

Mark E. Byrne, PhD

Founding Department Head and Professor
Department of Biomedical Engineering
Rowan University



Harnessing Biology in the Engineering of Next Generation Biomaterials for Drug Delivery

Abstract: Biomaterials that utilize biology in their design are prime candidates for the creation of enhanced delivery systems with tremendous promise to profoundly impact medicine via improved treatment options for disease and better quality of life. Within the field of advanced drug delivery, major emphasis is now being focused toward engineering the architectural design of biomaterials on the molecular level. This presentation will touch upon three recent areas of our work that utilize biological considerations or harness the power of biology with biomolecules in the design: (i) creating macromolecular memory within polymer networks to produce novel thin film medical devices with exquisite control of drug transport, (ii) nucleic acid aptamer/biohybrid constructs to achieve high loading nanoparticles with programmable on-demand modulatory release mechanisms, and (iii) novel self-assembled, nano-polymersomes engineered to cross the blood-brain barrier.