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Polyethyleneimine-folic acid modified mesoporous silica nanoparticles for the targeted delivery of curcumin and the anti-tumor efficacy in mice

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Curcumin (CUR), a compound extracted from the rhizome of *Curcuma longa*, has shown anti-cancer activity. However, its clinical applications are limited by the low water solubility, poor chemical stability, and low oral bioavailability. In this study, we developed a Polyethyleneimine-folic acid modified mesoporous silica nanoparticles for the targeted delivery of curcumin and evaluated its therapeutic efficacy in mice. The mesoporous silica nanoparticles (MSNs) was modified with polyethyleneimine-folic acid (PEI-FA) and hyaluronan (HA), respectively. The capacity of the resultant nanocarriers (MSN-PEI-FA and MSN-HA) for CUR delivery was evaluated using breast cancer lines and a mouse xenograft model. The results indicated that both nanocarriers enhanced the drug cellular uptake, and MSN-PEI-FA showed higher targeting and accumulation in tumors than MSN-HA. The CUR-loaded MSN-PEI-FA nanoparticles exhibited greater anti-tumor efficacy than free CUR.

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