

Interaction of Ni(II) and Cu(II) with a metal binding sequence of histone H4: AKRHRK, a model of the H4 tail.

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Streszczenie

Chromatin proteins are believed to represent reactive sites for nickel binding. The unique structure of the N-terminal tail of histone H4 contains sites for post-translational modification close to a histidine residue capable of anchoring binding sites for metal ions. We have analyzed as a minimal model for the H4 tail, the blocked peptide $\text{CH}_3\text{CO-AKRHRK-CONH}_2$ for nickel and copper binding. Ultraviolet-visible, circular dichroism, electron paramagnetic resonance and nuclear magnetic resonance spectroscopic analysis showed that histidine acts as an anchoring metal binding site. A 1N complex is formed between pH=5–7 and 4–6 for Ni(II) and Cu(II), respectively, while at a higher pH a series of 4N complexes are formed. Above pH 8, the 2N high-spin octahedral resulted in a 4N low-spin planar Ni(II) complex. The stability constants of the Cu(II) (3N, 4N) and Ni(II) (4N) complexes with the peptide model of the H4 were distinctly higher than those for a similar blocked peptide with a histidine in the fourth position. Significant shifts in the α proton region in the ^1H NMR spectrum of the 4N Ni-complex showed that the conformation of the peptide had been dramatically affected following Ni(II) complexation.

Adres publiczny

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