Versatility in the biological behavior of two aminobenzoate oxidovanadium (V, IV) compounds. Inhibition or simulation of enzymes

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The pharmacological potential of vanadium compounds is of great interest to researchers in treatments of various diseases (diabetes, cancer, tropical endemic diseases, etc.) [1,2]. On the basis of the potential biological/pharmacological applications, in this work we have synthesized and physico-chemically characterized, two new complexes containing vanadium (IV) and (V) with 4-aminobenzoic acid as the ligand (L). The experimental results obtained (elemental analysis, FTIR, diffuse reflectance and UV-vis spectroscopy, EPR and ^{1}HNMR) as well as the theoretical calculations (DFT) performed allowed us to determine the following stoichiometries $[VO(O_2)LH_2O].H_2O$ **(1)** and *cis*-$[VOL_2H_2O]$ **(2)**. The inhibitory effects on acid phosphatases (AcP) and alkaline phosphatases (ALP) were determined. The complexes demonstrated specific activities: **(2)** better inhibitor of AcP (IC_{50} = 250 μM), **(1)** higher inhibition on ALP (IC_{50} = 500 μM). The pro-oxidant, antioxidant and anti-leishmaniasis activities were also studied. Only **(1)** catalyzes the oxidation of dihydrorhodamine (DHR) but none of them manifests activity against *L. amazonensis promastigotes*. Both complexes catalyzed the dismutation of superoxide (IC_{50}**(1)** = 114.0 μM, k_{McF} = 1.6 x10^5 $M^{-1}.s^{-1}$, IC_{50}**(2)** = 155.0 μM, k_{McF} = 1.1x10^5 $M^{-1}.s^{-1}$), showing a moderate effect and also mimicked peroxidase activity (phenol red, **(1)** V_{max} = 8.34 x 10^{-5} min^{-1}, K_m = 3.29 x 10^{-4} M, k_{cat} = 3.48 min^{-1}, k_{cat}/K_m=10577.5 $M^{-}.min^{-1}$; **(2)** V_{max} = 3.44 x 10^{-5} $M.min^{-1}$, K_m=1.35x10^{-4} M, k_{cat} =1.43 min^{-1}, k_{cat}/K_m = 10592.6 $M^{-1}.min^{-1}$). Interaction with albumin will also be discussed.

Both complexes resulted with potential pharmacological activities in some of the aspects studied.

[1] D. Rehder, Future Med. Chem**,** 0.4155/fmc.15.187.

[2] D. Wischang, O. Brücher, J. Hartung, Coord. Chem. Rev. 255 (2011) 2204-2217.