Structure and Properties of A New NO-donors – nitrosyl Iron-Complexes with Functional Ligands as A Synthetic Models of Nitrosyl [2Fe-2S] Protein Sites

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New stable crystalline mono- and dinuclear iron nitrosyl complexes with ligands, which are analogous to the natural thiols, have been prepared in IPCP RAS [1]. We propose to consider nitrosyl [2Fe-2S] complexes, which are synthetic models of natural NO reservoirs in cells, as hybrid medicines, provided that functional thiolyls will be used as sulfur-containing ligands.

The cytotoxic efficacy of nitrosyl [2Fe-2S] complexes against the human tumor cell lines (ovarian carcinoma, erythroblastic myeloleukemia, carcinoma of large intestine, carcinoma of mammary gland, prostate carcinoma, mmortalized kidney cells and breast carcinoma) have been studied. Differential sensitivity of human tumor cells of different genesis to nitrosyl [2Fe-2S] complexes of various structural types have been founded. The induction of apoptosis and expression of alkyguanintransferase of selected compounds on human tumor cells in culture have been studied. High antitumor activity of nitrosyl [2Fe-2S] complexes in vivo has been shown on the experimental models of animals (melanoma B16, adenocarcinoma Ca755 and LL carcinoma (LLC)).

Nitrosyl iron complexes with functional sulfur-containing ligands – thiosulfate and penicillumamine – were studied on the models of ischemic and reperfusion heart damage of rats Wistar in vitro and in vivo, and were shown to have a cardioprotective effect. They can be used for the preparation of unique medications in the therapy of acute coronary event. Vasodilatation properties of these compounds affect the restoration of coronary flow; reduction of systolic blood pressure; improvement of restoration, metabolism and heart function after ischemia; reduction of the dimensions of myocardial infarction.

References:

[1]. N.A. Sanina, S.M. Aldoshin, *Russ. Chem. Bull.* **2004**, *11*, 2326-2345.

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