

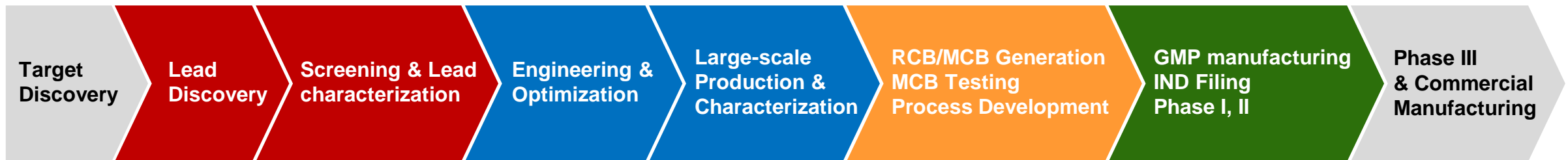


Molecular Construction & DNA/Protein Production Services

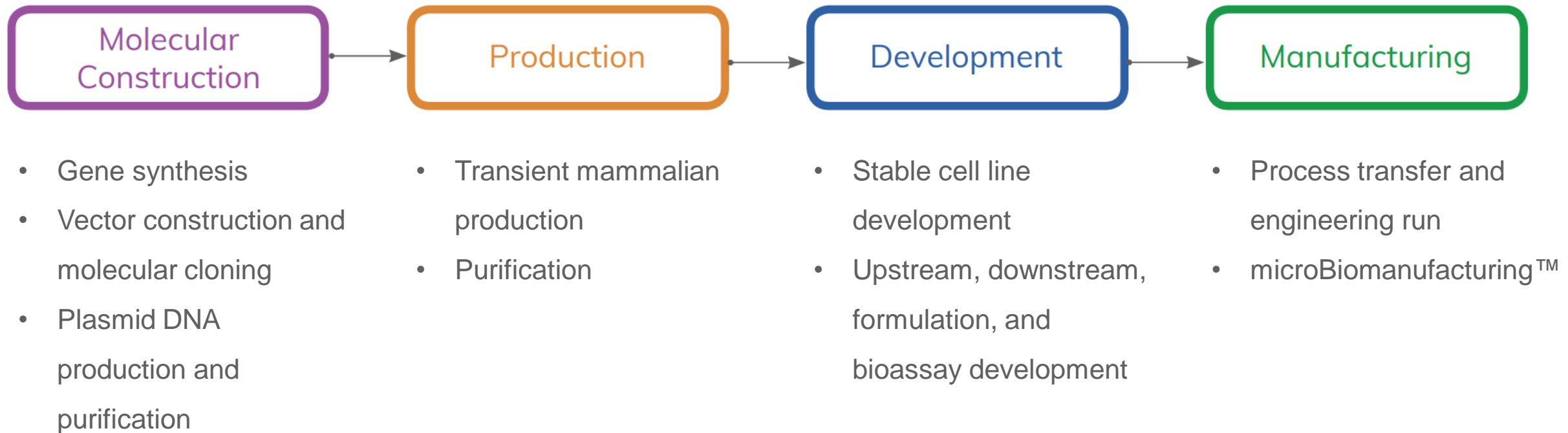
LakePharma Belmont

About LakePharma

- LakePharma is a US-based Biologics CRDMO with operations in CA, MA, and TX
- Specializes in the production and evaluation of DNA vectors, viral vectors, cell lines, proteins, antibodies and conjugates, while providing integrated solutions bridging discovery, engineering, development, and GMP manufacturing. *Ask us about ISPs!*
- LakePharma has contributed to the development of 200+ therapeutic or diagnostic products and strives to do hundreds more.
- LakePharma Hayward is ISO 9001:2015 certified, and LakePharma Hopkinton is ISO 13485:2016 certified.

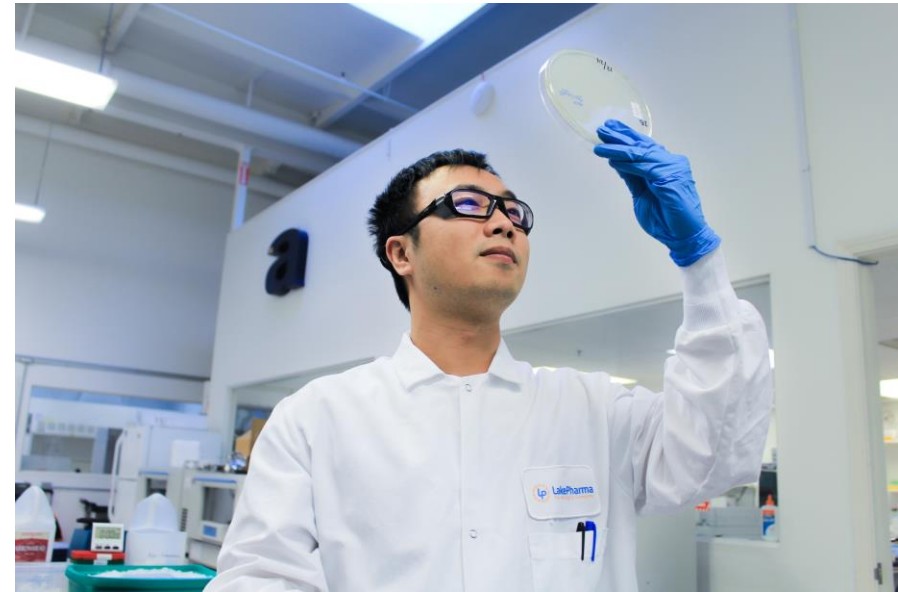


Integrated Solutions for Mammalian Recombinant Protein Production at LakePharma



LakePharma Belmont

Dedicated facility for molecular construction & DNA / Protein production services



Service Overview



Molecular Construction & DNA Services

- Gene synthesis
- Molecular cloning
- Plasmid DNA productions
- Stand-alone DNA purification



Transient Production and Purifications

- Transient protein production
- High-throughput productions



Hybridoma Cloning and Sequencing

- Antibody variable region or full-length sequencing from Hybridoma cells
- Recombinant antibody production

Molecular Biology
Projects By the
Number

25,000+
Expression vectors
constructed

23,000+
Protein purifications
performed

4,500+
Hybridoma samples
sequenced

500+
Organizations served

Gene Synthesis

- A gene of interest or any desired DNA sequence can be synthesized
- For DNA encoding proteins, codon optimization can be performed
- Restriction enzyme sites, promoters, and epitope tags can be incorporated for optimal utility
- Sequence confirmation of the synthesized DNA is included as part of the service
- Deliverable includes miniprep DNA and Certificate of Analysis
- **Turnaround time: 1-2 weeks**

Gene synthesis	Timeline (days)	Price
Up to 500 bp	6	\$200
501 to 1000 bp	8	\$0.50 per base
1001 to 1500 bp	10	\$0.60 per base
>1500 bp	TBD	TBD

Molecular Cloning

LakePharma's plasmid construct design service includes

- Subcloning a gene of interest into a vector of choice
- Site-directed mutagenesis to introduce point mutations, small insertions, or deletions
- Custom cloning in which a peptide tag or additional sequence is encoded at the N or C terminus
- Sequence confirmation with Certificate of Analysis
- **Turnaround time: 1-2 weeks**

Services	Timeline (days)	Price
Ligation cloning	4	\$600
PCR cloning	5	\$800
Site mutagenesis	5	\$600
Custom cloning	TBD	TBD

Plasmid DNA Production

Culture

- Customized culture conditions
 - Optimized for low copy or unstable plasmid
- Large volume and high-throughput capacity

DNA Purification

- Various production scales
- Anion exchange method
- DNA production at various scales from 0.5 mg to >50 mg with three endotoxin level options
 - Transfection grade (<100 EU/mg)
 - Low-endo grade (<10 EU/mg)
 - Endofree grade (<1 EU/mg)

Quality Control

- Agarose gel assessment (to confirm intactness)
- Restriction enzyme digestion
- Sequence confirmation
- Optional endotoxin measurement and removal process available

23-Hour DNA Purification

LakePharma offers 23-hour DNA purification (23 DP) service at multiple scales. Free pickup and delivery service is available for Bay area clients with contract volume orders.

Receipt of Bacterial Pellet

- Sample inspection
- Large volume and high-throughput capacity

DNA Purification

- Multiple prep scales
 - Midiprep (0.2 mg)
 - Maxiprep (1 mg)
 - Megaprep (5 mg)
 - Gigaprep (10 mg)

Quality Control

- Certificate of Analysis
- Optional endotoxin measurement and removal process available

Hybridoma Cloning & Sequencing

- **Industry leading turnaround time: 5-7 business days**
- Variable region sequencing with high accuracy
- Full-length antibody sequencing with sequence analysis
- One-stop service from hybridoma sequencing to recombinant antibody production
- More than 4500 hybridoma samples analyzed
- High-throughput batch capacity
- A variety of species and isotypes available:
 - Mouse, rat, rabbit, human, hamster, macaque, transgenic mouse/rat, primary B cells
 - IgG, IgM, IgA

Services	Timeline (weeks)	Price
Cloning and sequencing of variable regions	1	*From \$1500
Cloning and sequencing of full-length antibody	1-2	*From \$2400
Sequencing to recombinant antibody production	5-7	*From \$2500

* Volume discount is available

Transient Protein Production and Purifications



LakePharma offers a variety of transient production processes such as

- TunaCHO™ and Tuna293™ Processes
- Production scales ranging from 10 mL to 20+ L

TunaCHO – A High Yield Transient Production System



TunaCHO™

**7-14 Day Transient
High Yield**

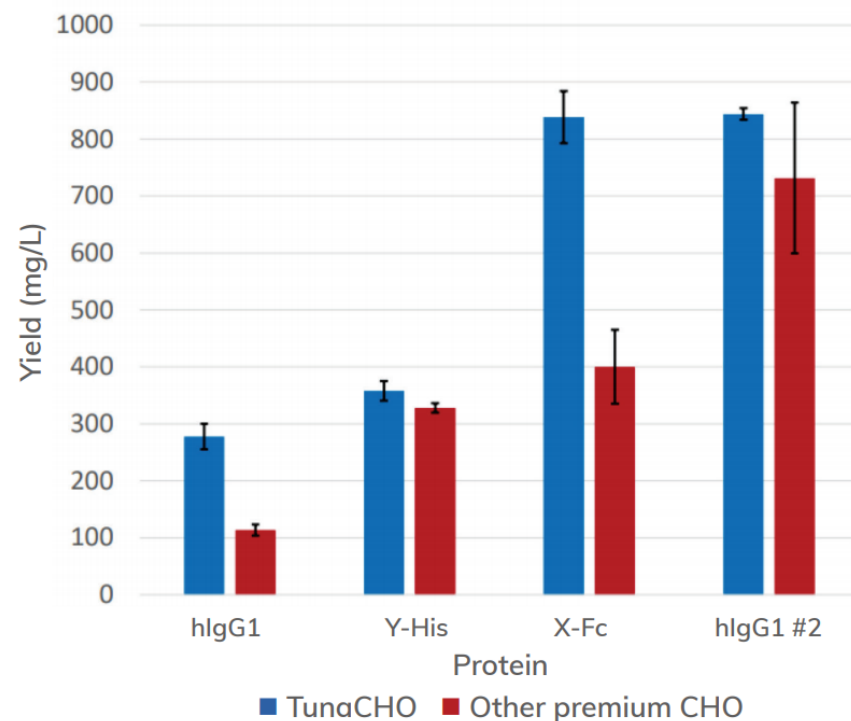
10 mL – 20 L

Can reach >1 g/L

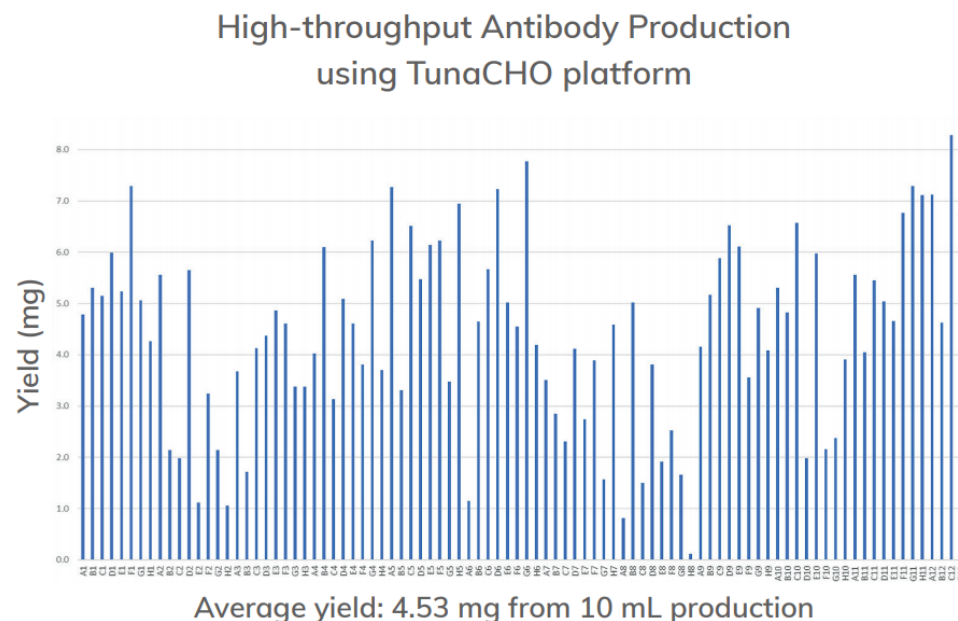
- TunaCHO is a CHO transient protein production system
 - LakePharma's proprietary CHO-SE™ cell line (same parental cell line as CHO-GSN™)
 - MEDNA Bio reagents
 - LakePharma's proprietary process
- Support discovery, development, and manufacturing
- The same CHO-K1 parental is used for all platforms so products from the different platforms have similar activity & post-translational modification (PTM) profiles
- Cost effective compared to other premium CHO transient production systems

Outstanding IgG Transient Transfection Yields in LakePharma TunaCHO Cell Line

TunaCHO™ used for Batch High-throughput Antibody Production



Higher yield of recombinant human IgG1, Fc-fusion protein, and His-tagged non-antibody protein were observed in the TunaCHO process



Example: 85 recombinant IgGs were produced in 10 mL TunaCHO™ cells with Protein A purification and the average yield was 4.2 mg per 10 mL culture.

TunaCHO™

7-14 days transient
High Yield
 10 mL – 20 L
 Can reach >1 g/L

High-Throughput 96-Block Antibody Production

- TunaCHO™ and Tuna293™ processes with 10 mL to 100 mL production scale
- Cost-effective way to produce large quantity of antibodies (up to 96 or more per batch) for downstream applications
 - Also compatible with non-antibody proteins
- Quick turnaround time between 3 to 7 weeks based on starting material
- Complementary mass spec QC for standard mouse and human IgG antibody

Services	Timeline (weeks)	Size (batch)
96-batch molecular construction of IgG expression vectors, 0.01 L transient production in HEK293 cells (Tuna293™ Process), Protein A purification	3-6	96
96-batch molecular construction of IgG expression vectors, 0.01 L transient production in CHO cells (TunaCHO™ Process, 7-day or 14-day extended production), Protein A purification	3-7	96

Working with LakePharma

- Comprehensive technology platform
- Technical consultation with experts in antibody discovery, protein production, and GMP manufacturing
- Online data system for 24-hour access to project information (timelines, data, team communications)
- Strong project management with regular project updates (email and teleconferences)

For more information, please contact Inquiries@LakePharma.com