

Study of the Anticancer Activity of Polyoxometalates

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Polyoxometalates (POM) are polynuclear transition metal oxo-clusters, commonly composed of V⁵⁺, Nb⁵⁺, Ta⁵⁺, Mo⁶⁺, and W⁶⁺, making up a class of coordination complexes that can take on a broad range of compositions and structures.^{1,2} They have previously proven themselves as suitable drug candidates against cancers;³⁻⁷ their suitability arises from the modularity of their structure and tunability of their properties.^{5,7}

Despite the growing field of research on the anticancer activity of POMs, the mechanisms leading to the POMs' cytotoxicity are not well understood,⁴ nor are the stability of the POMs in the cellular environment,⁸ and therefore the active species leading to the therapeutic effects are unknown.⁴

With this work, these shortcomings aim to be addressed. The stability and speciation of various, common POMs in aqueous solution and cell culture medium have been investigated by NMR. Then the effects of the POM species and relevant reference compounds on different cell lines were investigated using PrestoBlue assays. In this way, the features of the POMs' structures causing the anti-cancer activity can be derived and an effective and selective POM-drug candidate can be developed.

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