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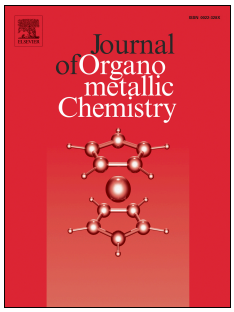

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Medicinal Applications of Gold(I/III)-Based Complexes Bearing *N*-Heterocyclic Carbene and Phosphine Ligands

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Abstract

Phosphines are the most studied ligands on gold-based metallodrugs, whereas *N*-heterocyclic carbenes (NHCs) have been emerging in the past years as potential alternative ligands for medicinal applications. Indeed, in both cases, phosphine and NHC allow the preparation of a plethora of transition metal-based complexes with attractive properties for medicinal applications. This review offers an update on phosphine and NHC ligands used in gold complexes with potential anti-cancer, anti-bacterial, anti-parasitic (malaria, leishmaniasis and trypanosomasis) and anti-viral (HIV-1) activity. Structural information about diverse ligands is discussed and the biological activity of the corresponding homo-metallic Au(I), Au(III) and hetero-metallic complexes is summarized in tables and discussed as well. Additionally, these complexes are compared with reference compounds and facts about mechanistic studies and luminescence properties are highlighted. The main target of this review is to find trends in ligand design for medicinal purposes. Particularly, questions about the balance between lipophilicity and hydrophilicity, the presence of functional groups, the utilization of multinuclear complexes and the comparison of neutral versus cationic complexes will be addressed.

Keywords: Gold(I/III) Complexes – N-Heterocyclic Carbenes – Phosphines – Medicinal Applications.