TEXAS STATE UNIVERSITY

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Title: Fluidic system for high throughput preparation of polymeric microparticles and nanoparticles

Background: Nanoparticles loaded with active drugs present significant advantages to active and passive delivery of molecules in disease treatment. Several major breakthrough treatments have been developed using polymer-encapsulated drug particles. Through the development of these technologies, one critical element that has prevented widespread commercial adoption has been the reproducible manufacturing of uniform drug-loaded particles. Most systems rely on a single batch production process where scaling of factors like volume, temperature and processing time produce batch to batch imperfections and lack of continuity. Although appealing to researchers, many nano-drug delivery technologies may not be compatible with large-scale production owing to the nature of the preparation method and high cost of materials employed. It is critical that drug molecules under therapeutic development be paired with drug delivery technology that allows true commercialization.

Technology & Competitive Advantage: Inventors have developed a new process for large-scale preparation of monodispersed polymer nanoparticles suitable for a range of applications through the use of a fiber fluidic system. The system can produce drug-loaded nanoparticles using a versatile, low-cost, rugged and easily scalable process that can be used for continuous manufacture of NPs in a small footprint. All current nanoparticle production systems utilize a single-batch process for the formation of drug-loaded particles. This technology represents the first example of a scalable process for the continuous formation of nanoparticles with encapsulated drugs. The system and potential applications allow a licensee immediate access to a technology that can be adapted to produce drug-loaded particles from polymers already approved for this type of therapy.

Opportunity: The commercial potential is present for drug delivery products, however, the manufacturing of nanoparticle-drug systems will remain the challenge in the conversion of a product from a laboratory benchtop project to a scaled commercial process. The technology identified in this review is capable of commercializing nanoparticle-drug delivery system manufacturing. This technology can be immediately used for production of a specific API-nanoparticle drug delivery system then the entire technology base could be licensed as a wholesale drug delivery platform.

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