Site Specific Drug-Delivery

Lesa Bishop
Thomas Gonzalez
Josh Loessberg-Zahl
Katelynn Vargas

Mentor: Michael Isacman
Advisor: Luke Theogarajan
Department of Chemistry & Biochemistry
The Cure to Cancer!

• Current chemotherapy methods are harmful

• Site-specific treatment vs. full-body treatment
Swedish Meatball?

- Juicy Middle- Drug
- The Meat- Capsule
- Crunchy Outside- Scattered Antigens
Lipid Bi-Layer

Hydrophilic-Red
Hydrophobic-Blue
Self-Assembly

http://www.temple.edu/cst/icms/gallery.html
Encapsulating the Drug

• Keeping the drug encapsulated

• Releasing the drug to the infected area

hv > 300 nm

hv at 254 nm
The Monomer

Coumarin → coumarin-2-oxazoline

2-methyl-2-oxazoline (commercially available)
Polymerization

coumarin-2-oxazoline
2-methyl-2-oxazoline (commercially available)

Diblock poly(oxazoline)

Expected Polymerization
Nuclear Magnetic Resonance (NMR)

- Monitoring Progression of polymerization
- Electromagnetic Pulses
Polymer Formation
Polymer Formation
Confirming Product

• What finalized product “should” look like

http://www.coatingscience.com
End Results

• Why is it not working?
Future of the Project

• Develop a new set of monomers to expedite polymerization
Acknowledgements

Michael Issacman
Andrew Merithew
Luke Theogarajan
Summer Institute of Mathematics and Science
California NanoSystems Institute
National Science Foundation