

Drug Delivery in Cancer - Technologies, Markets and Companies

Description: Drug delivery remains a challenge in management of cancer. Approximately 12.5 million new cases of cancer are being diagnosed worldwide each year and considerable research is in progress for drug discovery for cancer. Cancer drug delivery is no longer simply wrapping up cancer drugs in a new formulations for different routes of delivery. The focus is on targeted cancer therapy. The newer approaches to cancer treatment not only supplement the conventional chemotherapy and radiotherapy but also prevent damage to normal tissues and prevent drug resistance.

Innovative cancer therapies are based on current concepts of molecular biology of cancer. These include antiangiogenic agents, immunotherapy, bacterial agents, viral oncolysis, targeting of cyclic-dependent kinases and tyrosine kinase receptors, antisense approaches, gene therapy and combination of various methods. Important methods of immunotherapy in cancer involve use of cytokines, monoclonal antibodies, cancer vaccines and immunogene therapy.

Several innovative methods of drug delivery are used in cancer. These include use of microparticles as carriers of anticancer agents. These may be injected into the arterial circulation and guided to the tumor by magnetic field for targeted drug delivery. Polyethylene glycol (PEG) technology has been used to overcome some of the barriers to anticancer drug delivery. Encapsulating anticancer drugs in liposomes enables targeted drug delivery to tumor tissues and prevents damage to the normal surrounding tissues. Monoclonal antibodies can be used for the delivery of anticancer payloads such as radionucleotides, toxins and chemotherapeutic agents to the tumors.

Antisense oligonucleotides have been in clinical trials for cancer for some time now. RNAi has also been applied in oncology. Small interfering RNAs (siRNAs) can be targeted to tumors and one example is suppression of H-ras gene expression indicating the potential for application in therapy of ovarian cancer. Cancer gene therapy is a sophisticated form of drug delivery for cancer. Various technologies and companies developing them are described. Nucleic acid-based cancer vaccines are also described.

Drug delivery strategies vary according to the type and location of cancer. Role of drug delivery in the management of cancers of the brain, the bladder, the breast, the ovaries and the prostate are used as examples to illustrate different approaches both experimental and clinical. Biodegradable implants of carmustine are already used in the treatment of malignant brain tumors.

The market value of drug delivery technologies and the anticancer drugs are difficult to separate. Cancer market estimates from 2008-2018 are given according to organs involved and the types of cancer as well as according to technologies. Distribution of the into major regions is also described.

Profiles of 205 companies involved in developing innovative cancer therapies and methods of delivery are presented along with their 221 collaborations. The bibliography contains over 600 publications that are cited in the report. The report is supplemented with 55 tables and 8 figures.

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