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Using nanodiamond for drug delivery in liver cancer treatment by adsorbing Epirubicin

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Liver cancers are among the most common cancers worldwide and hepatocellular carcinomas (HCCs) account for 75% of all primary liver cancers. In HCCs, potential cancer stem cells (CSCs) have been identified through the isolation of side population (SP) cells according to the ability to efflux Hoechst 33343 dye. These SP cells share many functional properties of CSCs such as extensive self-renewal and proliferative capacity, and more importantly, the ability to initiate tumor growth in immuno-compromised mice. SP cells are also resistant to conventional chemotherapies and are the likely candidates for tumor recurrence owing to the ability to efflux drugs effectively via expression of various ABC drug transporters. Here, we proposed the use of a nanoparticle drug delivery platform, nanodiamonds (NDs) for targeting of these chemoresistant cells. Using ND adsorbed with a common chemotherapeutic agent, Epirubicin (Epi), we demonstrated that these EPND complexes can prolong drug retention in tumor cells. More importantly, we also showed that EPND complex can significantly reduced the SP cells as compared to epirubicin drug alone. Finally, EPND showed significant lower toxicity than Epi. Collectively, ND-conjugated chemotherapy presents a promising avenue for overcoming chemoresistance and tumor recurrence in cancers such as HCC.

Biography

Wang Xin is currently a PhD student at National University of Singapore. She has attended several local & international conferences and achieved multiple awards. She has published 1 paper as first author in reputed journal *ACS Nano*.

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