Locoregional Chemotherapy for Liver Cancers

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Technology description

Unmet Need

Over 800,000 people are diagnosed with liver cancer annually. As the leading cause of cancer death worldwide, liver cancer accounts for more than 700,000 deaths annually. Recently, Johns Hopkins researchers have developed new chemotherapeutic drugs to treat liver cancer that demonstrate higher efficacy than the current standard of care for both hepatocellular cancer and cholangiocarcinoma (sorafenib and fluropyrimidines/gemcitabine). However, effective usage of these drugs requires identifying the optimal methods of drug delivery to enhance their anti-tumor activity. While systemic administration is viable and the most straightforward strategy, it is almost always accompanied by adverse side effects. In contrast, a method of locally delivering the drug to the tumor or the tumor environment and its corresponding blood vessels can deliver higher levels of the drug to the tumor with significantly fewer systemic side effects. Also, chemotherapeutic drugs are often enhanced when used in combination with other drugs, and can be made more useful by formulating them with imaging contrast agents. Understanding the possible formulations of the drugs can increase their treatment effectiveness and utility to imaging specialists such as interventional radiologists. Thus, there is a need to identify formulations and methods of delivery for the recently developed chemotherapeutic drugs that will enhance their anti-cancer effectiveness and utility while minimizing side effects.

Technology Description

Several drugs are disclosed for treating liver cancer both locally and systemically, including HDAC and proteasome inhibitors. Methods of delivering the drugs for local treatment of liver tumors include direct injection, which may be performed under imaging guidance, and intravascular delivery (ex. transarterial infusion) to the blood vessels supplying the tumor. These local delivery methods will help target chemotherapeutic treatment to the tumor site, minimizing off-target effects and increasing the quantity of the drug that reaches the tumor. Additionally, the drugs may be formulated in combination with other drugs intended for local liver cancer treatment, or with lipiodol, embolization beads, delayed delivery compounds, or opaque contrast materials. Formulations of the chemotherapeutic drugs with other compounds that aid their delivery will enhance the effectiveness of the drugs in treating liver cancer and can allow for improved procedural decision-making.

Institution

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