

Full Papers

脱铁伴清蛋白两结合位点不同酪氨酸氢键的特性

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收稿日期 2005-2-1 修回日期 2005-6-16 网络版发布日期 接受日期

摘要 在0.01 mol/L

Hepes, pH 7.4及室温条件分别研究了作为脱铁伴清蛋白两结合位点的探针离子—镓离子与8-羟基喹啉, 水杨酸, HBED, EHPG, 和伴清蛋白之间的相互作用。研究显示当镓离子与8-羟基喹啉和HBED作用时, 其荧光强度增强。相反, 当镓离子与水杨酸, EHPG作用时, 其荧光强度降低。在pH 7.4, 8-

羟基喹啉和HBED分子内有

型氢键, 而水杨酸, EHPG分子内存在

型氢键。当用镓离子滴定脱铁伴清蛋白时, 结合在N-端时蛋白质荧光强度降低, 而结合在C--端蛋白质荧光强度却增强。由此推论, N-

端结合位点配体Tyr 92 和 Tyr 191 残基与邻近残基之间存在

型氢键, C-端结合位点配体Tyr431和Tyr524

残基与邻近残基之间存在

型氢键。此外, 在相同实验条件下,

本文用荧光法测定了配合物Ga-EHPG与Ga-HBED的条件结合常数分别为 $\lg K_{\text{Ga-EHPG}} = 19.18$ 和 $\lg K_{\text{Ga-HBED}} = 19.08$ 。

关键词 伴清蛋白, 镓(III), 酚羟基团, 氢键, 荧光光谱

分类号

## Tyrosine Hydrogen Bond Properties for the Two Binding Sites of Apoovotransferrin

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**Abstract** The interaction of gallium(III) with the ligands containing phenolic group(s), such as salicylic acid, 8-hydroxyquinoline, *N,N'*-bis(2-hydroxybenzyl)ethylenediamine-*N,N'*-diacetic acid (HBED), *N,N'*-ethylenebis[2-(*o*-hydroxyphenyl)glycine] (EHPG), and ovotransferrin, was studied, respectively, by means of fluorescence in 0.01 mol/L Hepes at pH 7.4 and room temperature. Fluorescence intensity showed an increase when gallium(III) was bound to 8-hydroxyquinoline and HBED. In contrast, it was decreased with the interaction of gallium(III) with salicylic acid and EHPG. At pH 7.4, there was N...H—O type intramolecular hydrogen bond in the former, and the latter existed O...H—O type intramolecular hydrogen bond. Fluorescence titration of apoovotransferrin with gallium(III) displayed that the fluorescence intensity was decreased at the N-terminal binding site, while enhanced at the C-terminal binding site. It can account for the O...H—O type intramolecular hydrogen bonds for the phenolic groups of Tyr92 and Tyr191 residues at the N-terminal binding site. And there are N...H—O type intramolecular hydrogen bonds for Tyr431 and Tyr524 residues at the C-terminal binding site. In addition, under the same conditions, the conditional binding constant of gallium(III) with EHPG or HBED determined by fluorescence method is  $\lg K_{\text{Ga-EHPG}} = 19.18$  or  $\lg K_{\text{Ga-HBED}} = 19.08$ .

**Key words** [ovotransferrin](#) [gallium\(III\)](#) [phenolic group](#) [hydrogen bond](#) [fluorescence spectra](#)

DOI:

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