

Species Analysis of Platinum Based Cytostatic Drugs

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Cisplatin is frequently used as an efficient drug in chemotherapy for germ cell tumours, osteosarcoma and neuroblastoma. Unfortunately, it also causes serious side effects like nephrotoxicity and ototoxicity. The reasons for those side effects are not associated with reactions of cisplatin with the DNA, which was thoroughly investigated in the past. It is still unclear, which interactions of cisplatin in the human body cause the toxic effects. Particular reactions with Pearson soft thiols are proposed and proven. Therefore, we investigate the interactions of cisplatin with biologically relevant thiols under different physiological conditions.

Cisplatin is a highly reactive substance. Therefore the reaction between blood constituents and cisplatin does strongly depend on the reaction conditions. Hence, the kind and concentration of buffer salts in the reaction medium and the LC mobile phase were important as well as the pH value. Yet the most important parameter is the chloride concentration in the reaction mixture, because a high chloride concentration improves the stability of cisplatin, which affects the reaction behaviour of the platinum complex.

We present a high performance liquid chromatography (HPLC) separation of cisplatin and the respective adducts, which were formed with biologically relevant thiols. We identified these adducts by means of HPLC coupled to electrospray ionization mass spectrometry (ESI-MS) detection. The coupling of HPLC to inductively coupled plasma mass spectrometry (ICP-MS) detection allows quantifying the platinum amounts matrix and species independent.