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Bryce Noe

Cleveland State University

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**Characterizing Complexes of DNA and Elastin-like Polypeptides**

Washkewicz College of Engineering

**Student Researcher:** Bryce Noe

**Faculty Advisor:** Nolan B. Holland

**Abstract**

Elastin-like polypeptides (ELPs) are a class of environmental responsive materials. When prepared with a protein motif that selectively binds to nucleic acids, a nucleic acid-ELP complex can be formed, conferring the responsive properties of ELP onto the nucleic acid. One possible use for such a complex is in DNA origami, where nanoscaled assemblies of DNA can be transformed into nanomachines by using the ELP as an actuator. Other possible uses include the isolation and extraction of a selected strands of genetic material, or the delivery of genetic material to a cell. Using a bacterial expression system, our lab has prepared ELPs with one such DNA binding motif, TAT, which is associated with immunodeficiency viruses. As the TAT-ELP was purified, we observed that it extracted bacterial genetic material along with it. To characterize these nucleic acid-ELP complexes, temperature dependent properties, full UV absorbance spectra, and particle sizing data were collected. Compared to a solution of pure ELP the nucleic acid ELP complex aggregates at a much lower temperature. The absorbance values of the complex show that the complex has a maximum absorbance at a different value than pure ELP. Particle sizing results showed multiple distinct sizes for the complex, as opposed to a singular size for ELP aggregates.