

FULL PAPERS

柔红霉素与DNA相互作用的机理研究

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摘要 本文以循环伏安、光谱电化学和原子力显微镜方法从DNA角度研究柔红霉素与天然鱼精DNA和热变性DNA之间相互作用的机理, 并对柔红霉素与鱼精DNA和热变性DNA复合物的组成及复合物的形成常数作了测定。研究发现嵌入作用是柔红霉素和天然DNA之间的主要作用方式; 并且柔红霉素和天然DNA之间的作用要强于和热变性单链DNA之间的作用。对这两种复合物的光谱电化学和原子力显微镜研究表明, 在体内氧化还原代谢条件下, 柔红霉素还原过程中产生的半醌自由基可引发自由基链反应, 造成DNA链的断裂、断裂等损伤。

关键词 DNA, 柔红霉素, 光谱电化学

分类号

Study on the Interaction between Antitumor Drug Daunomycin and DNA

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Abstract A detection of anthracycline antitumor drug daunomycin (DNR) reacting with DNA in simulate metabolism *in vitro* has been made. It was found that DNR could react with DNA to form DNR-DNA adducts. The adduct compositions of DNR with fish sperm DNA and thermally denaturated DNA were determined. The equilibrium association constant *K* of DNR with fish sperm DNA is $1.98 \times 10^7 \text{ mol}^{-1}$, and that of DNR with denaturated DNA is $2.29 \times 10^4 \text{ L/mol}$. Semiquinone free radicals, metabolic products of DNR, can destroy both fish sperm DNA and its thermally denaturated DNA. It is verified by hyperchromic effect increase observed in UV spectrum and AFM experiments. The mechanism of DNA degradation has also been investigated. Results obtained allow one to explain the reason of side effect of anthracycline drug and give the way to depress, which were of clinical significance.

Key words DNA, daunomycin, spectroelectrochemistry.

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