & B. Ö. Ünsalver (Eds.), Gut Microbiota - Brain Axis. IntechOpen.
3. Is Vitamin D Deficiency Associated with Disbiosis in Bowel Flora? Gulsen Meral, Aysegul Uslu, Aysegul Guven, Gamze Can, Ali Unsal Yozgatli, Faruk Akcay, Pinar Yaprak

Biography

Gulsen Meral has completed Faculty of Medical and pediatrician associate professor. He is a PhD candidate in molecular biology and medical genetic in Biruni University Turkey. He is the founder of Epigenetic Coaching in UK. He has over 32 that have been cited over 100 times and has publication H-index, 6. He has been serving as an editorial board member of reputed Journals.

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