Drug Des 2017, 6:4(Suppl)
DOI: 10.4172/2169-0138-C1-017

Combinational strategy via co-delivery of drugs and siRNA by layered double hydroxide-based nanocomposites in cancer therapy

Li Li
The University of Queensland, Australia

Chemotherapy is one of most common cancer treatments in clinics. In most cases, the clinical responses show that the efficacy of chemotherapy is limited by the development of multidrug resistance (MDR) in cancer cells during a long period of treatment. Target-specific delivery and sustained release of anticancer agents and siRNA has attracted considerable research interest in cancer chemotherapy. It is clear that the single treatment by either anticancer drug or siRNA delivered by nanocarriers can only achieve limited success in overcoming the MDR of cancer cells. Thus, the development of an effective strategy to overcome the multidrug resistance in chemotherapy remains a major challenge in the treatment of cancers, where co-delivery of anticancer drugs and siRNA would be a promising strategy. For this purpose, layered double hydroxides (LDHs), a family of anionic clay materials, have been examined as an example for simultaneous drug and gene delivery by using their unique properties. Our strategy is to combine two different types of anticancer therapeutics for effective cancer treatment. For example, 5-fluorouracil (5-FU) and siRNAs were co-loaded and then co-delivered to treat cancer cells, as illustrated in Scheme 1. Our data clearly indicate that LDH nanoparticles (NPs) can efficiently co-deliver 5-FU and siRNA into MCF-7 and U2OS cells and combination treatment with siRNA and 5-FU leads to significantly higher cytotoxicity to three cancer cell lines (MCF-7, U2OS and HCT-116), compared to the single treatment with either siRNA or 5-FU. Therefore, co-delivery of siRNAs and anticancer drugs by LDHs synergistically enhances the efficacy in these cancer treatments and has great potential as a novel approach for effective cancer treatment.

l.li2@uq.edu.au

Pharmaceutical impurity analysis of raw materials and final product by using analytical techniques

Muhammad Jehangir
Novamed Group, Pakistan

Isolation and identification of unknown components and impurities: The evaluation of pharmaceutical raw materials and finished products for impurities and degradation products is an essential part of the drug development and manufacturing testing process. Additionally, toxicological information must be obtained on any drug-related impurity that is present at a concentration of greater than 0.1% of that of the active pharmaceutical ingredient (API). In pharmaceutical QC and manufacturing, impurity analysis has traditionally been performed by HPLC with UV, PDA, or MS detection. As it is essential to detect and measure all of the impurities in the sample, it is necessary to have a high resolution separation process. This usually involves long analysis times resulting in low throughput. As candidate pharmaceutical compounds become more potent and are dosed at lower and lower levels, ever more sensitive assays are needed to detect and measure impurities. The low throughput of HPLC can become the rate-limiting step in product release testing or process evaluation. Since much of the process of impurity identification involves the coupling of LC to sophisticated MS, any reduction in analysis time will result in a more efficient use of these significant investments. Analytical technology advances such as UPLC and UPC offer significant improvements in throughput and sensitivity, with benefits to the process of product release and identification of drug-related impurities. The most characteristic feature of the development in the methodology of pharmaceutical and biomedical analysis during the past 25 years is that HPLC became undoubtedly the most important analytical method for identification and quantification of drugs, either in their active pharmaceutical ingredient or in their formulations during the process of their discovery, development and manufacturing.

m.jehangir@novamed.com.pk