Nanoparticle (NP) delivery of chemotherapeutic drugs can be used to both improve tumor toxicity and reduce toxicity to normal tissue in chemo and chemoradiotherapy (CRT). However, various properties of nanoparticles with respect to CRT are yet to be explored. For instance, it is unknown how particle size may affect the therapeutic index of CRT. Exploration of this topic may provide invaluable insight on how NP-based CRT could be administered clinically in the future, as there is currently no set standard on an optimal particle size. PEG-PLGA nanoparticles were engineered encapsulating either the DNA-PK inhibitor Wortmannin (wtmn) or the ATM inhibitor KU60019 of various sizes (50, 100, or 150 nm in diameter) and studied their biodistribution, efficacy, and toxicity in CRT. Effects in vitro were observed in three colorectal adenocarcinoma lines (HT-29, SW480, and LoVo) and in vivo in mice. These nanoformulations were shown to be both cytotoxic and radiosensitizing in these cell lines, and there was no effect of particle size on toxicity in vitro.

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