Bioinorganic Chemistry and Applications

Hindawi

Special Issue on

Beyond DNA as Target for Metal-Based Anticancer Drugs: The roles of Protein Metalation

CALL FOR PAPERS

Metal complexes represent today an essential arsenal to fight cancer, about half of all patients being subjected to anticancer chemotherapy treated with platinum based drugs. It is nowadays ascertained that, despite nuclear DNA commonly reputed to be the main target for clinically established Pt drugs, interaction of platinum-based (as well as non-Pt-based) drugs with cellular proteins represents a very important aspect for their pharmacokinetic, bioavailability, and pharmacological effects. Also, there is today an increasing awareness that proteins are preferential "binding partners" for several metal-based drugs, according to the so-called protein metalation process. Protein metalation may be relevant to account for the toxic effects of anticancer metallodrugs (e.g., cisplatin) but also for determining some aspects of their mode of action, using model protein target to compare the reactivity of different complexes with the aim to formulate mechanistic hypothesis. To the other hand, metal-protein interactions may be exploited for downregulation or inhibition of enzymes, this effect being reachable in different manners, depending on the mode of action and characteristics of the compound and its target.

Taking advantage of these aspects, it is possible to exploit metal complexes capable of binding specific amino acids or protein's sites and binding pockets, in order to inhibit selected proteins that play key roles in cellular life. Indeed, in recent years, selected gold (III) and gold (I) compounds had been reported as promising anticancer agents, characterized by their ability to target thioredoxin reductase. Remarkably, because of binding and protein's activity inhibition, a series of perturbations involving redox homeostasis loss leads to the activation of the apoptotic process. Beyond thioredoxin reductase, other proteins may be targeted for therapeutic purposes. This is the case of those involved in protein homeostasis, which, in turn, represents a crucial aspect for cancer cells proliferation and survival.

In this view, proteasome is today recognized as an important target for innovative gold, zinc, nickel, and copper-based anticancer drugs. With these ideas in mind, it clearly appears how it is possible to exploit the extreme versatility and diversity of transition metals, to design innovative metal-based compounds able to target and impair the activity of specific enzymes (or more in general proteins), relevant to cancer growth and proliferation. Targeting proteins with a crucial role in the control of cell growth, as well as survival and malignancy with metal-based drugs, may result in paramount importance in controlling and fighting of the tumor itself.

This special issue aims to collect original contribution describing and reporting recent advances and developments in the field of metal-based antineoplastic agents that bind to proteins. These topics are of main interest, but papers and contributions treating similar or strongly related topics, still of interest in the field of metal-based anticancer research, are welcome in this special issue.

Potential topics include but are not limited to the following:

- Design and synthesis of novel metal-based anticancer drugs that bind to protein targets
- Study and characterisation of metal-protein adducts
- Study of mechanistic aspects involved in protein metalation
- New protein targets for metal-based anticancer drugs

Authors can submit their manuscripts through the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/bca/mbat/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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