Development of Anticancer Nanomedicine

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Abstract:
Nanoparticles are promising carriers for the delivery of chemotherapeutics for cancer therapy because they are able to carry large payload of therapeutic modalities, extravasate leaky tumor vasculatures, and mediate sustained drug release in tumor tissues. However, over the past several decades there has been only very limited clinical success of anticancer nanomedicine because of tremendous issues related to their formulation. We developed various controlled chemistries and engineering processes to prepare anticancer nanomedicines with well-controlled physicochemical and biological properties. In one study, we developed the nanoconjugation technique, utilizing hydroxyl-containing therapeutic agents initiated lactide polymerization followed by nanoprecipitation to develop polymeric nanoconjugates with defined drug loading, quantitative loading efficiency and controlled release profiles.\textsuperscript{1-3} We also developed drug-conjugate silica nanoparticles with precisely controlled particle sizes and demonstrated the size-dependent tumor tissue penetration.\textsuperscript{4} Preliminary studies on cancer targeting using aptamer-nanoparticle conjugates was also evaluated and demonstrated in vitro and vivo.\textsuperscript{5}

References: