Colorectal cancer stem cells: a review of targeted drug delivery by gold nanoparticles

ABSTRACT

Colorectal cancer (CRC) is one of the most common cancers with equal probability of affecting both men and women worldwide. Recently, the newly emerged theory of cancer stem cells has associated CRC stem cells (CRCSCs) with the high rates of recurrence and poor prognosis. Thus, targeting CRCSCs instead of CRC may resolve cancer relapse. Among the chemotherapeutic drugs, the antimetabolite 5-fluorouracil (5-FU) has shown high efficiency in CRC treatment. However, due to several limitations, the usefulness of 5-FU has been restricted. The application of gold nanoparticles (AuNPs) in drug delivery systems is reported to enhance the effectiveness of anticancer drugs due to their biostability, non-toxicity and feasibility for surface modification. Furthermore, the overexpression of biomolecular surface markers in CRCSCs may elevate the specific targeting by AuNPs, and hence, reduce the non-specific binding, which could lead to systemic side effects. This review briefly presents the proposed therapeutic potential of AuNPs loaded with 5-FU, conjugated with specific antibodies targeting CRCSCs, which could be valuable to improve some limitations in current CRC management.