The Role of Mn$^{2+}$ in Concanavalin-A Structure and Stability

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Abstract

Concanavalin A (con-A) is an important model lectin protein currently used in the Cloninger lab for the development of a competitive binding mannose-functionalized dendrimer to inhibit con-A from binding to the glycoprotein, RNAse B. The inhibition of con-A is serving as a model system for future studies with the glycoprotein galectin-3, prevalent in cancer cells. Bound to con-A are two metal ions, Mn$^{2+}$ and Ca$^{2+}$. Studies have shown that Mn$^{2+}$ plays a vital role in the con-A structure and the Mn$^{2+}$, Ca$^{2+}$ combination is essential in stability. This paper will investigate the properties of the con-A manganese site, the ligand-Mn$^{2+}$ interactions, and the Mn$^{2+}$ and Ca$^{2+}$ protein stabilizing ability through electron paramagnetic studies.