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**Ph.D. thesis summary:**

Synthesis of new 9,10-anthraquinone derivatives containing heterocyclic amine fragments and study of electrochemical, spectroscopic and biological features of selected derivatives.

9,10-anthraquinone derivatives are extensively used as antitumor antibiotics [1]. However, the anthracycline antitumor antibiotics have many disadvantages as evidenced by their cardiotoxicity. It is known that anthracycline toxicity may result from the formation of free radicals and subsequent redox cycle with oxygen resulting in the generation of reactive oxygen species such as: superoxide anion, hydroxyl radicals and hydrogen peroxide. Tissues such as heart tissue are particularly susceptible to injury by oxygen radicals that leads to their damage [2].

The main aim of my dissertation was the design and synthesis of a new series of 9,10-anthraquinone derivatives, containing in their structure nitrogen heterocyclic systems that were additionally modified to obtain new group of molecules potentially exhibiting antitumor activity. The group of compounds I have obtained was a combination of several structures of biologically active molecules with confirmed pharmacological properties.

As part of the doctoral dissertation I have designed and synthesized 31 new derivatives of 9,10-anthraquinone, which are synthetic analogues of anthracycline antibiotics. All obtained molecules were tested for their *in vitro* antiproliferative activity on selected cell lines. In addition, for molecules with the highest antiproliferative activity, I conducted electrochemical and spectroscopic studies to try to determine the relationship between biological activity and physicochemical properties.

The bioassay results demonstrate that most of the tested compounds show potent antitumor activities and that some compounds exhibit better effects against various cancer cell lines than the positive control of cisplatin, mitoxantron or doxorubicin. Furthermore, some test compounds exhibit low cytotoxicity against normal Balb / 3T3 cell line.

Synthesis and antitumor properties of all synthesized 9,10-anthraquinone derived compounds are the subject of nine national patent applications.

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[1] Leng F., Savkur R., Fokt I., Przewłoka T., Priebe W., Chaires J.B., *Journal of the American Chemical Society*, 1996, 118, 4731 – 4738

[2] Karim S., Bhabdari U., Kumar H., Salam A., Siddiqui M.A.A., Pillai K.K., *Indian Journal of Pharmacology*, 2001, 33, 203 – 207