

论文

用作盲肠位点药物载体的交联凝胶的体外降解

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摘要:

目的 考察用作结肠位点药物载体的偶氮苯交联凝胶的降解机制及影响因素。方法 凝胶经大鼠结肠菌培养,在不同时间间隔内取出用蒸馏水洗净,加15%氢氧化钠加热水解后,用紫外光度法测定其降解率。结果 这类凝胶能被盲肠内的厌氧菌降解,其降解率与凝胶的溶胀程度有关,凝胶的溶胀程度越大,其降解率越高。凝胶的降解率与溶胀程度间的关系主要取决于网络孔密度和孔尺寸。影响网络孔密度和孔尺寸的因素包括网络上疏水基的长度、交联程度及组成等,通过改变这些因素可以达到调节网络孔密度和孔尺寸,从而控制其降解率和药物释放的目的。结论 电子载体对凝胶降解率的影响研究,不仅证实盲肠菌对芳香族偶氮化合物的还原发生在细胞体外,而且亦显示偶氮还原酶存在于细胞体内,电子载体的功能是穿梭于细胞内的偶氮还原酶与细胞外的偶氮基团之间起传递电子的作用。本实验结果对开发结肠位点的控释载体有重要的指导意义。

关键词: 交联凝胶 盲肠菌 降解 溶胀程度 电子载体

DEGRADATION *IN VIVO* OF CROSS-LINKED HYDROGELS FOR COLONIC-SITE DRUG DELIVERY

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Abstract:

AIM To investigate the mechanism of degradation by cecal bacteria of cross-linked hydrogels for colonic-site drug delivery. METHODS Hydrogels that were incubated with cecal bacteria from rats for different time were washed repeatedly in distilled water till complete removal of bacteria. 15% NaOH solutions were added and heated till complete hydrolysis of the gels. The cleavage of azo bonds was monitored with a Lambda spectrophotometer. RESULTS The gels were degradable by ananeroes present in the colon. The rate of degradation was found to be related to the degree of swelling of the gels. The higher the degree of swelling, the higher the rate of degradation. The relation between the rate of degradation and the degree of swelling was attributed to the porosity and pore size of the networks. The lengths of hydrophobic side chains, the degree of cross-linking, the composition of structural units were shown to influence reduction of azo bonds. By changing the composition of structural units, the length of hydrophobic groups, it is possible to adjust the degree of swelling and thereby control the rate of degradation of the gels and the release of drugs. The study on the influence of electron carriers on the rate of degradation not only affirmed the hypothesis of extracellular reduction, but also appeared that there is an intracellular enzymatic component. Electron carriers function as exogeneous electron shuttles between azo compound and enzyme. CONCLUSION The above-mentioned results are of important significance for the development of carriers for the delivery of colon-specific drugs.

Keywords: cecal bacteria degradation the degree of swelling electron carriers cross-linked hydrogels

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