Delivery Strategies of Nanomedicine for Cancer Treatment

By
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Abstract
To ameliorate complex physiological barriers of tumor tissues, improve targeting delivery efficiency and PK/PD behavior of antitumor nanomedicine, we put forward “Five De” strategies, which included long circulation, Targeting, Penetration, Internalization, Release. Based on “Five De”, we developed 4 novel targeting strategies in tumor therapy. First, non-PEGylation hydrophobicity reverse strategy. According to the unique microenvironment of tumor tissues, we developed temperature- and pH-responsive nanogels. These nanogels could realize hydrophobicity reverse, overcome PEG dilemma, enhance tumor targeting efficiency and tumor therapy effects finally. Second, mechano-nano oncology strategy. We develop tumor cells-derived MPs drug delivery system. Through modulation in stiffness of MPs, the PK/PD behavior of MPs was enhanced significantly. Thirdly, hyperbaric oxygen (HBO) Strategy. HBO was a common adjuvant therapy method in clinic. HBO could improve tumor hypoxia microenvironment, enhance accumulation and penetration of nanomedicine in tumor tissues. Meanwhile, HBO also make tumor cells sensitive against antitumor drug. Fourthly, HES strategy. In the basis of RES block, drug co-delivery and drug covalent coupling, we developed various novel HES drug delivery system, and realized enhanced tumor chemotherapy effects.

Short Biography
Prof. Yang is vice president of Nanomedicine of Chinese Pharmaceutical Association, Nanomedicine and Engineering of Chinese Society of Biomedical Engineering, Nano-Oncology of Chinese's Anti-Cancer Association and panel member of Chinese National Key Research and Development Plan. He is the Chief Scientist of the Major Research Program of “Nanomedicine for Liver Cancer” from the Ministry of Science and Technology of China. His research has focused on nanomedicine including nano drug delivery systems, nanodiagnostics and biomedical nanomaterials. He has published more than 300 papers including Nature Biomedical Engineering, Nano Letters, ACS Nano, Advanced Functional Materials, Biomaterials etc as well as more than 50 Chinese patents, 3 national new drug certificates and 15 national drug registration approvals. His H-index is 47. He is also the Most Cited Chinese Researchers by Elsevier from 2014 to 2018.