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Abstract

Organometallic Compounds and Metal Complexes in Cancer Therapy †

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Abstract: Globally, colon cancer is a major cause of deaths, being the fourth most common type of cancer in the world. The most common therapeutic choice in the early stages of colon cancer is surgical resection, but in some stages of the disease, adjuvant chemotherapy is recommended and is essential for the proper treatment of this pathology [1]. Complex combinations based on metals play an important role in the treatment of cancer because of their cytotoxic properties against cancer cells. An organometallic compound that can be used clinically and that plays an important role in the treatment of patients with colon cancer is oxaliplatin. Following studies, chlorine-based derivatives of Au (I)-phosphate showed comparable values to cisplatin on HT-29 (colon cancer) cell lines. Further studies continued to determine absorption at the cellular level, showing that most lipophilic compounds demonstrated a higher colon cancer cell absorption, meaning that they could be correlated with high antiproliferative activity [2]. Copper-based complex combinations were studied, and an inhibitory effect in the nanomolar range on the Colo 205 and Colo 320 colon cancer cell lines was thus observed. Some complexes showed increased toxicity to cancer cells compared to the MRC-5 cell lines. The antiproliferative activity of these complex combinations is significantly low in normal cell lines, thus increasing selectivity towards neoplastic cells was observed. Complex combinations based on Cu (I) show cytotoxic effects against LoVo MDR cell lines that are five times higher compared to oxaliplatin, thus showing the ability to overcome oxaliplatin resistance [3]. Nanostructured drug delivery systems allow the incorporation of metal-based drugs, thus limiting some of their most common shortcomings, such as low selectivity, low solubility and permeability, and high toxicity, which limit he dosage and the emergence of resistance at the cellular level [4]. These drug delivery systems are able to carry the drug and to release it according to its requested dose, even in a targeted manner, thus improving therapeutic activity and limiting systemic toxicity.

Keywords: metal complexes; drug delivery systems; cancer therapy

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