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Lupane triterpenoids in the synthesis of biologically active compounds

**Summary of Ph.D. Thesis**

The main goal of the dissertation was to investigate the reactivity of side chain and E-ring and the possibility of using the derivatives obtained for the synthesis of compounds with high cytotoxicity. The conducted research allowed developing convenient methods of inserting functional groups and functionalization of the lupane system within the E-ring.
It also determined the scope of applicability of used chemical transformations. The derivatives obtained were utilised for the synthesis of series of the lupane-type saponins.

The dissertation was divided into three main chapters — the literature review,
 own research and experimental part.

The literature review includes four main parts. The first one discusses the construction and biosynthesis of triterpenes and triterpenoid. The second part is devoted to the betulin molecule and its semi-synthetic derivatives. This part consists of the general characteristics of the betulin molecule and its chemical modifications within the E-ring and the isopropenyl group. The third part describes the chemical properties of lupane-type saponins and the methods for their synthesis. The last part is devoted to the biological activity of lupane derivatives and describes antitumor properties of betulin, its semi-synthetic derivatives and the lupane-type saponins.

The results obtained through laboratory investigations are presented in a separate part dedicated to own studies. This part is divided into three main issues. The first one discusses new methods for modifying the core of the betulin molecule within the E-ring and
the isopropenyl group. the second one presents the synthesis of saponins using Schmidt's peracetylated donors, OSW-1 disaccharide and its structural analogues. The effect of hydrogen bonding on the regioselectivity of the glycosidation reaction is also discussed there. The last issue presented in this part describes the synthesis of saponins containing a four-ring aglycone. The third part is devoted to discusson of the biological activity of the obtained compounds. The betulin derivatives and saponins were tested *in vitro* against fibroblasts and selected cancer cell lines of various histopathological origin.

The experimental section describes procedures for preparation of new betulin derivatives and the lupane-type saponins.