

Anticancer activity of ruthenium polypyridyl complexes – combined cytotoxic and anticancer properties

Abstract:

In recent years, ruthenium complexes with polypyridyl ligands have become a very popular group of compounds tested as potential anticancer agents. A huge database of such compounds has been created, comprising *in vitro* studies focused mainly on their cytotoxic activity, uptake, and localization as well as the cellular death mechanism. Therefore, all efforts were made to check their effectiveness against primary tumors. However, the main cause of death in cancer patients is the development of secondary tumors and so far there are no successful treatment protocols. The main goal of our studies was to draw the attention of scientists to the great potential of Ru polypyridyl complexes not only as cytotoxic agents but also compounds that can control the formation and the development of metastases. Such properties were very rarely checked, and on the basis of our research and a few cases found in the literature we postulate that many of the compounds tested so far for their cytotoxic activity may also be active as antimetastatic agents. Therefore, this issue deserves reinvestigation.

Ineffective clinical trials in the testing of antimetastatic drugs showed the need to develop compounds that simultaneously target several steps of the metastatic cascade. We believe that the developed Ru complexes can successfully fill this niche and that our findings might be relevant for other researchers working on designing new compounds that are also active as inhibitors of metastasis. Our studies have demonstrated that by selecting appropriate substituents in polypyridyl ligands, the activity of the Ru complexes can be tuned towards their combined cytotoxic and antimetastatic activity against cancer cells.

In this presentation, the way we are testing Ru compounds for their potential antimetastatic activity will be shown, as well as the most important finding (summarized in figure below) will be briefly discussed.

We anticipate that our findings will draw the attention of scientists to the underrated properties of polypyridyl Ru(II) complexes and toward their application as antimetastatic agents.

