

GENETICALLY ENCODED POLYMERS FOR DRUG DELIVERY

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I will highlight two technologies developed in my laboratory for the delivery of diverse drugs by genetically encoded polymer drug carriers. First, I will describe a new drug delivery system that we have developed for small molecule cancer chemotherapeutics. This methodology —attachment-triggered self-assembly of recombinant peptide polymers— can package small molecule cancer drugs with a range of hydrophobicity into soluble nanoparticles of a recombinant peptide polymer. These nanoparticles increase the solubility, plasma half-life, and tumor accumulation of the drug, which translates to improved efficacy of the nanoparticle formulation as compared to free drug. Examples of encapsulating doxorubicin, paclitaxel, and gemcitabine — three drugs with vastly different structures and physico-chemical properties— will be presented to illustrate the versatility of this new technology for drug delivery. I will also discuss an injectable delivery system based on thermally sensitive polypeptides for the sustained and tunable release of peptide drugs from a subcutaneous injection site that we have developed for treatment of type 2 diabetes.