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A Multivalent Approach to Triggerable-Release Cancer Drug Delivery Systems

Jessica M. Dennison

University of Windsor, denni11g@uwindsor.ca

Sarah Nasri

University of Windsor

Emma Lauren Dennison

University of Windsor

Daniel Meister

Department of Chemistry and Biochemistry, University of Windsor

Dr. John F. Trant

University of Windsor

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A Multivalent Approach to Triggerable-Release Cancer Drug Delivery Systems

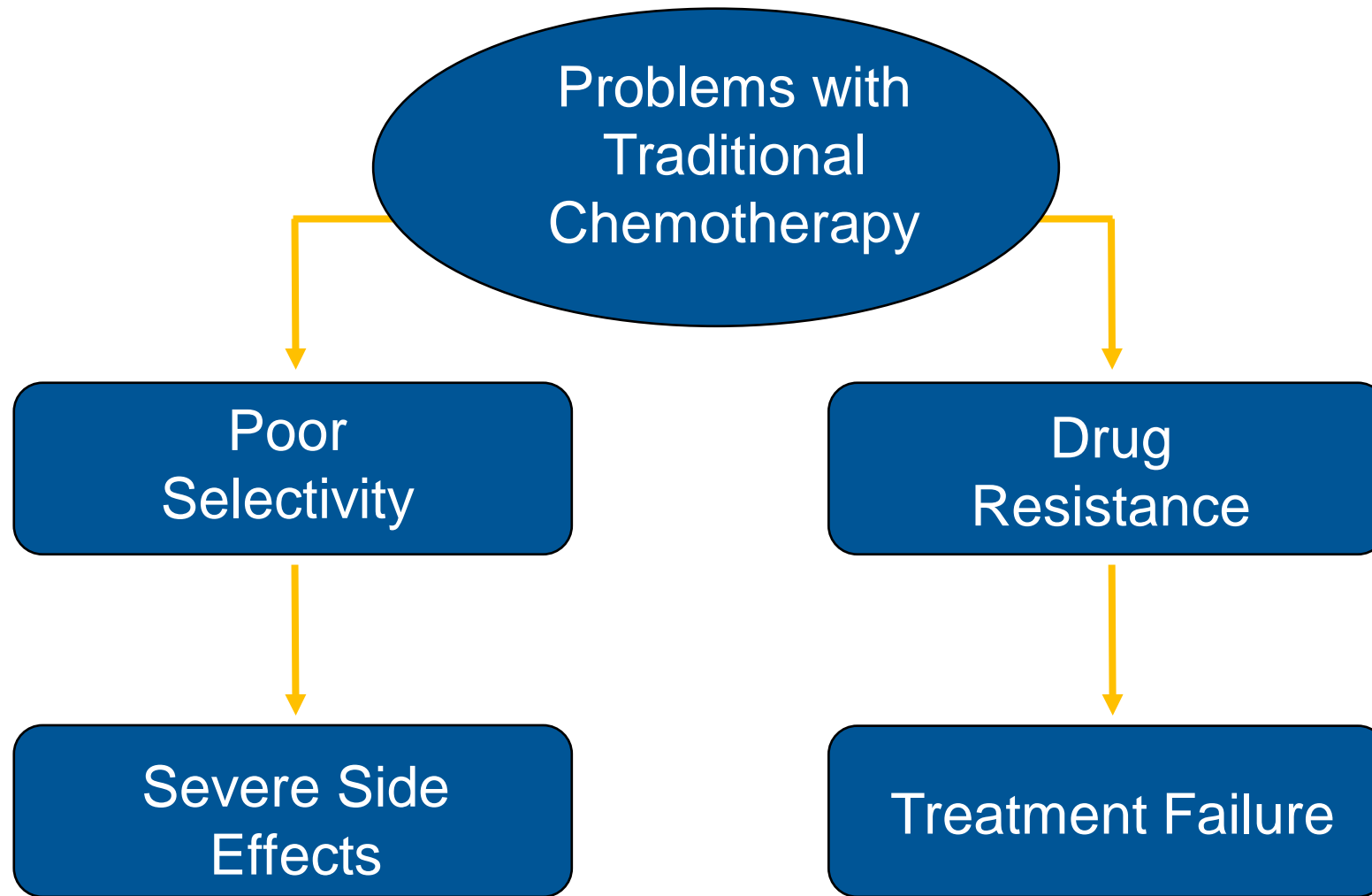
Jessica Dennison, Sarah Nasri, Emma Dennison, Daniel Meister,
Dr. John Trant





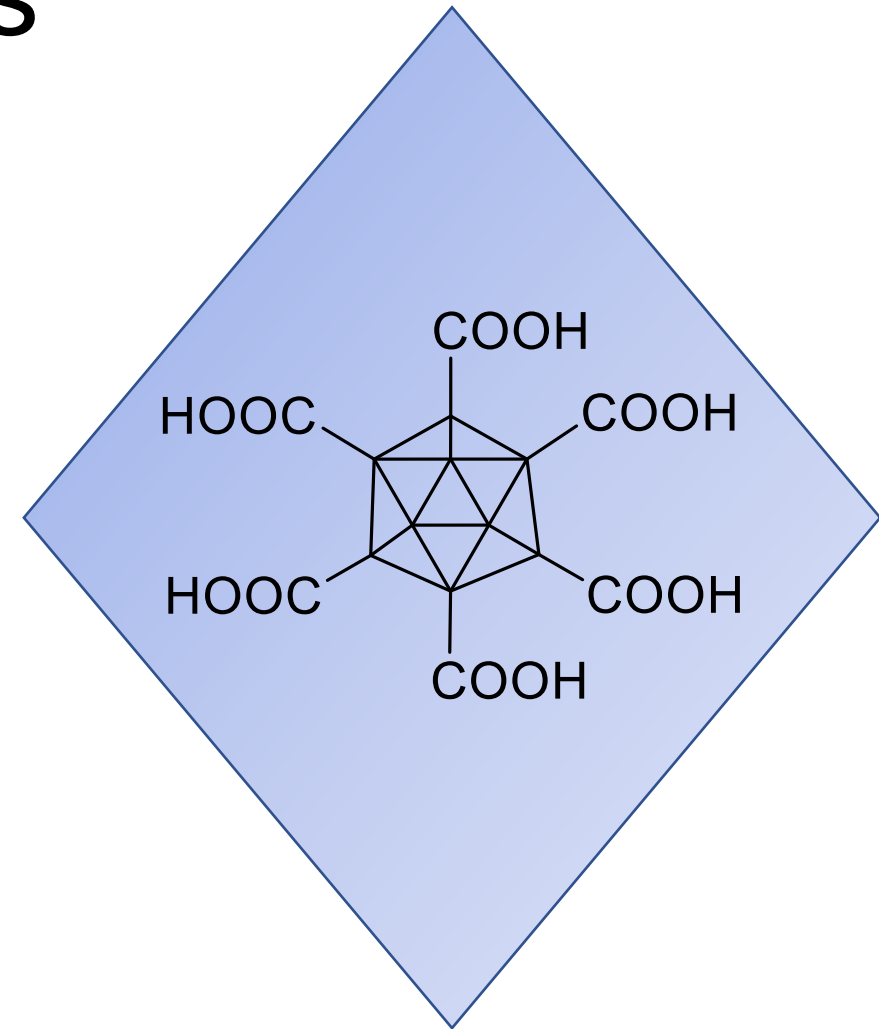
43% of Canadians are expected to be diagnosed with cancer in their lifetime.



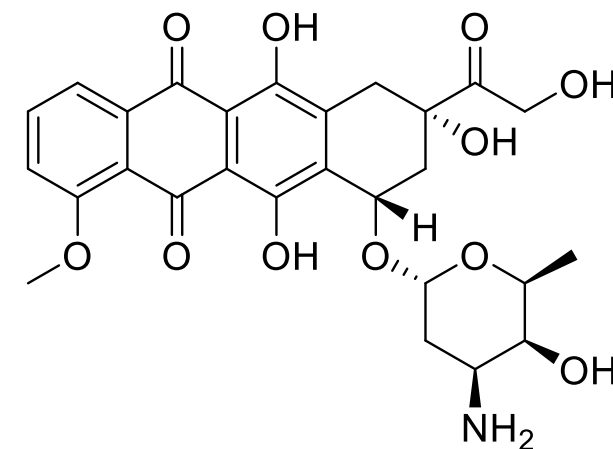
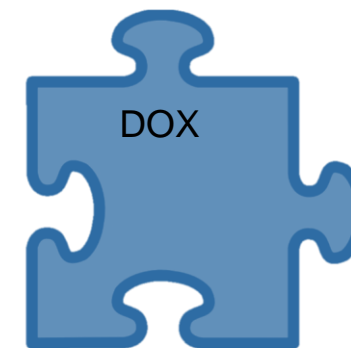
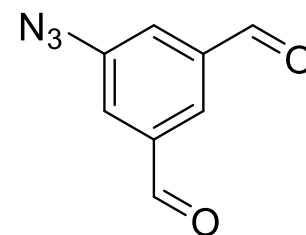
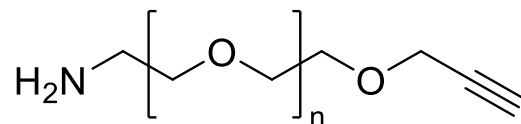
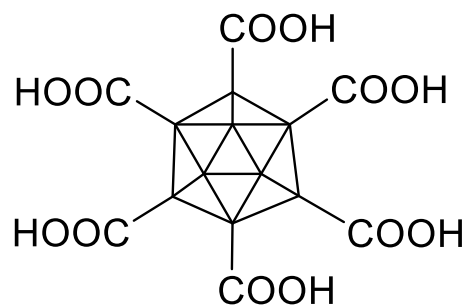


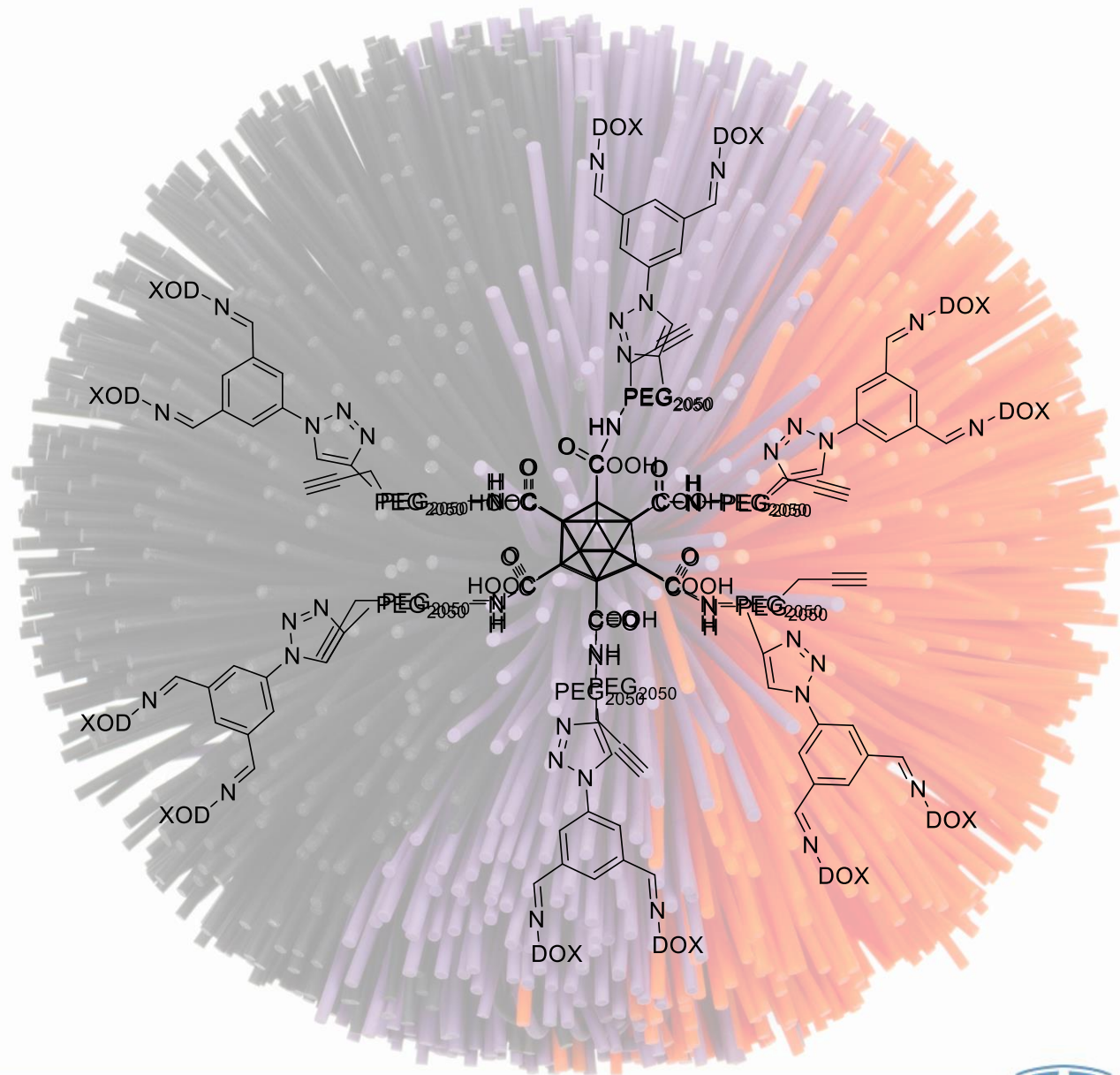
Nanodiamonds

- Nanoscale diamond particles
- Popular in biomedical studies due to their:
 - Low toxicity
 - Biocompatibility
 - Decreased drug resistance
 - Easily functionalizable surface area
 - Increased drug efficacy

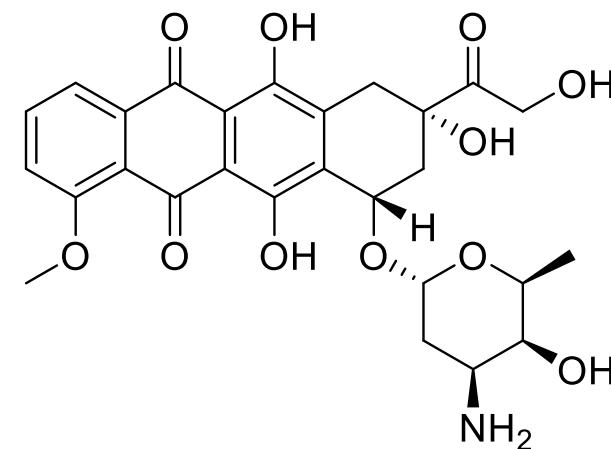
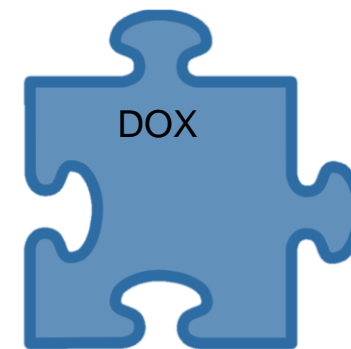
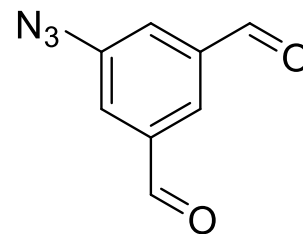
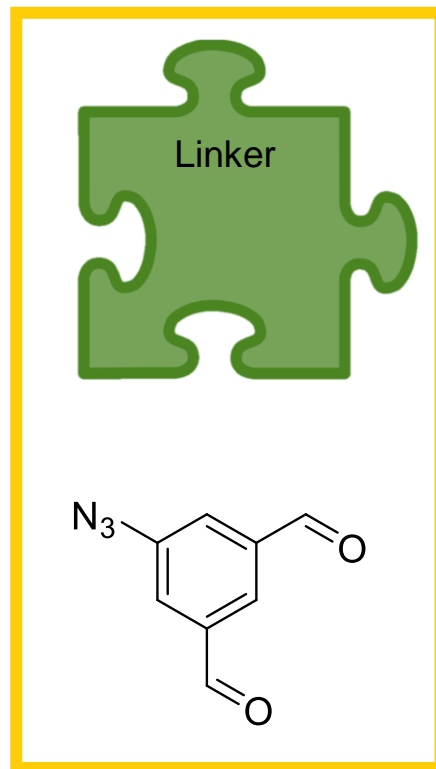
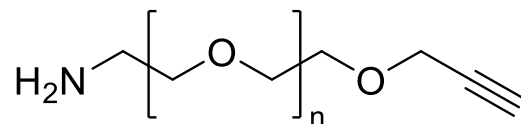
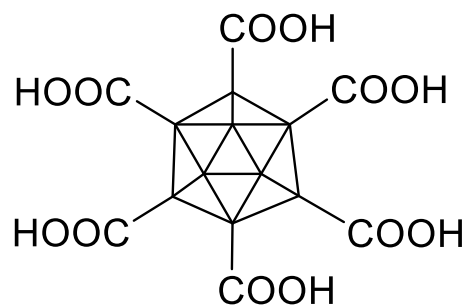


Meet the Pieces



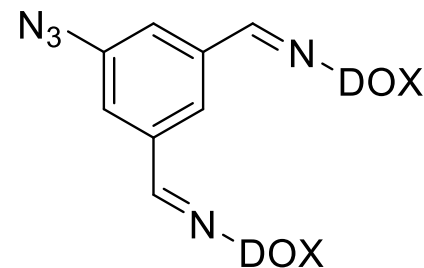
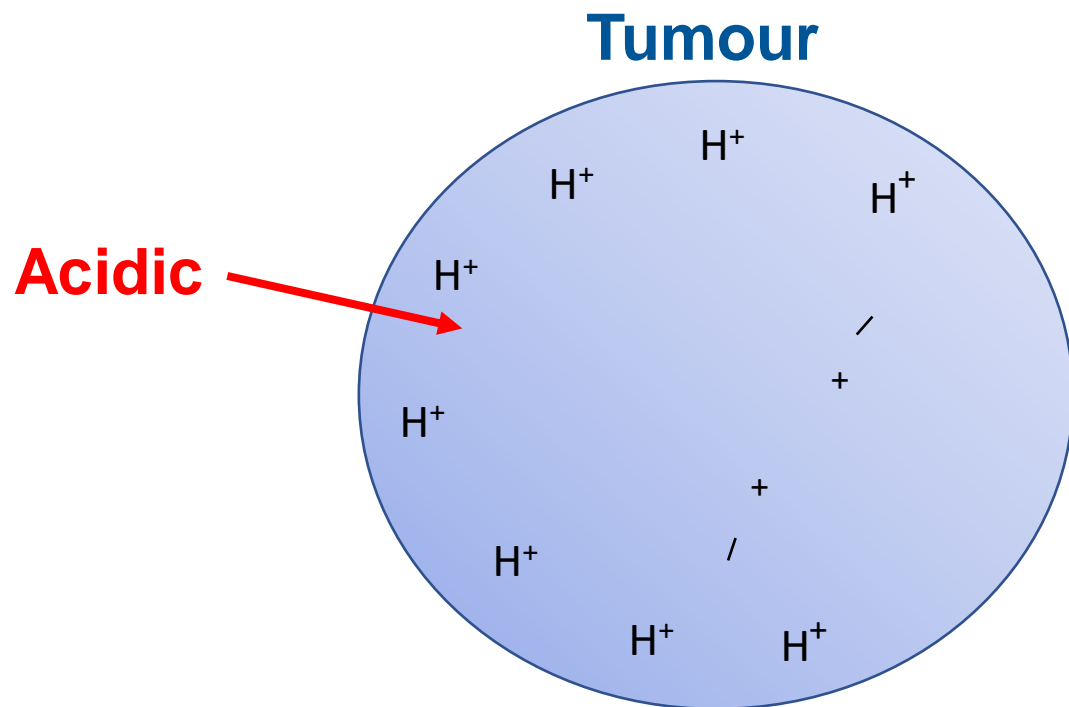


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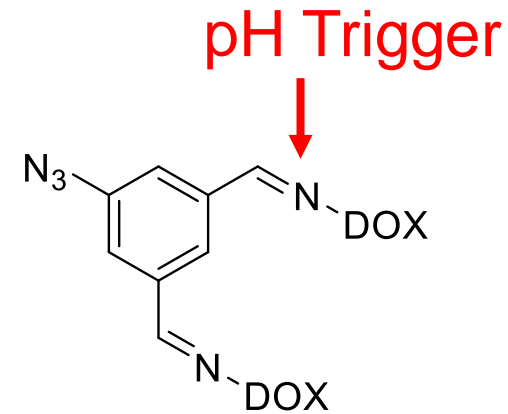
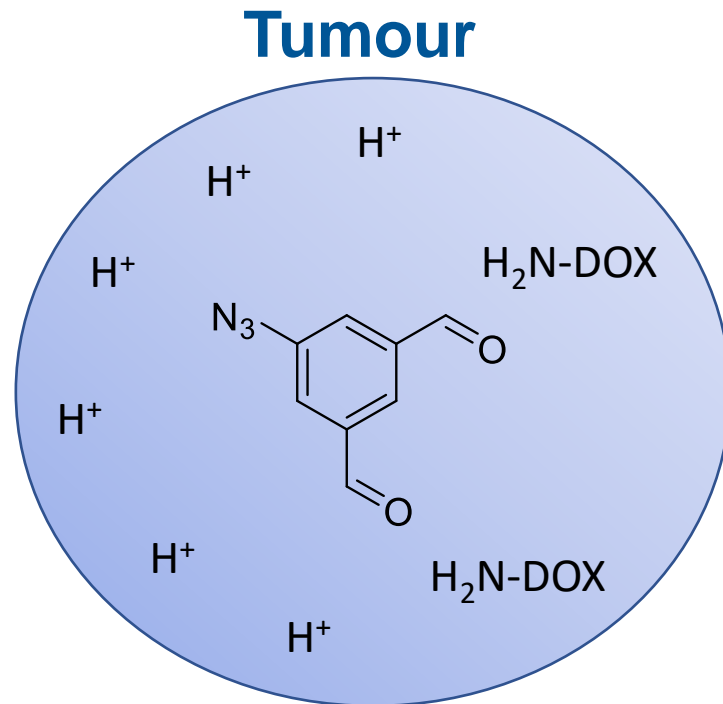
Why This Linker?

- Increases selectivity by triggering the release of DOX at low pH



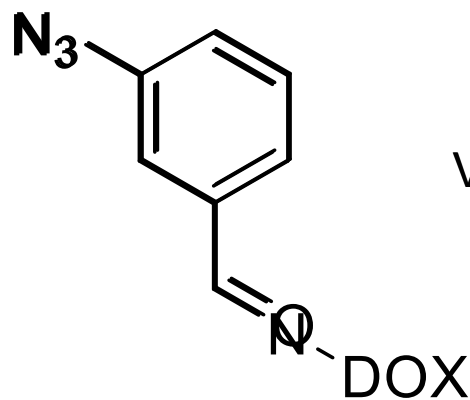
Why This Linker?

- Increases selectivity by triggering the release of DOX at low pH



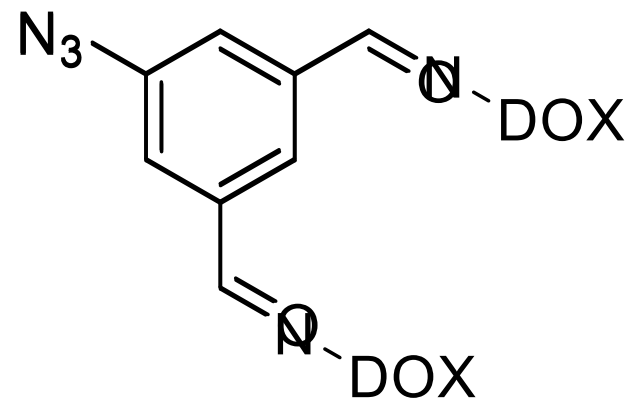
Why This Linker?

- The multivalency provides a more potent delivery system



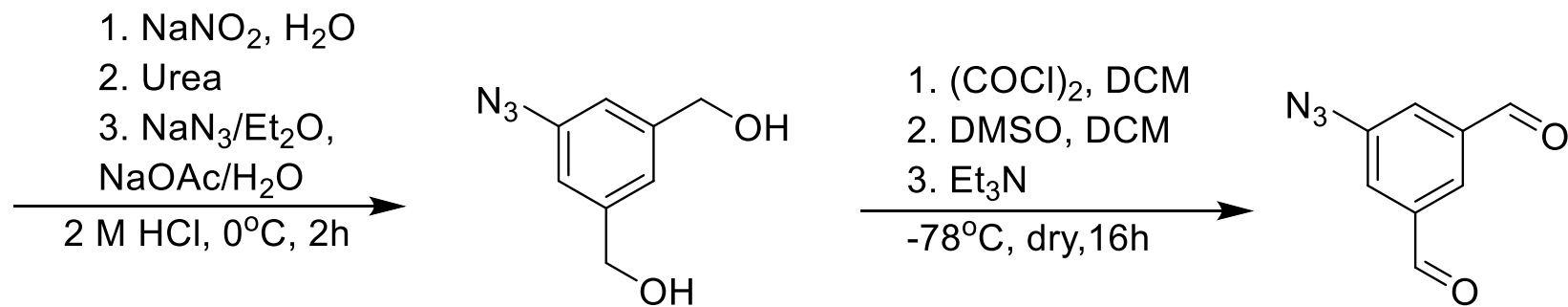
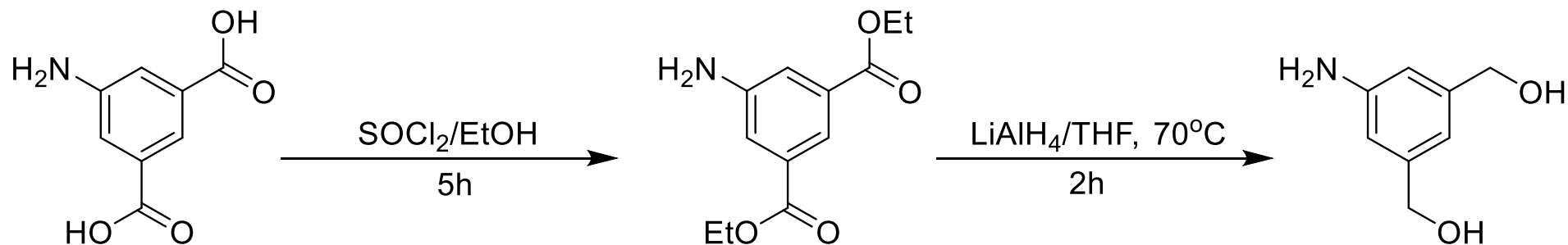
Previous Linker Design

vs.



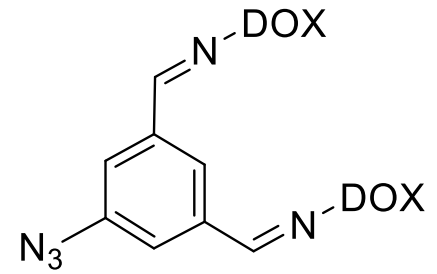
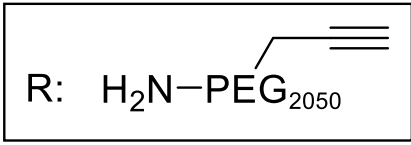
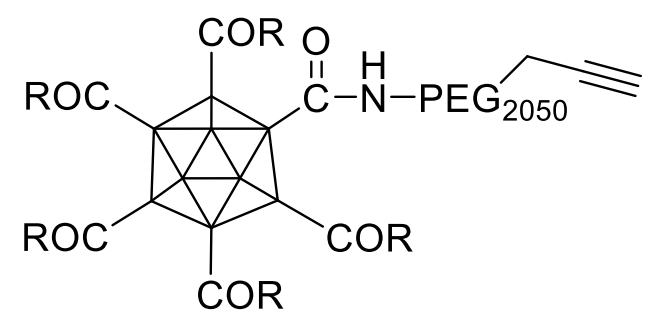
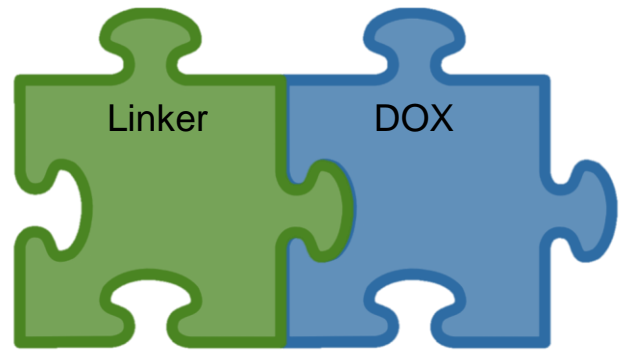
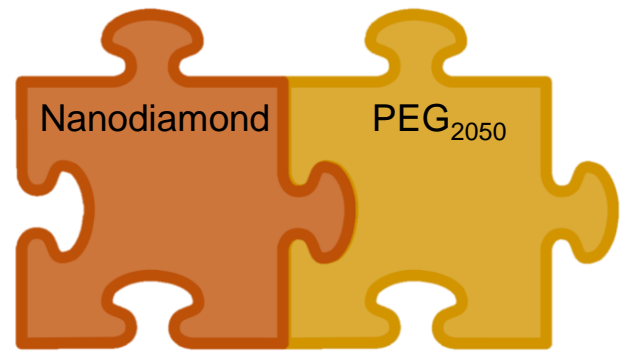
Current Linker Design

Making the Linker



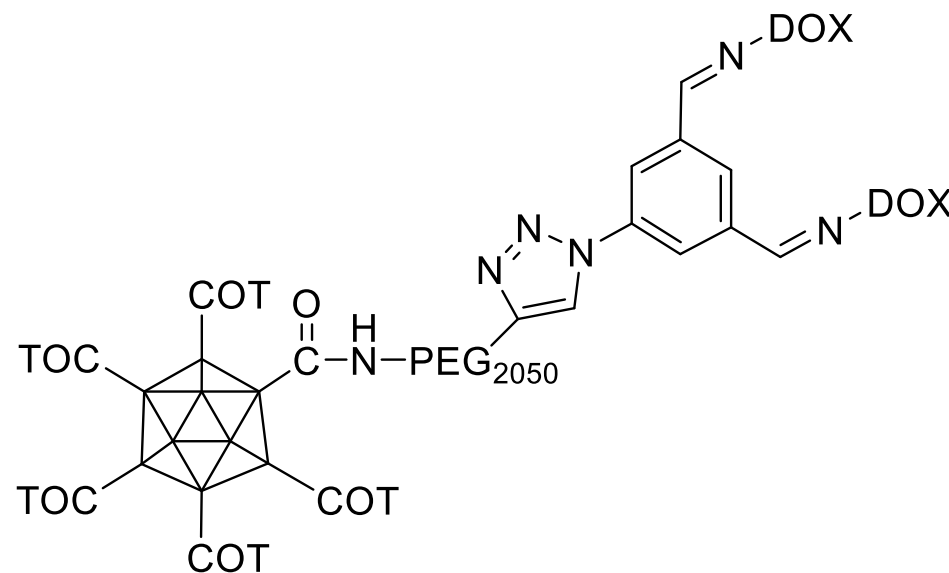


Piecing Together the Drug-Delivery System

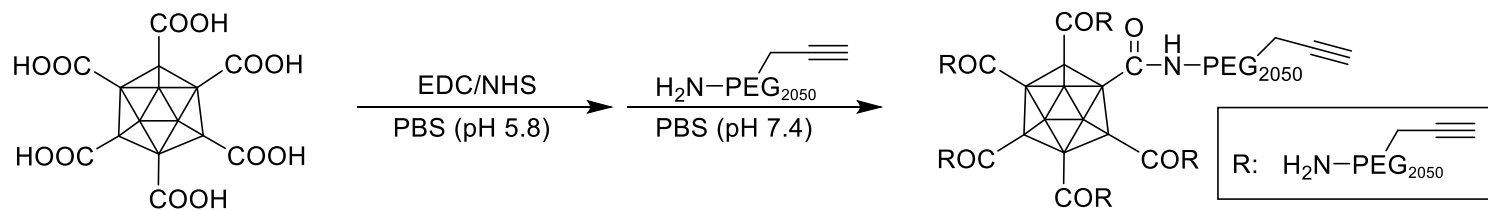




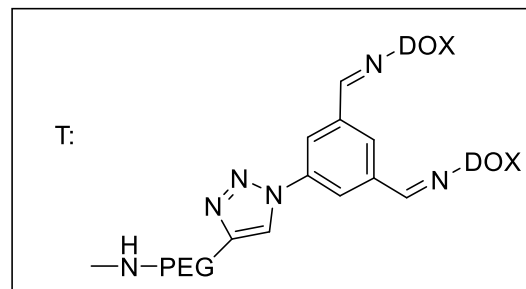
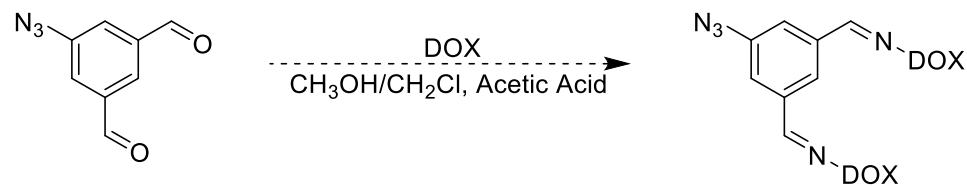
Piecing Together the Drug-Delivery System



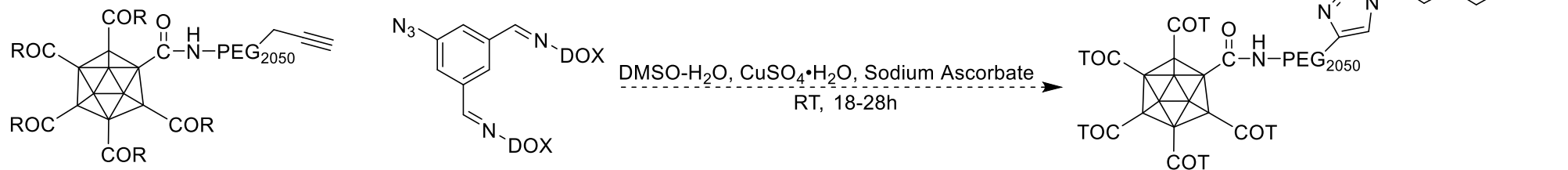
Adding PEG₂₀₅₀ to the Nanodiamond



Adding DOX to the Linker



Synthesizing the System





Characterizing the System: A Work in Progress





Future Plans

Scale Up Reactions

Characterize and Confirm the Purity of the Product

Send Out the Samples to Be Tested on Zebrafish



Thank you!

