



Microbial Protein Development and Manufacturing Services

Cobra Biologics, with locations in Matfors and Södertälje, Sweden and Keele, UK, provides a full range of services from gene cloning to cGMP manufacturing for pre-clinical through to Phase III clinical trials and commercial supply. Cobra Biologics' track record in manufacturing cGMP products helps to ensure programs are on time and to budget. Our goal is to deliver our customers' microbial protein development programs in a cost effective and timely manner.

Production Systems

- *E. coli* B
- *E. coli* K-12
- *Bacillus subtilis*

Strain Development

- Cytoplasmic accumulation and secretion systems
- Proprietary technology:
 - Antibiotic free maintenance technology (ORT®)
 - Bacteriophage-free T7 expression system
- *E. coli* strains: BL21, B834
- Plasmid stability testing
- Expression plasmid and host strain development
- *E. coli* expression systems: Ptrc, ParaBAD, Lambda PL/PR, T7

Process Development & Scale Up

- Robust and scalable manufacturing processes
- Media development and optimisation (animal free)
- Optimisation of harvest parameters
- Partitioning studies
- Efficient extraction and primary recovery procedures
- Solubilisation and refolding of insoluble proteins
- Purification by low pressure chromatography and by preparative HPLC
- Formulation development

cGMP Manufacturing

- Master Cell Bank & Working Cell Bank production
- Clinical manufacture

Analytical Development & Qualification

- Assay transfer
- Product Characterization
 - Protein characterization for IND submissions
 - Analytical reference standards
- QC Release Testing
 - QC testing of drug substance and drug product
 - Cell based potency assays
- Stability Studies: Drug Substance & Drug Product
 - To ICH guidelines
 - Forced degradation studies
 - Pre-formulation studies
- Cleaning validation
- Raw material testing
- Shipping studies

Fill/ Finish

- Aseptic production
- Syringes and vials
- Freeze-drying/ Lyophilisation
- Up to commercial scale

Quality Assurance & Regulatory Support

- 3 Qualified Persons (QP)
- Fully compliant with European Clinical trials Directive 2001/20/EC and FDA standards
- Licensed for cGMP manufacture in Sweden and the UK
- Support customers with their CMC filings
- Representation at MHRA and FDA meetings
- QP release & shipment to clinical trial sites