



DowpharmaSM
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Vital Statistics

Key Personnel: Nick Hyde, global business director; Mark Cassidy, business director small molecules and commercial director, Europe/Asia; Kurt Hoeprich, business director biopharmaceuticals.

Who We Are

DOWPHARMASM CONTRACT MANUFACTURING SERVICES serves the pharmaceutical and biopharmaceutical industries with innovative technology, products, and services for clients in drug discovery, development, manufacturing, and delivery. Dowpharma offers broad service and support capabilities for both large and emerging pharmaceutical companies.

Services Offered

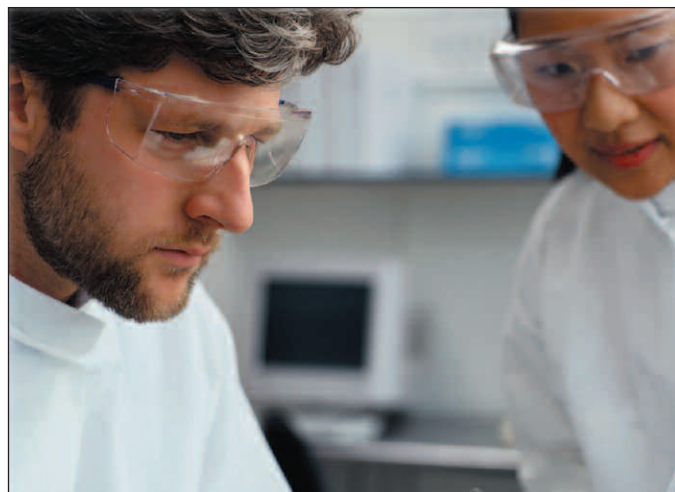
WITH MORE THAN 30 YEARS OF EXPERIENCE, Dowpharma services include process development, route selection, methods development and associated analytical services as well as manufacturing and scale-up from the bench, through clinical trials, to commercial launch.

Dowpharma manufactures small molecule APIs and intermediates, catalysts, oligonucleotides, cGMP polymers, and poly(ethylene) glycols (PEGs) and provides microbial fermentation technology (Pfenex Expression TechnologyTM, a *Pseudomonas-fluorescens* based system) for protein expression. Dowpharma operates research, process development, and manufacturing facilities in North America and Europe.

Key technology areas include:

Small Molecules: We work with customers to develop the simplest, most cost-effective route for manufacture of their target material, using Dowpharma's unparalleled technology portfolio, highly knowledgeable and experienced staff, FDA-inspected facilities, leading continuous improvement methodology and low-cost assets. No matter where customers are in the product development cycle, Dowpharma can meet their needs.

Chiral Products: Route selection and process development for chiral compounds. Extensive portfolio of chiral capabilities gives customers access to an unbiased, systematic approach to optimal route selection for new or existing products.



Capabilities include biocatalysis, asymmetric chemocatalysis: asymmetric hydrogenation (including the DuPont DuPhos catalysts), (including Trost allylic alkylation and asymmetric hydroformylation), crystallization-based resolution and chiral pool starting materials, in addition to classical methods.

Nucleic Acid Medicines: Commercial-scale cGMP nucleic acid medicines manufacturing facility is one of only two in the world and can produce approximately half a metric ton of API annually.

Biopharmaceuticals: Dowpharma offers Pfenex Expression TechnologyTM, a *Pseudomonas*-based system, for rapid, cost effective production of recombinant proteins such as antibody derivatives and other disulfide bond containing targets. The Pfenex platform is built around specially designed strains of *Pseudomonas fluorescens* that consistently outperform *E. coli* and yeast. Key services include high throughput strain engineering, fermentation optimization, analytical method development, process development and process scale up.

Pegylation: Dowpharma offers activated PEGs with a broad range of functionality and molecular weights, including 40kD and 60kD, to enhance the efficacy of biomolecules. Dowpharma also custom-designs PEGs to meet specific requirements. Our cGMP production assets and advanced analytical capabilities provide our customers with the complete solution for PEG supply.

Vaccines: Dowpharma has a range of vaccine production technologies for antigens and adjuvant proteins ranging from peptide epitopes and virus-like particles (VLPs) to bacterial toxins and heteromultimers. All our systems, including our high-yield Pfenex Expression TechnologyTM, are designed for cost effectiveness, rapid supply and scalability.

www.dowpharma.com

SM Service Mark of The Dow Chemical Company

TM Trademark of The Dow Chemical Company