

Colorectal Cancer Treatment: Resistance Mechanisms, Insights, Advances, and Solutions

Nanomedicine innovations: Conquering colorectal cancer drug resistance

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Colorectal cancer (CRC) is one of the most frequent cancers in both men and women globally. For decades, the management of CRC posed a lot of challenges with increased morbidity associated with radical surgery and mortality of the disease. Chemotherapy advances gave patients and doctors alike optimism that the burden of this cancer might be lessened. However, disease recurrence as well as resistance to multiple chemotherapeutic drugs pose a challenge and is a setback to all the gains made over decades. There is new hope found in the innovative technology that can be used with both old and newer chemotherapeutic drugs to overcome resistance. This chapter focuses on the innovative use and application of advanced nanotechnology-or nanoparticle-based drug delivery system, for chemotherapy resistance tumors. This will include the use of, but not limited to, liposomes, polymeric micelles, and other targeted nanoparticles, which enhance drug delivery, improve bioavailability, reduce adverse effects of chemotherapy, and improve the therapeutic efficacy in CRC. Several studies have shown that the therapeutic effectiveness of nanoparticles against CRC with the use of platinum-based treatments as well as drugs of different chemical classification is improved. Although many of these innovative technologies are still used in clinical research setting, there has been benefit shown where such are used outside of research.