

UNIVERSAL TARGETED DRUG DELIVERY AND IMAGING PLATFORM

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Background

Targeted delivery of cytotoxic therapeutics is crucial to prevent adverse side effects of chemotherapy and to increase drug concentrations at the tumor site. These prerequisites also apply to the treatment of infections caused by multiple drug resistant bacteria. To address this unmet need, scientists from Washington University in St. Louis developed a new polymeric targeted delivery platform.

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Technology Summary

The team led by Dr. Jonathan Barnes developed a drug delivery platform with both drug-binding receptors and targeting modalities covalently bound to a polymer backbone. The versatile design enables loading with (a combination of) small-molecule drugs and/or metal ions. This makes the system suitable for chemotherapy, treatment of bacterial infections, and other indications. Loading the polymer with radioisotopes (in combination with drugs) affords a targeted imaging agent. The modular polymeric platform is synthesized from customizable pre-synthesized building blocks to precisely control the ratio of drug/targeting unit/imaging agent. The drug receptor unit allows for binding a large variety of small molecule drugs and circumvents the necessity to resynthesize the platform for every drug, thereby facilitating drug combination therapy for both research purposes and clinical use.

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Figure. Schematic representation of the polymeric targeted drug delivery platform.



Key Advantages

Platform technology for chemotherapy, antibacterial, or other indications, including imaging

- Drug formulation: overcomes limited water solubility of small molecule drugs
- Delivery of high concentrations of drug or imaging agent at the target site
- Targeted delivery reduces side effects and the polymeric particles size may lengthen *in vivo* half-life
- Allows for simple variations in drug combination therapy
- Research tool: drug-imaging combination allows *in vivo* tracking of targeting
- Seed coating application: slow nutrient and pesticide release to support seedling growth

Patents

Pending