ItPS Seminars

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Mass spectrometry investigation of peptide metallation: recent advances in the field of toxic and therapeutic metals reactivity

As the most potent intracellular soft Lewis base, selenocysteine (SeCys) is able to bind electron poor soft acids as heavy metals, of interest for environmental and human toxicology, and metal-containing compounds, employed as therapeutic agents. For example, mercury's affinity for Se is ~one million times greater than its affinity for sulfur which is mostly compensated by the 105 higher cellular abundance of thiols.

Moreover, gold compounds, such as the Au(I) drug auranofin, are reported to manifest a large affinity to cysteine and even a larger one to selenocysteine in proteins. In this seminar, I will discuss about our investigation, by high resolution mass spectrometry, on the comparative reactivity of Cys and SeCys containing peptides and proteins towards Hg(I), Hg(II) and Au(I) compounds.

In view of the apparent strength of the Se-metal bonds, our results corroborate the hypothesis that the relatively few SeCys containing proteins (in total 25 in humans) are preferential and likely targets for soft Lewis acids, such as mercury and metallodrugs.

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