

PRECISION POLYMER ARCHITECTURES AND MOLECULAR CONJUGATES TO ENABLE THERAPEUTICS AGAINST UNDRUGGABLE TARGETS

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Abstract: The Duvall Advanced Therapeutics Laboratory specializes in design and application of smart polymer-based technologies for: (1) intracellular delivery of biological drugs such as peptides and nucleic acids, (2) proximity-activated targeting of drugs to sites of inflammation and matrix remodeling, and (3) long-term, “on-demand” drug release from localized depots. These delivery systems are designed to improve the therapeutic index of existing drugs and/or to serve as enabling technologies for manipulation of intracellular targets currently considered to be “undruggable”. To achieve optimal, finely-tuned properties for these varied biomedical applications, polymers are utilized that respond to one or more environmental stimuli including pH, matrix metalloproteinases, reactive oxygen species, and temperature. This talk will focus on the latest nanoparticle and bioconjugate strategies from our group focused on development of new molecularly-targeted breast cancer therapies.

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Speaker’s biography: Dr. Duvall completed his Ph.D. in BME at Georgia Tech and Emory University under the direction of Bob Guldberg and Bob Taylor in 2007. He then joined the labs of Patrick Stayton and Allan Hoffman at the University of Washington for his NIH NRSA-funded postdoctoral fellowship. Based on these foundations, the Duvall Advanced Therapeutics Laboratory (ATL) was launched in the Vanderbilt Biomedical Engineering Department in 2010, and Dr. Duvall was promoted to Associate Professor in 2016. Dr. Duvall has won awards such as the PECASE, NSF CAREER Award, AHA Scientist Development Grant, Society for Biomaterials Young Investigator Award, and BMES Cellular and Molecular Bioengineering Young Innovator Award. The ATL is funded by grants from NIH, DOD, NSF, and AHA.

