

cGMP Viral Product Development and Manufacturing SAFC Pharma™ – Carlsbad

SAFC Pharma's Carlsbad, California (USA) operations specialize in the clinical manufacturing of intermediates and final products used in viral vaccines and gene therapies.

Leading the field with over eleven years experience in this complex emerging technology, SAFC Pharma works closely with customers to develop and manufacture exciting new treatments for cancer, cardiovascular and central nervous system diseases. With its latest expansion, (2008), the Carlsbad site's fully segregated state-of-the-art viral product suites employ traditional stirred tank reactors (100 L) and the latest in disposable bioreactor technologies to support commercial-scale manufacturing.

Carlsbad's biologics manufacturing site meets EU and FDA compliance for cGMP clinical production and is fully validated and Biosafety Level 2 compliant, allowing manipulation of human pathogens. Highly-trained and experienced production teams work in these state-of-the-art facilities.



Manufacturing Areas Feature

- Unidirectional personnel and materials flow layout
- Six client-dedicated Class 10,000 (ISO 7) Clean Room suites
- Single-pass air exhausted directly from clean rooms
- Aseptic manipulations performed in Class 100 (ISO 5) Biosafety cabinets
- Two dedicated Class 1,000 (ISO 6) Fill suites
- Highly-qualified process development teams focused on early-stage process optimization and scale up
- Successful history of technology transfers for complex processes
- Extensive QC and QA programs to support early-stage through commercial manufacturing

cGMP Viral Bulk Drug Substance Manufacturing

Backed by the experience of over 400 lots of viral substance production, (including Adenovirus, Retrovirus, Lentivirus, AAV, Alphavirus and Reovirus), SAFC scientific production teams employ an array of bioreactor systems and purification technologies along with a comprehensive compliance program for bulk drug substance manufacturing including:

- Multiple cell culture systems for adherent or suspension cells
- Stainless steel bioreactors up to 130 L
- Multiple Wave™ bioreactors
- Cell factories
- Shake flasks
- Cell cubes
- Column chromatography
- Tangential flow filtration
- Membrane absorption
- Gradient centrifugation
- Formulation

cGMP Viral Product Development and Manufacturing SAFC Pharma™ – Carlsbad



cGMP Cell and Viral Banking

SAFC Pharma manufactures key intermediates including Master and Working Cell and Viral Banks. Our services cover screening for clonal derivatives early in the development process and characterizing viral seed stock to determine the optimal processing parameters for manufacturing. Services include:

- Process development (including clonal selection)
- Access to fully-characterized 293-clonal cell line (AC2) and PER.C6™ cell lines
 - Master and working cell banks in any SAFC cell culture system
 - Master and working viral banks manufactured in dedicated viral suites



Quality Control and Process Development

Extensive collaborations with clients have helped us develop an extensive list of tests and characterization studies to identify manufacturing issues early-on and determine the likely productivity parameters for cGMP manufacturing. Services include:

- Process optimization
- Scaled up manufacturing for pharmacologic/toxicity studies
- Stability and formulation studies
- Transfer of client-based processes for reproducibility assessment (prior to cGMP production)
- Transfer, qualification and validation of product specific assays (HPLC, PCR, immuno assays and cell based assays)
- PCR assay development
- Process validation



Sterile Fill/Finish

To meet cGMP regulations and remain EU and FDA compliant, filtering, filling and finishing of bulk drug substances is performed by highly-trained operators in dedicated clean room fill suites equipped with semi-automated and automated systems. With fill capacity from 2,000 to 10,000 containers, our operations employ glass vials, cryovials and glass syringes, and use disposable bags for all product contact surfaces. Fill capacity:

- Semi-automated capacity to 2,000 vials/day
- Fully-automated capacity to 10,000 vials/day

Secure cGMP Biostorage

SAFC Pharma Carlsbad has controlled temperature freezers of -80 °C and -20 °C along with on-site liquid nitrogen dewars for final product storage. Freezer units are continuously monitored via a networked system of data logs that provide remote access to temperature information and an alarm notification system. The site's comprehensive biostorage program covers:

- Restricted key-card access
- Complete freezer inventories
- Full documentation
- Diesel-powered emergency generator
- Additional local alarms tied to building management system



SAFC Pharma's Carlsbad facility supports development and manufacturing of viral drug products from pre-clinical to commercialization.