



CHARACTERIZATION OF NEW FUNGAL METALLOTHIONEIN SEQUENCES (SEQUENCE-DEPENDENT VARIATION OF PROPERTIES WITHIN A MT (SUB-) FAMILY)

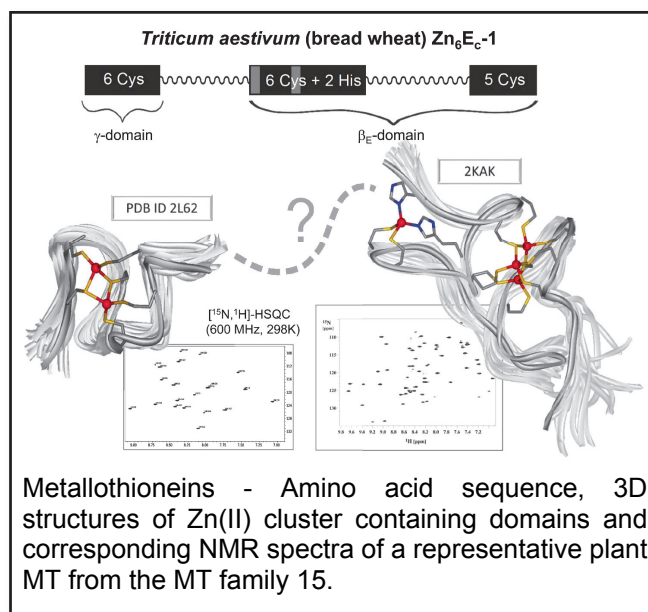
Position: PhD Project / Master Thesis

Area: Bioinorganic Chemistry

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Abstract

Metallothioneins (MTs) are small and cysteine-rich proteins, low in secondary structural elements and found in practically all kingdoms of life. They occupy roles in metal ion homeostasis (Zn^{II} , Cu^I) and detoxification (Cd^{II} , Hg^{II} , etc), and also seem to be important for fighting oxidative stress conditions. The amino acid sequence diversity of MTs across all phylae is high and hence the superfamily of MTs is divided into 15 families based on phylogenetic relationships. Most of the MT research in our group so far has focused on plant MTs (see figure). Fungi MTs are even less explored and (as the plant MTs) highly diverse in sequence, featuring between 7 and 19 Cys residues and occasionally histidine that might also function as ligand (see figure as well).



Goal

- prepare recombinant proteins
- determine metal ion preference, binding capacities, and general spectroscopic properties of selected fungal MT sequences
- evaluate thermodynamics and kinetics of metal-thiolate cluster formation and attempt 3D structural investigations.

Methods

- construction of expression vectors, protein production in *E. coli*, protein purification
- UV/vis, CD, fluorescence, IR (Raman) spectroscopy
- pH titrations, titrations with Ag^I as Cu^I mimic, working under anaerobic conditions
- determination of thermodynamic and kinetic binding constants, competition assays
- 3D structures with NMR and crystallography

Requirements

- studies of (bio-)chemistry, molecular biology or alike

For more details or to send a short motivation letter and your CV please contact Prof. Freisinger.