

研究论文

DNA与5-氟尿嘧啶相互作用的电化学和谱学研究

葛存旺¹, 王南平*,¹, 顾宁²

(¹南通大学化学化工学院 南通 226007)

(²东南大学分子与生物分子电子学国家重点实验室 南京 210096)

收稿日期 2005-8-17 修回日期 2006-3-14 网络版发布日期 2006-9-8 接受日期 2006-5-29

摘要 以电位控制共价组装法制得的DNA修饰电极为工作电极, 采用循环伏安和方波脉冲伏安法, 以亚甲基蓝(MB)为电活性指示剂, 研究了非电活性抗癌药物5-氟尿嘧啶(5-FU)与DNA的相互作用, 还结合紫外-可见光谱进一步研究了这种相互作用. 循环伏安测试结果表明: 5-

FU与DNA在电极表面反应的过程为可逆电化学反应-化学反应偶合(EC)过程. 当扫描速度较低时, EC反应是扩散控制过程; DNA与电活性物质MB通过静电吸附相互结合, 抗癌药物5-FU与DNA通过插入作用相互结合. 本研究对于遗传工程中以DNA为靶标的药物设计有重要的意义.

关键词 [DNA自组装](#) [电位控制](#) [金电极](#) [5-氟尿嘧啶](#)

分类号

Electrochemical and Spectroscopic Studies on Interaction between DNA and 5-Fluorouracil

GE Cun-Wang¹, WANG Nan-Ping*,¹, GU Ning²

(¹ School of Chemistry and Chemical Engineering, Nantong University, Nantong 226007)

(² State Key Laboratory of Molecular and Biomolecular Electronics, Southeast University, Nanjing 210096)

Abstract The primary object is to investigate the interaction between DNA and 5-fluorouracil (5-FU) in the light of DNA modified electrode based on covalent assembly by the potential control. The cyclic voltammetry and square wave voltammetry, along with ultraviolet-visible absorption spectrometry, proved to be a powerful technique for the elucidation of interaction between DNA and 5-fluorouracil with methylene blue (MB) as electroactive indicator. The results indicated that the peak potential shifts negatively with the increase of the scanning rate. The ratio of anodic current to the cathodic current decreased with the decrease of the scanning rate. The mechanism of the electrode is coupling electrochemistry-chemistry. The interaction between MB and DNA is electrostatic interaction, while the interaction between 5-FU and DNA is intercalative. These studies are very important for the design of DNA-targeting drugs in the hereditary engineering.

Key words [DNA self-assembly](#) [potential control](#) [gold electrode](#) [5-fluorouracil](#)

DOI:

通讯作者 王南平 bobow56@163.com

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(440KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“DNA自组装” 的相关文章](#)

▶ 本文作者相关文章

· [葛存旺](#)

· [王南平](#)

·

· [顾宁](#)