Synthesis and Characterization of Sb(V)-adenosine and Sb(V)-guanosine Complexes in Aqueous Solution

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It has been previously reported that Sb(V) forms a complex with adenine ribonucleosides, suggesting that ribonucleosides may be involved in the mechanism of action of pentavalent antimonial drugs against the parasitic disease leishmaniasis. In this study, Sb(V) complexes with adenosine and guanosine were prepared and characterized. Two antimony derivatives were obtained in the solid state: a 1:2 Sb(V)-adenosine complex and a 1:1 Sb(V)-adenosine complex. A thermoreversible Sb(V)-guanosine hydrogel was also obtained at Sb/guanosine molar ratio varrying from 0.5 to 1. These complexes were characterized by H^1 NMR spectroscopy, high resolution eletrospray mass spectrometry, elemental analysis and circular dichroism. In the case of adenosine complexes, it is proposed that Sb(V) ion can be penta-coordinated by two riboses and one hydroxyl or octa-coordinated by two riboses and two hydroxyls or by one ribose and four hydroxyls. Characterization of the Sb(V)-guanosine hydrogel indicated that it is composed of 1:1 and 1:2 Sb(V)-guanosine complexes. Evidences for the formation of nanoassemblies were obtained, in which two types of interaction take place: covalent bonds through the formation of Sb(V)-guanosine complexes and intermolecular interactions between the different Sb(V)-guanosine complexes involving base stacking. This work was supported by CNPq/MCT (fellowship, Nanobiotechnology Network) and FAPEMIG (Nanobiotechnology network).