

Copper binding to chicken and human prion protein amyloidogenic regions: differences and similarities revealed by Ni²⁺ as a diamagnetic probe.

Autorzy

Daniela Valensin

K. Gajda

Ewa K. Gralka

Gianni Valensin

Wojciech Kamysz

Henryk Kozłowski

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Streszczenie

Both human (h) and chicken (Ch) prion proteins (PrP) bind copper ions within the so called "tandem repeat" N-terminal region. Outside this region, hPrP possesses two additional copper binding sites, localized at His-96 and His-111 in the so called "amyloidogenic" or neurotoxic region (residues 91-126). Also ChPrP possesses a similar region (ChPrP(105-140)) containing two His (His-110 and His-124) and an identical hydrophobic tail of 15 amino acids rich in Ala and Gly. The copper binding abilities within such region of ChPrP were investigated by NMR, CD and potentiometry using Ni(2+) as diamagnetic probe. The formation of diamagnetic metal complexes allowed to monitor the chemical shift and signal intensity variations and to determine the structural and kinetic features of the His-110 and His-124 metal binding sites. Finally a comparison between the hPrP and ChPrP metal binding abilities was performed. We found that the two prion proteins exhibited different copper and nickel preferences with the favoured metal binding sites localized at opposite His: His-110 for ChPrP, and His-111 for hPrP.

Słowa kluczowe

prion protein, copper, diamagnetic probe, NMR, Amyloidogenic region, chicken

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