



UNIVERSIDAD
NACIONAL
DE LA PLATA



ASOCIACION ARGENTINA DE INVESTIGACION FISICOQUIMICA

XXII CONGRESO ARGENTINO DE FISICOQUÍMICA Y QUÍMICA INORGÁNICA LA PLATA 2021

SPECIATION CHEMISTRY IS KEY FOR BIOLOGICAL ACTIVITIES OF POLYOXOVANADATES AND COORDINATION COMPLEXES

Debbie C. Crans

Colorado State University, Fort Collins, Colorado, USA. Email:
Debbie.Crans@Colostate.EDU

A number of different vanadium coordination complexes have been reported with anti-diabetic, anti-cancer and other biological properties (1,2). These properties are often linked to the effects of protein phosphatases (1). A hydrophobic non-innocent substituted catecholate Schiff base vanadium complex has recently been reported to have anti-cancer properties exceeding that of cisplatin in resistant cell lines (3). Its desirable properties arise from the combination of high reactivity, hydrophobicity, and stability (3,4) make the compounds it well suited for intratumoral injections regardless of their limited lifespan in a biological system. Recently, we found that larger vanadium compounds, polyoxovanadates, have desirable biological affects, initiating cell signaling in mammalian cells (5) and also inhibiting bacterial growth (6). A limited number of studies have been done, wherein some of the compounds show surprisingly low toxicity (7). The activity of these compounds is sensitive to the speciation chemistry that takes place in cell media or after the administration of the compounds and should be considered before the biological activity can be attributed.

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