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### **Functional Polycaprolactones for Delivery of Anticancer Drugs and Histone Deacetylase Inhibitor**

Libraries of biodegradable thermoresponsive polycaprolactones for drug delivery of anticancer drugs and histone deacetylase (HDAC) inhibitors were synthesized by the ring-opening polymerization of various  $\gamma$ -substituted- $\epsilon$ -caprolactone monomers.

The combination of biocompatibility, biodegradability, and tunable thermoresponsive behavior is ideal for drug delivery of anticancer drugs and HDAC inhibitors. The use of functional polycaprolactones containing masked HDAC inhibitors will allow the sustained release of the HDAC inhibitor upon the degradation of the ester groups.

Amphiphilic polycaprolactone block copolymers with tunable thermoresponsive behavior were synthesized. The amphiphilic block copolymers self-assembled in water to form micelles with a hydrophobic core that was employed to load and deliver hydrophobic anticancer drugs. The fine tuning of the ratio between hydrophobic and hydrophilic blocks provided polymers with tunable lower critical solution temperatures (LCST) in the range of 37-55 °C. The functional groups of the hydrophobic block were varied to adjust the size of micelles which allowed the tunability of drug loading capacity. The thermoresponsive micelles will be used for the treatment of solid tumors by local administration of heat at the tumor site, which will promote the collapse of the micelles and the release of anticancer drug.