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Theranostic nanomedicine and its application in cancer diagnosis and treatment

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Theranostic nanomedicine is new era of therapeutics and diagnostics for different diseases including cancer. Nanoparticles carry entire units with high affinity and biocompatibility that are used in molecular imaging and for therapeutic purposes. In addition, theranostic nanomedicine can determine the course of treatment and diagnosis. Moreover, nanoplatforms are designed as co-delivery treatment complexes. These nanoplatforms include polymers, dendrimers, lipid, organometallic and carbon based materials. Selection of specific nanoparticles for cancer nanotechnology is based on several criteria including: Biocompatibility, toxicity, size, chemistry, surface and their biological characteristics. The aims of cancer theranostics are to improve diagnostic capabilities, deliver treatment in timely manner and it appears to be fundamental in regards to personalized cancer therapy. This paper highlights the basic definition of nanotechnology, types of nanoparticles and the role of nanoplatforms in drug delivery and molecular imaging. It illustrates applications for cancer theranostics in the medical field, provides examples of nanoparticles that are used for image-guided therapy and those that are involved in drug delivery systems. Finally, the recent applications of cancer theranostics in treating pancreatic adenocarcinoma and some of the future aspects of theranostic nanomedicine will be discussed.

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