Cytotoxic and Apoptosis-Inducing Activity of Plants from the Family Asparagaceae in Relation to Human Alveolar Adenocarcinoma Cells

Y.N. Kamalova a*, V.V. Shtyreva a, Essam Abdul-Hafeez b**, Omer H.M. Ibrahim b***, P.V. Zelenikhin a****, N.S. Karamova a*****; O.N. Ilinskaya a******

a Kazan Federal University, Kazan, 420008 Russia
b Assiut University, Assiut 71515 Arab Republic of Egypt

E-mail: *yazgulen@mail.ru, **noresam_2000@yahoo.com, ***omer_hooo@yahoo.com, ****pasha_mic@mail.ru, *****nskaramova@mail.ru, ******ilinskaya_kfu@mail.ru

Full text PDF

Abstract

Cancer is known as the second major mortality cause. The number of new cases is increasing every year. Thus, it is urgent for scientists to search for alternative drugs with selective antitumor action and minimal side effects. It is known that some plant metabolites exhibit antioxidant, cytotoxic, and antitumor activity, while at the same time being less toxic than modern allopathic drugs. In this work, we have investigated the cytotoxic and apoptosis-inducing effects of extracts obtained from plants of the family Asparagaceae on A549 human lung adenocarcinoma cells. The analysis has been performed using flow cytofluorometry. If extracts showed cytotoxicity, the apoptosis-inducing action has been evaluated at the concentration of 50 μg/mL; in other cases, the analyzed concentration range was 50–300 μg/mL. On the basis of the experiments carried out, the following conclusions have been made. Extracts of the leaves and rhizomes of Sansevieria cylindrica and Sansevieria trifasciata do not possess antitumor activity. Extracts of the leaves of Polianthes tuberosa and Furcraea gigantea, which were cytotoxic at high concentrations, cause cell death at 50 μg/mL in the amount of 21.35 ± 1.86 and 15.6 ± 3.23, respectively. Extracts of Polianthes tuberosa bulbs and Yucca filamentosa leaves are able to induce apoptosis at higher concentrations. When the concentration reaches 100 μg/mL, the proportion of apoptotic cells for these plants is 45.76 ± 1.34 and 11.33 ± 0.07, respectively. The number of dead cells at the concentration of 300 μg/mL increased up to 73.33 ± 3.05 and 81.75 ± 4.07. The results have great importance for development of new drugs based on metabolites from these plant extracts.

Keywords: cancer, apoptosis, plant extracts, Asparagaceae

Acknowledgments. This study was supported by the state program for increasing the competitiveness of Kazan Federal University, Russian Foundation for Basic Research (project no. 15-54-61024), and Science Technology Development Fund (STDF) of Egypt (project no. 13821).

Figure Captions

Fig. 1. Apoptosis-inducing effect of plant extracts. Differences from control significant at $p \leq 0.05$ are marked with
References


The content is available under the license Creative Commons Attribution 4.0 License.

Keywords: Uchenye Zapiski, Archive