Design and development of apigenin loaded nanoparticles for the treatment of hepatocellular carcinoma in rats

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Hepatocellular carcinoma (HCC) is one of the most common malignant solid tumors with a very poor prognosis and survival rate in humans and HCC-related death has been reported as the second highest among the all cancer related deaths worldwide. Apigenin, a dietary flavonoid, possesses anti-tumor activity against HCC cells *in-vitro*. The apigenin loaded nanoparticles (ApNp) were developed. The physicochemical characterization of apigenin loaded nanoparticles (ApNp), biodistribution pattern and pharmacokinetic parameters of apigenin upon intravenous administration of ApNp, and effect of ApNp treatment in rats with HCC were investigated It was observed that Apigenin loaded nanoparticles had a sustained drug release pattern and it reached successfully to the hepatic cancer cells *in-vitro* as well as in liver of carcinogenic animals. ApNp predominantly delayed the progress of HCC in chemical induced hepatocarcinogenesis in rats. Quantification of apigenin was done by liquid chromatography–mass spectroscopy (LC-MS/MS) which showed that apigenin availability significantly increased in blood as well in the liver upon ApNp treatment. Thus, the severity of hepatocellular carcinoma was substantially controlled by Apigenin loaded and could be a future hope for lingering the survival in hepatic cancer patients.

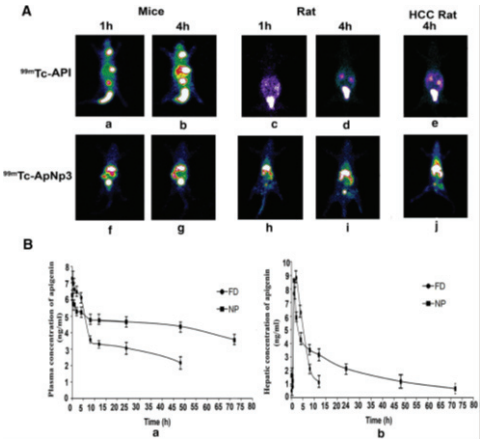

Figure . Pharmacokinetic data of apigenin from ApNp3//API and Gamma scintigraphic images of radiolabeled ApNp3/API and apigenin biodistribution in vivo (A). Pharmacokinetic profile of apigenin: plasma profile and hepatic accumulation of drug in experimental animal (B).(A) Time dependent biodistribution and accumulation of 99mTc-API in mice at 1 h (a) and 4 h (b); in rats at 1 h (c) and 4 h (d); in rats with HCC at 4 h (e) along with the accumulation of 99mTc-ApNp3 in mice at 1 h (f) and 4 h (g); in rats at 1 h (h) and 4 h (i); rats with HCC at 4 h (j).(B) Plasma (a) and hepatic (b) concentration of apigenin upon i.v. bolus injection (at a dose of 1 mg/kg body weight) of ApNp3 and API were shown.

Biography

Alankar Mukherjee has completed her M. Pharm in Clinical Pharmacy and Pharmacy Practice from Department of Pharmaceutical Technology, Jadavpur University, Kolkata, West Bengal, India. During her master's degree, she has worked on the project entitled "Pattern of use of various erythropoiesis stimulating agents in hemodialysis patients in a tertiary care hospital of Eastern India". The project has been done in collaboration with the AMRI hospital, Kolkata, West Bengal, India.

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