

# ORBIS BIOSCIENCES

A spoon full of sugar makes the medicine go down, but so does Orbis Biosciences. Orbis' technology creates long-acting, taste-masked, format-flexible pharmaceutical products for improved compliance. According to the Centers for Disease Control the direct cost of medication non-adherence is estimated between \$100 billion and \$289 billion annually with costs of \$2000 per patient in physician visits annually. Orbis Biosciences develops novel, controlled-release drug delivery systems and its Precision Particle Fabrication technology enables companies to create new product lines and reinvent their current portfolios through unprecedented control of microparticles – factors that can help patients better adhere to pharmaceutical regimens.

## PHASE III SUCCESS

Orbis has grown from 1 to 9 employees since its first SBIR award and holds the exclusive worldwide license for commercialization for its patent protected Precision Particle Fabrication Technology.

## AGENCIES

HHS, DoD, USDA

## SNAPSHOT

Orbis creates long-acting, taste-masked, format-flexible pharmaceutical products for improved compliance.

## ORBIS BIOSCIENCES, INC.

8006 Reeder Street  
Lenexa, KS 66214

[www.orbisbio.com](http://www.orbisbio.com)  
(913) 544-1199

Orbis was founded in 2008 by Bo Fishback and Cory Berkland and is based on Berkland's PhD work in Chemical and Biomolecular Engineering from the University of Illinois, Urbana, where he co-invented and developed the Precision Particle Fabrication technology. Two years after starting the company Orbis received its first SBIR award.

"With our first SBIR we were able to take something from the lab to the marketplace, scaling up to commercial product, which can be a chicken or egg challenge when dealing with large pharmaceutical companies. The pharmaceutical companies want something fully developed. The SBIR program provided the bridge we needed to work with pharmaceutical companies to scale up and develop specific applications," explains Maria Flynn, President and CEO. "Proving applications through SBIR lets us advance products that are interesting and the pharmaceutical industry can see this work and evaluate proof points."

Today, Orbis works together with clients to efficiently incorporate precision particle fabrication technology into their products. Their technology is patent-protected, and Orbis holds the exclusive worldwide license for commercialization. Existing methods used to produce microparticles are often costly and imprecise. For solid microparticles, the primary production methods are emulsion/solvent evaporation techniques and spray drying methods, both of which provide inadequate particle control and a limited release rate. Phase separation techniques are most common for fabrication of double-layered core-shell microparticles, but this method is not compatible with all materials and has limitations on the range of achievable architectures, release profiles, and shell thicknesses. Orbis technology

platforms are comparable to emulsion/solvent methods in terms of production cost, but with a much greater degree of control over particle characteristics. While sieve fabrication and spray drying offer marginal improvements over emulsion methods, in terms of controlling particle characteristics, these methods cannot compete with the level of precision available with the Orbis technology platforms and are also comparatively expensive due to high maintenance and large material waste.

“The diversity of our products and the relationships we’ve established are key to our success,” says Ms. Flynn. “In the development stage a lot can happen and very few drugs make it to the finish. However, by both focusing on core areas and having enough in our pipeline we are able to bring solutions to the market. Many of the products are based on strategic partnerships with pharmaceutical companies and foundations. Products developed internally or with governmental support are positioned for co-development and licensing arrangements.”

Controlling particle size and shell thickness gives clients control of delivery to consistently improve release profiles. This creates the desired release for improved consumer compliance, the safety and efficacy by increasing time in the optimal concentration range, and taste masking for orally administered drugs and foul-tasting nutrients. These attributes and the SBIR program have helped the company to tap into new markets.

“Through the SBIR program we diversified into new industries and honed our expertise – we saw these programs as inspiration. For example, we’re working on vaccines for animals through the USDA and are working to make a radical change to a current standard. For DoD we’re working on long-acting antimicrobials for Meals Ready-to-Eat (MREs) to allow for the use of different foods in these kits,” said Flynn.

At present Orbis leverages its technology to advance oral and injectable drugs where extended or pulsatile release is needed and utilizes in-house manufacturing capabilities for reliable clinical supply and speed to clinic. The company licenses technology to pharmaceutical companies to maximize utility and partners with Contract Manufacturing Organizations (CMO) for commercial production. Orbis is currently at clinical scale and commercial scale for some orphan drugs, and is advancing to even larger commercial scale.

“Perseverance is key in this program,” notes Flynn. “I ran into another person who had reached SBIR success who mentored me and gave me ideas and questions to ask. It’s a learning experience, so don’t quit if the first one doesn’t work out, try new agencies, proposals, etc. and just keep working at it.”

In addition to benefiting from mentoring opportunities, Orbis Biosciences sees many advantages to doing business in Kansas. The area provides an excellent arena to work in animal health and vaccines and also is home to many legacy pharmaceutical companies with a strong network of contract research organizations (CRO), which increases the available presence for pharmaceutical trials.



Orbis licenses technology to pharmaceutical companies and partners with Contract Manufacturing Organizations (CMO) for commercial production. They are currently at clinical scale and commercial scale for some orphan drugs, and are advancing to even larger commercial scale.