Integrating Nanotechnology with Cell Biology and Neuroscience

INCBN IGERT Seminar

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Polymerization in Microdroplet Reactors: From Nanostructured Particles to Nucleic Acid Sequencing

Emulsions are dispersions of two immiscible liquids. Emulsion polymerization is defined as emulsification of an inorganic or biological polymer precursor followed by execution of the polymer chemistry within emulsion microdroplet reactors. The two immiscible liquid phases required for emulsion polymerization provide unique and complex chemical and physical environments suitable for the engineering of novel materials and biological assays.

Using emulsion polymerization along with incorporation of droplet-based microfluidics, we have devised methods for producing complex nanostructured materials. Additionally, we are utilizing biological polymerization (DNA PCR) in microdroplets for the characterization of single-molecule mRNA splice variants. Continuing work includes on-chip fluorescence characterization for high throughput mRNA exon-typing and a droplet-based method for formation of dense clonal DNA arrays.