



Precision design of nanomedicines to target tumor microenvironment and overcome low chemosensitivity for pancreatic cancer treatment



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聂广军, 国家纳米科学中心研究员, 博士生导师, 课题组长, 中科院特聘研究员, 国科大特聘教授; 科技部纳米研究国家重大科学研究计划(973)项目首席科学家, 国家杰出青年基金获得者, 入选中科院“引进国外杰出人才”计划, 结题优秀, 国务院享受政府特殊津贴专家; 基金委创新群体、中科院创新交叉团队、中科院卢嘉锡国际团队成员; 2016年获中国药学会以岭药业青年科学家奖; 美国Houston Methodist Research Institute (休斯敦) 兼职教授, 英国医学科学院Advanced Newton Scholar, 东北大学兼职博士生导师, 华东理工大学兼职博士生导师; 中国抗癌协会纳米肿瘤学专业委员会委员, 中国毒理学会纳米毒理学会分会委员, 中国生物物理学会自由基生物医学专业委员会委员, 中国药学会纳米药物专业委员会委员, 国家纳米科学中心科技处处长。在Adv Mater, Angew Chem Int Ed, Antioxid Redox Sign, Adv Funct Mater, Biomaterials, Blood, Brit J Haematol, J Am Chem Soc, J Biol Chem, Sci Rep, Small和Nanomedicine等国际重要学术期刊上发表SCI论文110多篇; 申请抗肿瘤应用等相关发明专利30多项 (PCT专利2项, 授权22项, 其中美国专利授权2项, 专利转让2项)。相关研究成果也被Nat Mater, Adv Mater, Small (封面), Blood, Chem Soc Rev, Materials View和中国科学报等著名学术期刊、网站和媒体进行了重点推荐和报道。

报告摘要:

In spite of the promising therapeutic potential exhibited by the numerous antitumor nanomaterials, it remains a major challenge for particulate-based therapeutics to effectively transport into solid tumors, especially in stromal enriched tumors. The recent progress on understanding the critical roles and the underlying mechanisms of tumor microenvironment on tumor rapid growth and metastasis has made targeting the tumor microenvironment becomes a feasible strategy to improve the effectiveness of nanomaterials-based cancer diagnosis and therapy. Expression of stromal fibroblasts-specific enzymes and pathological changes of tumor vasculature are the most remarkable hallmarks of tumor microenvironment in almost all types of tumors and can be considered as good specific triggers or targets for design of broad-spectrum and local-environment responsive functional nanomaterial-based platform. Here we report novel biomimetic nanostructures based on oligopeptide self-assemblies that could quickly response and regulate the key components of tumor microenvironment. With such a strategy, the optimal formulations were developed, showing the high activation efficacy and antitumor efficacy. The tailor-made self-assembled biomolecule nanomaterials have the potential to be used in early and late stages of solid tumors, especially for stromal enriched solid tumors, which is expected to be of crucial importance for clinical tumor therapeutics. Although additional research is urgent needed to develop robust methods for targeting and regulating nanomaterials to tumor sites and the supporting environment, the applications of tumor microenvironment-based nanotechnology for safer and more effective antitumor nanomedicine have so far been proven to be successful and will eventually revolutionize the current landscape of cancer therapy.

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