TIP Project Brief – 090049/10H005

Manufacturing
PRINT® Nanomanufacturing: Enabling Rationally Designed Nanoparticles for Next-Generation Therapeutics

Scale up to practical commercial volumes a novel nanoparticle manufacturing process based on nanoscale molding to produce engineered nanoparticles of specific sizes, shapes and materials for therapeutic applications.

Sponsor: Liquidia Technologies, Inc.
Durham, NC

- Project Performance Period: 2/1/2010 - 1/31/2013
- Total project (est.): $5,942 K
- Requested TIP funds: $2,971 K

Liquidia Technologies is developing a novel, top-down approach to nanoparticle fabrication that uniquely enables simultaneous and precise control over nanoparticle size, shape and composition as well as surface functionalization to adapt the nanoparticles to specific tasks for medicine. Nanoparticle drug delivery systems have the potential for transformational results in healthcare, with the unique ability to access and target specific tissues, cell types, and biological systems. Advances in the technology can enable superior efficacy with novel therapeutics and minimize toxicity by specifically targeting certain cell types. Liquidia's Particle Replication in Non-wetting Templates (PRINT®) technology brings the precision and uniformity of the semiconductor industry together with the scale and cost structure of the films industries to create novel, complex particles with simultaneous control over structure and function. Widespread, practical use, however, will require much higher manufacturing efficiencies than currently possible. This project aims to increase the current nanoparticle manufacturing capability by 1000-fold. To achieve this, the company is attempting to simultaneously increase the scale of the process, improve its performance and reduce the process time. This requires exploring and balancing the design requirements for all three goals, including modeling the physical/chemical parameters of the process components to facilitate predictive manufacturing parameters. Unlike other nanoparticle manufacturing techniques, PRINT nanomanufacturing lends itself to a continuous "roll to roll" process of the sort used to make paper, films, and tapes. If successful, the project will enable both new, continuous manufacturing capabilities to create engineered nanoparticle products in clinically relevant quantities and potentially entirely new clinical products based on that capability.

For project information:
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