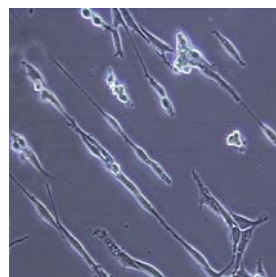
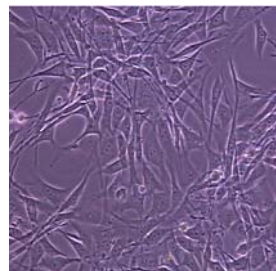




Center for Nanoscale
Chemical-Electrical-Mechanical
Manufacturing Systems

Corn Zein-Based Nanostructured Biomaterials

Zein is a corn (*Zea mays*) protein. It has an amphiphilic molecule, due to its amino acid composition and spatial disposition of amino acid residues. Zein tertiary structure has a regular prismatic geometry, 17nm x 4.5nm x 1.2 nm, with sharply defined domains of distinct HLB character. SPR experiments detected differences in Langmuir layers upon adsorption of zein to surfaces of different HLB number. It was suggested that zein could form patterned protein layers with different HLB regions and that such layers could be used for selective cell attachment. DPN and micro-contact printing techniques were used to prepare 2D patterned templates for protein adsorption. Zein layers adsorbed on the templates were later seen useful to guide the spatial arrangement of growing mouse fibroblast cells. In solution, zein is capable of 3D self-assembly, not unlike block copolymers and surfactants. Structures observed include spheres, sponges, rods, and lamellae. Their radius of curvature depended on the HLB of co-solvents and added surfactants. Zein is edible, biocompatible, and biodegradable. 3D structures are under investigation for their potential as biomaterials.



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Graciela Wild Padua is a Research Associate Professor of Food Engineering in the Department of Food Science and Human Nutrition. She received a B.S. in Biochemical Engineering from the Instituto Politecnico Nacional de Mexico and a Ph.D. in Food Science from the University of Illinois. Her research focus is on the structure and properties of novel bioderived materials for biomedical, food, and agricultural uses. She has published extensively in this area and has patented her results. Her work on novel biomass materials has been repetitively featured in the printed press, tv, radio and web sites. She has represented the Illinois Agricultural Experiment Station at the NC-1023 multistate project and is now member of its leadership technical committee. She serves on the editorial board of Journal of Food Process Engineering.

Co-sponsored by the Soybean Disease Biotechnology Center

Wednesday, November 28, 2007

4:00 pm

Monsanto Room, College of ACES Library