Abstract

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Title of diploma thesis: Study of cytotoxicity of newly prepared bronchodilators *in vitro*

This diploma thesis is focused on the determination the influence of developmental bronchodilatory active substances on viability of model tumor cell lines of human liver cells HepG2 and human lung cells HCC827. These potential drugs are theoretically suitable for the treatment of asthma bronchiale and COPD. The tested compounds (VN014a, VN015a, VN045b, VN122c) were derived from structure of the quinazoline alkaloids vasicine and vasicinone, which are substances contained in the *Justicia adhatoda* plant. The plant originated in India is widely used in traditional Ayurvedic medicine besides others to treat respiratory problems. The combination of both alkaloids showed significant bronchodilation activity. Cytotoxic activity of compounds was tested using colorimetric method by measuring cell metabolic activity based on reduction of tetrazolium compound. The IC_{50} value was determined for each studied compound on both used cell lines to assess the influence on cell viability.

Overall, the tested developmental bronchodilators proved cytotoxic effect on the hepatic cell line HepG2 and on the lung cell line HCC827 in the order of magnitude of hundreds μM concentrations. The final ranking of the tested substances according to the IC_{50} was different for each cell type. VN015a was the most cytotoxic substance for HepG2 cells, VN014a was the least cytotoxic compound. VN122c was the most cytotoxic substance for HCC827 cells, VN045b showed the lowest cytotoxic effect.

Considering maximum plasma concentration of most clinically used drugs in human organism, which ranges maximum in order of magnitude of singles to tens μM, we can conclude that test substances are perspective for further testing.