

The major role of vitamin D in the organism is to regulate calcium-phosphate homeostasis, to prevent rickets and osteoporosis. Recently, some other roles of vitamin D became apparent, and regulation of immune system is one of them. It has been documented that vitamin D deficiency correlates with an increased risk of autoimmune diseases and with an increased risk of some cancers. Vitamin D is produced by the human body from cholesterol and its effective concentration is strictly regulated by feedback mechanisms. Vitamin D is produced from 7-dehydrocholesterol in human skin, when exposed to UV-light, and needs further metabolic activation in liver and in kidneys. This most active form of vitamin D is named 1,25-dihydroxyvitamin D. 1,25-dihydroxyvitamin D is able to regulate immune functions of healthy organism, but also has very positive effects towards leukemic cells. There is specific protein inside the cells, named vitamin D receptor (VDR), which is responsible for biological activity of this vitamin, and only these leukemic cells which have VDR, positively respond to 1,25-dihydroxyvitamin D. Recently, our research group has discovered that some mutations which occur in solid tumors and in leukemias cause that the amount of VDR in cancer cells is decreased. These mutations occur in genes which encode other cellular receptors, named fibroblast growth factors receptors (FGFR). In our research project we want to study links between these two types of receptors, VDR and FGFRs. We believe that cooperation between these receptors is important in tumor formation and in normal function of the immune system.