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论文

蜂毒素在功能化金纳米粒子表面的吸附及构象变化

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摘要:

利用硼氢化钠还原法制备了金纳米粒子, 通过在其表面修饰链长不同的巯基羧酸, 得到了功能化纳米粒子. 利用荧光发射、紫外吸收和圆二色谱等手段研究了功能化金纳米粒子与蜂毒素分子之间的相互作用及其所诱导的蛋白质分子的构象变化. 研究结果表明, 功能化修饰的金纳米粒子可通过静电相互作用吸附蜂毒素(Melittin)并诱导其*α*-螺旋结构的形成, 且这种效应与巯基羧酸分子的链长直接相关.

关键词: 功能化金纳米粒子 蜂毒素 *α*-螺旋结构

Adsorption and Conformational Changes of Melittin on the Surface of Functionalized Gold Nanoparticles

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Abstract:

As the wide applications of gold nanoparticles(GNPs) in various fields as the biochemistry and biomedicine, the present investigation is geared to the practical demand. Recently, the capability of sulphydryl carboxylate functionalized GNPs to promote the folding of a positive charged peptide into an *α*-helix was established. This design allowed favorable electrostatic interactions between the nanoparticles and the peptide when the positive charged residues were positioned in a cofacial manner along the helix and was responsible for the assisted folding observed. GNPs coated with different chain lengths of sulphydryl carboxylate are prepared by adding sulphydryl carboxylate into GNPs solution which is synthesized *via* reducing tetrachloroauric acid($HAuCl_4$) by sodium borohydride. The structure of the functionalized GNPs can make it interact with electriferous proteins. Multiple spectral means have been used to study the interaction between the functionalized GNPs and melittin. The results show that the functionalized GNPs induced melittin to form *α*-helix by electrostatic interactions, and it is directly related with the chain length of sulphydryl carboxylate.

Keywords: Functionalized gold nanoparticles Melittin *α*-Helix

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