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研究论文

# 铱(IV)离子与人血丙种球蛋白的作用研究

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摘要 在0.1 mol•L$^{-1}$醋酸-醋酸钠(pH 5.0)体系中, 采用紫外吸收光谱、荧光光谱及同步荧光光谱法研究了人血丙种球蛋白(gamma seroglobulinum humanum, 简称GSH)与铱(IV)离子的相互作用. 结果表明, Ir(IV)离子使人血丙种球蛋白的构象发生了改变, α-螺旋含量减少, 并且用同步荧光光谱发现Ir(IV)离子与人血丙种球蛋白的作用位点更接近于色氨酸, 从而使色氨酸残基的疏水性略有减小. 荧光光谱结果表明Ir(IV)对人血丙种球蛋白内源荧光(342 nm)产生了较强的荧光猝灭作用, 根据不同温度下Ir(IV)对人血丙种球蛋白的荧光猝灭作用, 证明了这种荧光猝灭为静态猝灭机制, 计算了其结合常数和结合位点数, 从而得出了静电作用力为其主要的作用力.

关键词 铱(IV) 人血丙种球蛋白 紫外吸收光谱 荧光光谱 同步荧光光谱

分类号

## Study on the Interaction between Ir(IV) and Gamma Seroglobulinum Humanum

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**Abstract** In this paper, the interaction of gamma seroglobulinum humanum (GSH) with Ir(IV) has been investigated by using absorption spectra, fluorescence spectroscopy and synchronous fluorescence spectroscopy. In the system of acetic acid-sodium acetate buffer (0.1 mol•L$^{-1}$, pH 5.0), Ir(IV) enhanced the intensity of the characteristic absorption peak of GSH, accompanied with red shift, showing that binding of Ir(IV) to GSH had strong impact on protein conformation with decrease of *α*-helical content of the protein and local perturbation around the hydrophobic binding pocket of tryptophan and tyrosine amino acid residues. The fluorescence intensity of GSH at 342 nm was quenched when Ir(IV) was added, the quenching mechanism of GSH affected by Ir(IV) was a static quenching procedure, and the binding number *n* and binding constant *K* were calculated. The effect of Ir(IV) on the conformation of GSH was further analyzed using synchronous fluorescence spectroscopy. The results indicated the perturbation around the tryptophan residues, which was in agreement with that by absorption spectra.

**Key words** Ir(IV) gamma seroglobulinum humanum (GSH) absorption spectroscopy fluorescence spectroscopy synchronous fluorescence spectroscopy

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