Relevant Antiproliferative Activity against *Toxoplasma gondii* of a new binuclear Co(II) complex

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Cobalt is an essential element for life and it is less toxic than non-essential metals such as platinum. Cobalt is an integral component of cyanocobalamin (vitamin B12)[1]. Several recent publications in the literature highlight the relevant properties of cobalt complexes as antitumor compounds[2]. Other studies report the antibacterial and antiviral activities of cobalt complexes[3]. Recently, we report the cytotoxic effect on *Toxoplasma gondii* of a dinuclear iron(III) complex [Fe(HPClNOL)(SO_4)$_2$]-μ-oxo, which induces reduction of superoxide dismutase and catalase activities disturbing the parasite redox equilibrium, resulting in cystogenesis and parasite death[4]. In this work we report the synthesis, characterization and antiproliferative activity against an intracellular parasite of a new binuclear cobalt(II) complex, containing the ligand HPClNOL= 1-(bis-pyridin-2-ylmethyl-amino)-3-chloropropan-2-ol), which was previously described[5]. The binuclear complex [(HPClNOL)Co(-μ-Cl_2)Co(HPClNOL)](ClO_4)$_2$ **1** which was characterized by a variety of physic-chemical methods. M.p.: 230 °C. Anal. Calc. for $C_{30}H_{36}Cl_6Co_2N_6O_{10}$; MW = 971 g mol^{-1}: C, 37.10; H, 3.74; N, 8.85. Found: C, 37.47; H, 3.58; N, 8.85. Other physic-chemical methods were used, such as electronic spectroscopy , ESI(+)-MS, ESI(+)-MS/MS and X-ray diffraction, which allowed the resolution of complex structure (Fig. 1), which is a binuclear cation containing two counter-ions perchlorate and has octahedral structure distorted in their metal centers. Complex **1** was non-toxic to the host cells. This complex presented high anti-toxoplasma effect in infected LLC-MK_2 host cells. Comparing with control (no treatment), the ligand and Sulfadiazine did not control parasite growth after 24 h of treatment. However, the complex reduced parasite growth by 55% when 10 μmol L^{-1} was used. After 48 h of treatment this complex presented a reduction of *T. gondii* growth similar to 24 h.

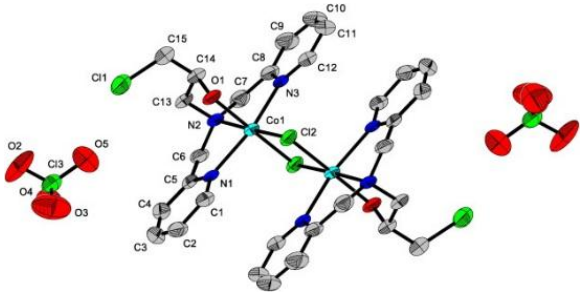

Figure 1. ORTEP for complex **1**.

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