



General Overview

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About LakePharma

- LakePharma is a US-based Biologics CRDMO with operations in CA, MA, and TX.
- This biotech company 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.
- LakePharma has contributed to the development of 200+ therapeutic or diagnostic products and strives to do hundreds more.
- During the COVID-19 pandemic, LakePharma became a key player in supplying COVID-19 reagents and in vaccine development and GMP manufacturing.

Key Features about LakePharma

- End-to-end solution provider from discovery to GMP manufacturing
- Comprehensive biologics production platforms
- Close partnership with clients to deliver on projects
- Workflow-based operation supported by industry-leading enterprise software system
- Relentless in technology innovation and capability expansion to meet clients' needs

LakePharma featured in *Pharma Tech Outlook*, April 2021

[LakePharma: The Face of Next-Gen Drug Development](#)

LakePharma featured in *Genetic Engineering & Biotechnology News*, July 2019

[Setting New Standards for CRO/CDMO Industry](#)

LakePharma Provides Integrated Solutions for Biologics Development



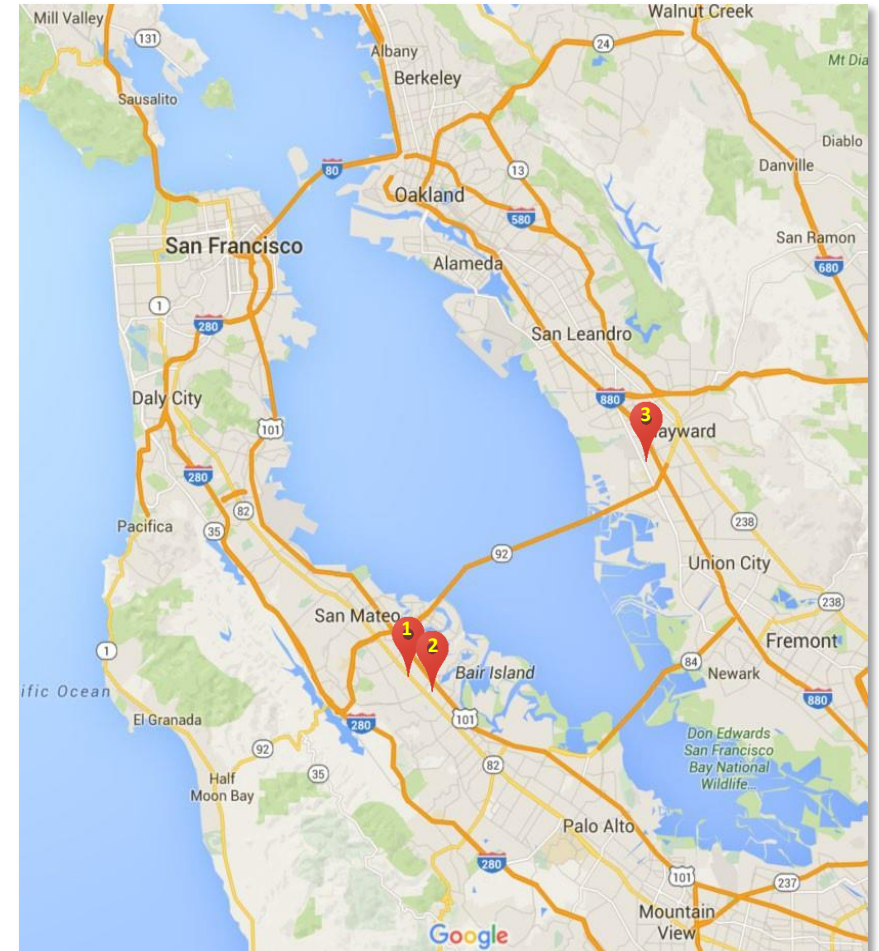
- Each LakePharma facility has a distinct focus, while collaborating closely with seamless integration

Five Lab Facilities

San Carlos, CA	Belmont, CA	Hayward, CA	Worcester, MA	Hopkinton, MA
Antibody Discovery	Protein Engineering	Development + Manufacturing	Vector Engineering	Development + Manufacturing
Antibody discovery with multiple technology platforms	DNA cloning and production	CHO-GSN™ stable cell line development	DNA cloning and production	Process development
Antibody characterization Octet, Carterra, DSC	High-throughput antibody reformatting and production using Tuna293™ and TunaCHO™	Upstream, downstream process, analytical and formulation development	AAV and lentivirus engineering and production	GMP production, GMP QC lab including USP sterility and bioburden testing, bioassay and analytical testing and method validation
Antibody developability	Protein and antibody production and characterization	GMP manufacturing of ASR	Virus process development and analytical testing	Biorepository (GMP)
<i>De novo</i> antibody sequencing by mass spec	Bioassay and analytics	Protein conjugation and bioassay development	Vector applications including CAR T and stable cell line generation	Bioassay and analytics

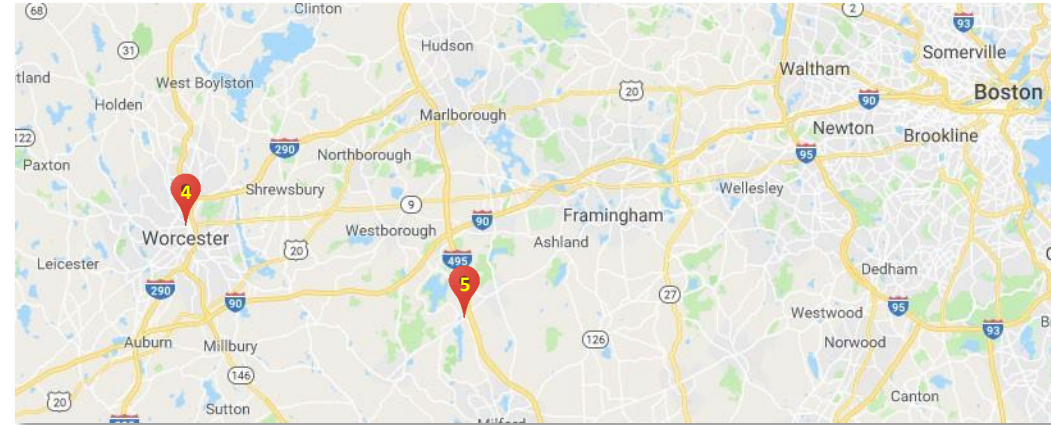
Three LakePharma Sites in the Bay Area

- Belmont site (2009 – present)
- San Carlos site (2014 – 2017, 2018 – present)
- Hayward site (2016 – present)

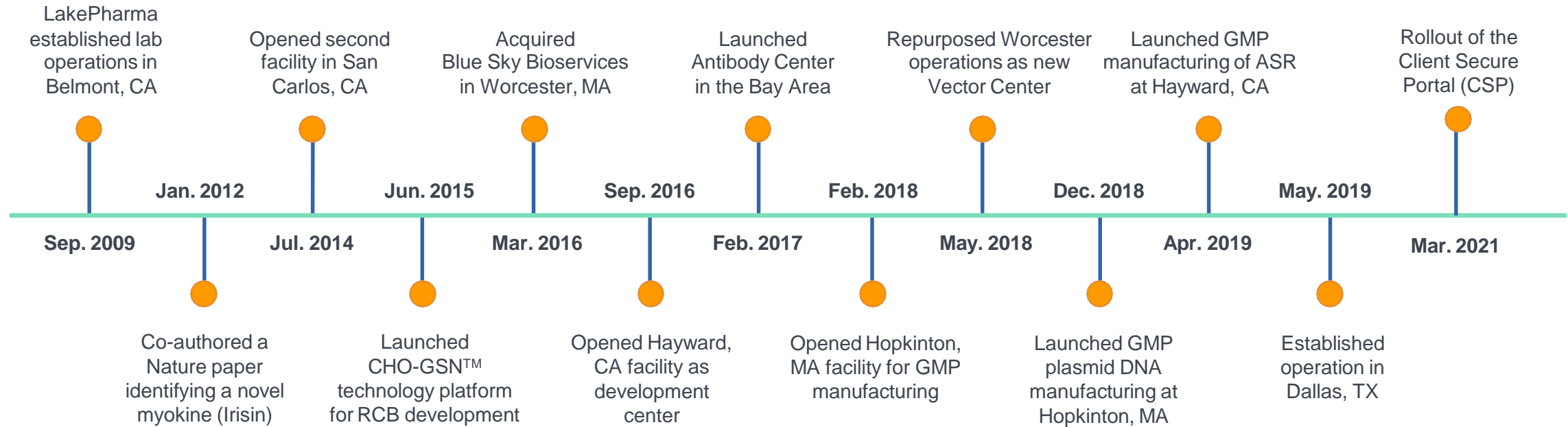


Two LakePharma Sites in the Boston area

- Worcester site (2003 – present)
- Hopkinton site (2018 – present)



Major Milestones



Technical Leaders



Norm Garceau, Ph.D.
Chief Scientific Officer



John Manzello
Chief Manufacturing Officer



Lisa Alexander
VP, Quality & Regulatory



Xiong Gao
VP, Lab Operations



Bill Hermans
VP, Technical Operations



Jordon Wang, Ph.D.
VP, Technology Development



Brian Zabel, Ph.D.
VP, Discovery Immunology

Margaret Wong, Ph.D.
Doug Demian
Jason Pratt, Ph.D.

Senior Director, Antibody Engineering
Senior Director, Pharma Assay & Analytics
Senior Director, Vector Technology

Roy Hegedus, Ph.D.
Kexin Huang, Ph.D.

Scientific Director, Vector Technology
Scientific Director, Protein & Analytical Sciences

Minna Ranniko
Dan Connors
Li Wang
Wenjing Chen, Ph.D.
Yang Shao, Ph.D.
Lloyd Yu, Ph.D.

Director, Manufacturing Solutions
Director, GMP Manufacturing
Director, BioExpression
Director, Process Development
Director, Quality Operations
Director, Portfolio Management

Significant Protein Bioanalytical Capability at Multiple Sites

- Antibody and protein high throughput analytics and mass spec in San Carlos, CA
- CMC development analytics in Hayward, CA and LP Hopkinton, MA
- Additional nucleic acid analytics in LP Hopkinton, MA



Protein Simple iCE3



Agilent 1260 Infinity II



ACQUITY UPLC



QTOF Mass Spec



LabChip GXII Touch HT



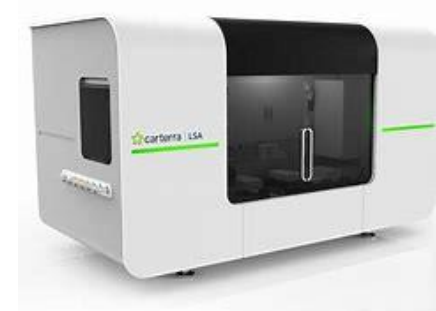
UNcle



Beckman Coulter PA800Plus



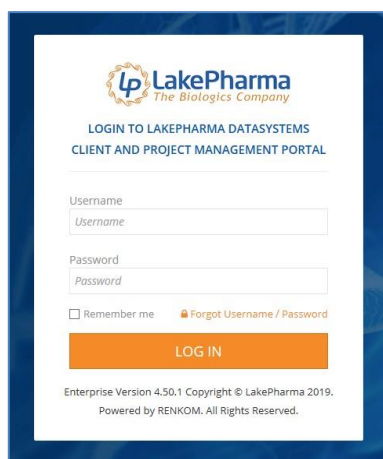
Nano DSC



Carterra LSA

LakePharma DPM System Enables Seamless Data Integration

- LakePharma DPM was built using **RENKOM RTST™** as development platform
- Single enterprise platform that manages all data and workflows
- ERP, CRM, supply chain, facilities, quality, documentation, training, data and sample storage
- System and modules are built to 21 CFR Part 11 compliance for GMP operation
- Clients can log on to view project and interact with LakePharma project team in real time



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2021-02-28 Abby Koshel Based the Nursery Care of Lakeharma Ministry
 2021-02-18 Abby Koshel 4014 meeting Social Study Group - Tuesday Feb 23 at 3pm Pacific & 6pm Eastern
 2021-02-18 Abby Koshel Company Meeting Thursday 2/18 at 2pm Eastern
 2021-02-04 Abby Koshel Benefits get an update -- new paid work time and better 401K matching
 2021-01-29 Brian Deane Branch visit on getting the COVID vaccine

Resources

Earning Data	Contacts	Guidelines, Policies, Resources	Employee Development
Our Mission and Approaches	Our Values	Lakeharma Ministry	Company Calendar
Company Monthly Calendar PDFs (Past)	Company Monthly Calendar Live (Go)		

Personalized

My job	My OPS	My ID	My JG or JRM
My JG or JRM	My COW	My Learning	My CRM Profile
See all	Search		

Centers and Domains

GTP Center	PDSM Center	Antibody Center	Vector Center
Mic Center	Quality	Project Management	Commercial
Environmental Health and Safety	HR	CSC	
Workflow Management	Customer Support	Operations and IT	Legal Support
Corporate Partners	Capacity Management	BUI	SBRU
Control	Queue for Stampo		

Management Administrative Panels (Authorized Access Only)

HR management	QMS management	EMS management	FSS management
COAD management	SR management	Equipment management	Facility management
Operations and IT management	DPM profile management	Kinetics management	F Table Processing
Material Management	Public Website Management		

Scientific Applications (In Developments)

Laserer DNA Design Studio	Stewen's TP Table and Charts	Edder's Chronogram	Bill's SRD Data Analysis
SL Notebook			

Liquid Nitrogen Sample Management (In development by julli)

San Carlos Ab	San Carlos GTP	Hayward S&B Tank 4	Warcenter
Worksheet 1	Worksheet 2	Worksheet 3	

Quality Manufacturing Operating Systems (In Development by Liza and Hui)

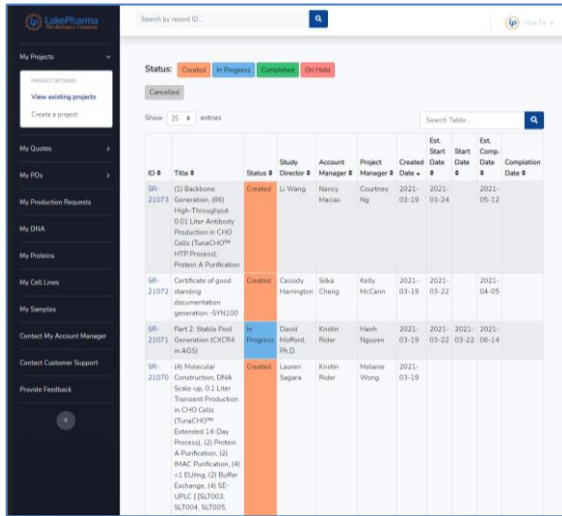
OMG - Lakeharma Hayward (CA)	OMG - Lakeharma Expedition (MA)
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More Functionalities, All Connected to DPM

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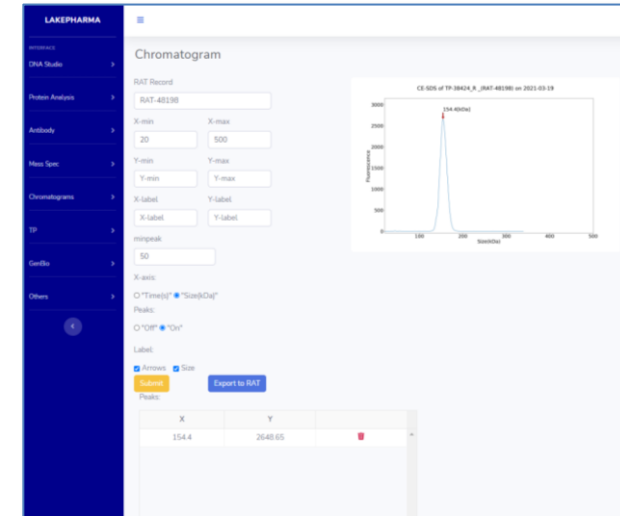
Client Secure Portal (CSP)



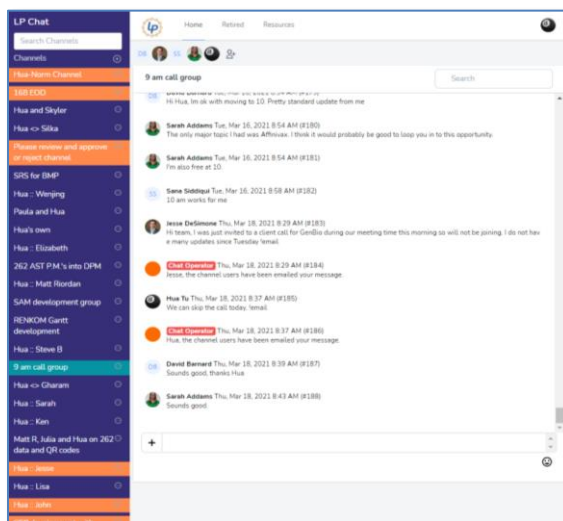
SAM (Scientific Application table)

RAT	Type	Sample Name	TP Number	SR Number	Submitter	Time of Submission	Time of Results
RAT-48227	CE	TP-38375_NH	TP-38375	SR-18732	Eugene Liu		
RAT-48226	CE	TP-38375_R	TP-38375	SR-18732	Eugene Liu		
RAT-48219	CE	TP-382299VPTT wFu-Pop4 (S2289)_R	TP-38259	SR-20709	Henry Chen	2021-03-19	
RAT-48218	CE	TP-382299VPTT wFu-Pop4 (S2289)_R	TP-38259	SR-20709	Henry Chen	2021-03-19	
RAT-48213	CE	TP-38380AET_P_03213_R	TP-38380	SR-20567	Henry Chen	2021-03-19	
RAT-48212	CE	TP-38380AET_P_03213_NH	TP-38380	SR-20567	Henry Chen	2021-03-19	
RAT-48198	CE	TP-38424_R	TP-38424	SR-20859	Alexis Tang	2021-03-19	2021-03-19
RAT-48197	CE	TP-38424_NH	TP-38424	SR-20859	Alexis Tang	2021-03-19	2021-03-19
RAT-48191	CE	TP-38172 (XENP15593)_PhuA Eluate_Protein_R	TP-38172	SR-19408	Vivian Sun	2021-03-18	
RAT-48190	CE	TP-38172 (XENP15593)_PhuA Eluate_Protein_NH	TP-38172	SR-19408	Vivian Sun	2021-03-18	

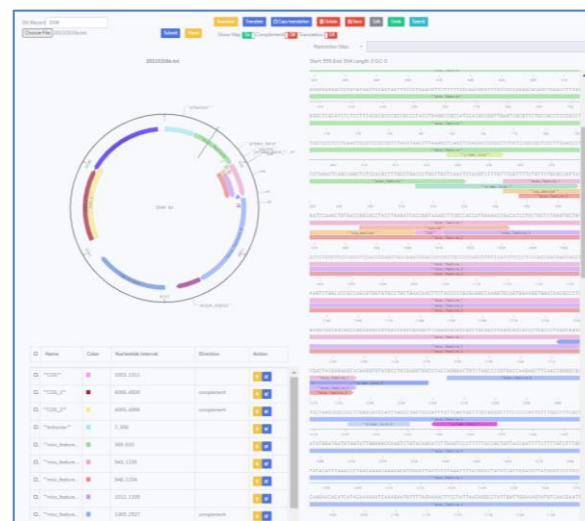
Scientific data charting page



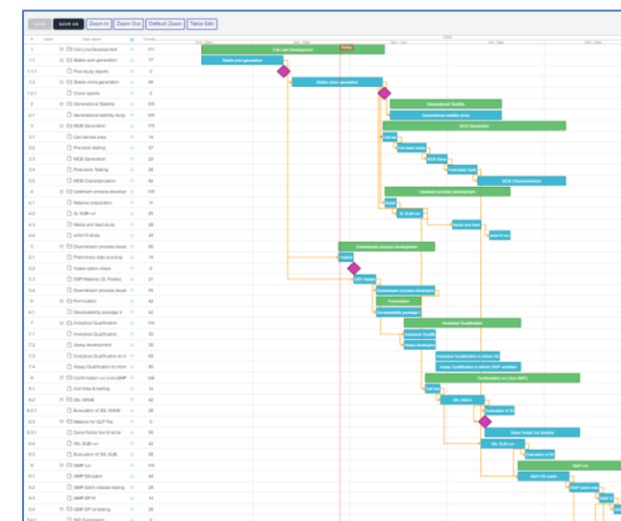
Enterprise Instant Messaging System



Construct design tool



Gantt chart tool



Case Studies

- Development of *in vitro* glycoengineering ([Roche](#))
- Purity and Identity Characterization of Adeno-Associated Virus Capsid Particles by Intact and Bottom-Up Based Liquid Chromatography-Mass Spectrometry Methods ([Case Study 10300](#))
- Development of PentaMice antibody discovery platform ([Webinar on Pentamice](#))
- Development and manufacturing of ASR for biomarker studies
- Rapid development of SARS-CoV2 spike protein reagents for diagnostic applications ([Mount Sinai](#))
- Discovery and manufacturing of novel SARS-CoV2 antibodies for COVID-19 diagnostics ([Apollos](#))
- Development and manufacturing of a novel COVID-19 protein vaccine ([Akston](#))
- Development of LP-635, a novel protein nanoparticle as a nasal COVID-19 vaccine
- Proprietary non-viral gene therapy platform
- Development of suspension baculo cell culture as a better production platform for AAV