

## **81d Polymeric Worm Micelles as Nano-Carriers for Drug Delivery**

*Young Kim, Paul Dalhaimer, David A. Christian, and Dennis E. Discher*

Nanoscale carriers of active compounds, especially drugs, need not be spherical in shape. Worm micelles as blends of degradable polylactic acid (PLA) and inert block copolymer amphiphiles were prepared for controlled release and initial study of carrier transport through nano-porous media. The loading capacity of a typical hydrophobic drug, Triamterene, and the release of hydrophobic dyes were evaluated together with morphological changes of the micelles. Degradation of PLA by hydrolysis led to the self-shortening of worms and a clear transition towards spherical micelles, correlating with the release of hydrophobic dyes. Perhaps equally important for application is the flexibility of worm micelles, which we show allows them to penetrate nanoporous gels where 100 nm sized vesicles cannot enter. Such gels have served as tissue models, and so the results here collectively suggest a new class of hydrophobic drug nano-carriers that are capable of tissue permeation as well as controlled release.