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Streszczenie w języku angielskim

Hematopoiesis is a multistage, hierarchical process of production, differentiation and replacing blood and immune cells. 1,25-dihydroxyvitamin D (1,25D3) and all-*trans* retinoic acid (atRA) are active compounds, that regulate cell proliferation and differentiation, and play an essential role in the proper functioning of the immune system. The vitamin D receptor (VDR) and retinoic acid receptors (RARs) are present in multiple blood cells. 1,25D3 induces differentiation of acute myeloid leukemia (AML) blasts to monocyte-like cells, while ATRA to granulocyte-like cells. Moreover, the *PML-RARA* fusion gene is responsible for blocking myeloid differentiation and uncontrolled proliferation of leukemia blasts, leading to initiation of acute promyelocytic leukemia. RARα is involved in regulation of VDR transcription.

The aim of PhD thesis was to determine the influence of 1,25D3 and all-*trans* retinoic acid on the expression of vitamin D receptor (VDR) in normal human blood cells at various steps of their development. Cells derived from umbilical cord and peripheral blood were used. Next, the epigenetic mechanism of silencing the *VDR* gene expression during blood cells differentiation was investigated. Normal blood cells, leukemia cell lines and cells from AML patients were used for this study. Methylation in promoter region of *VDR* was examined. Then, the effect of hypomethylating agents on HL60 cells was investigated.

This study has revealed that in human blood stem and progenitors cells expression of *VDR* is regulated by ligand-activated RARs, especially at early steps of blood development. However, methylation of the promoter region of the *VDR* gene is not the major mechanism responsible for these differences.