

Fibroblast growth factors (FGFs) and their receptors are very important for normal embryonic development and proper wound healing. However, mutations in the genes encoding FGF receptors can lead to the development of tumors, both solid and leukemias. Some of these mutations are so-called gene amplifications that cause the cells to have too many receptors on the surface. It is unclear how common these amplifications are in leukemias, because this type of mutation is not routinely diagnosed in leukemia patients. Our team has recently discovered that too many FGF receptors in leukemia cells make them more sensitive to the active form of vitamin D, which is called 1,25-dihydroxyvitamin D. We also found that patients could benefit from blocking a transcription factor called STAT using the inhibitor fludarabine.

The main role of vitamin D, which after exposure to sunlight is produced by the human body from cholesterol, is to regulate calcium-phosphate metabolism, to prevent rickets and osteoporosis. It has been documented recently that 1,25-dihydroxyvitamin D is important for the development of blood cells, the proper functioning of the immune system, and that vitamin D deficiency promotes the development of autoimmune diseases and some cancers. Under the influence of 1,25-dihydroxyvitamin D, the cells of some leukemias begin to resemble normal cells of the immune system. Therefore, we would like to know how often amplification of the genes encoding FGF receptors occur in leukemias, and whether in leukemias with such mutations, therapy with 1,25-dihydroxyvitamin D and fludarabine could improve the condition of the patient.