ASCENDIA PHARMA

Ascendia Capabilities Overview

Technologies that make the impossible **possible.**

Ascendia Facility

- Located in the Technology Centre of New Jersey
- US Headquarters: North Brunswick, NJ:
  - 60,000 SQF
  - Former Cambrex and AbbVie Facilities
  - R&D labs
  - Sterile and non-sterile GMP manufacturing suites

Business Model

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- **A specialty CDMO**
  - **New drug candidates - fee for service**
    - Focusing on developing formulations of discovery and clinical stage drug candidates
    - Specializing in market-suitable formulations for poorly-soluble drugs in clinical development
    - Delivering sophisticated formulations for biologics
  - **Product pipeline development**
    - Reformulation of existing drugs by NDA 505(b)(2) regulatory pathway
    - Complex generics
  - **cGMP sterile and non-sterile CTM & commercial manufacturing**

- **With a focus on applying proprietary nanoparticle-based process technologies**
  - EmulSol – *Novel nano-emulsion approach*
  - AmorSol – *Amorphous nanoparticle platform*
  - NanoSol - *Nanoparticle formation technology*
  - Lipidsol – *Lipid nanoparticle platform*

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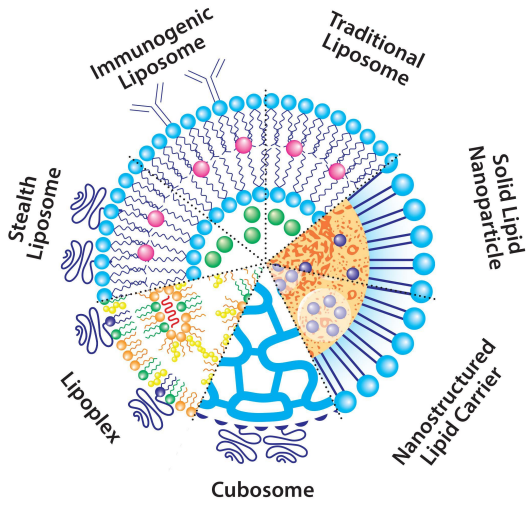
CDMO SERVICES

Ascendia Technology Applications

Technology	Prototype	Route of Admin.	Mechanism	Applications
Amorsol 	Amorphous Dispersions	Oral Transdermal Inhalation	• Solubility and dissolution rate enhancement	• Bioavailability enhancement when other technology failed for BCS II/IIb Solubility limited, BCS Class IV • Reduction of food effect
Nanosol 	Nanoemulsion formulation	Oral Injectable Topical Ocular Nasal Inhalation	• Enhance dissolution and kinetic solubility by nanosizing • Achieve high loading in suspension	• Bioavailability enhancement • Stabilization and stabilization • Minimize food effect • Long acting injectable • Lipid nanoparticles • Injection site reaction reduction • Pediatric formulation • Biologics/peptides
Emulsol 	Microemulsion formulation	Oral Injectable Topical Ocular Nasal Inhalation	• Solubilizing of lipophilic compounds • Nanosizing • Enhancement of permeability for BCS III/IV and bypass of first-pass	• Bioavailability enhancement • Solubilization and stabilization • Tastemasking and encapsulation of bitter APIs • Injection site reaction reduction • Pediatric formulation • Biologics/peptides
LipidSol 	Lipid Nanoparticles	Injectable Inhalation	• Enhance loading and efficient delivery • Long circulation time	• Solubility enhancement • Long acting injectable • Small and large molecules • Biologics/peptide • Gene therapies • RNA & DNA

LIPIDSOL®



LipidSol® (Traditional Liposome)−The first generation of LNPs comprised of bilayer layers derived by spontaneous dispersion of phospholipids in water, good carries of drug encapsulated in membrane for small and large molecules

LipidSol® (Solid lipid nanoparticle) are stable and comprised of solid lipids with higher drug loading capacity and controlled release properties and with probability of releasing drugs relatively faster due to solidified lipids in the interior core

LipidSol® (Nanostructured lipid carrier) are stable and comprised of liquid crystalline lipids with higher drug loading capacity and controlled release properties and longer retention of drugs due to liquid crystalline structure in the interior core

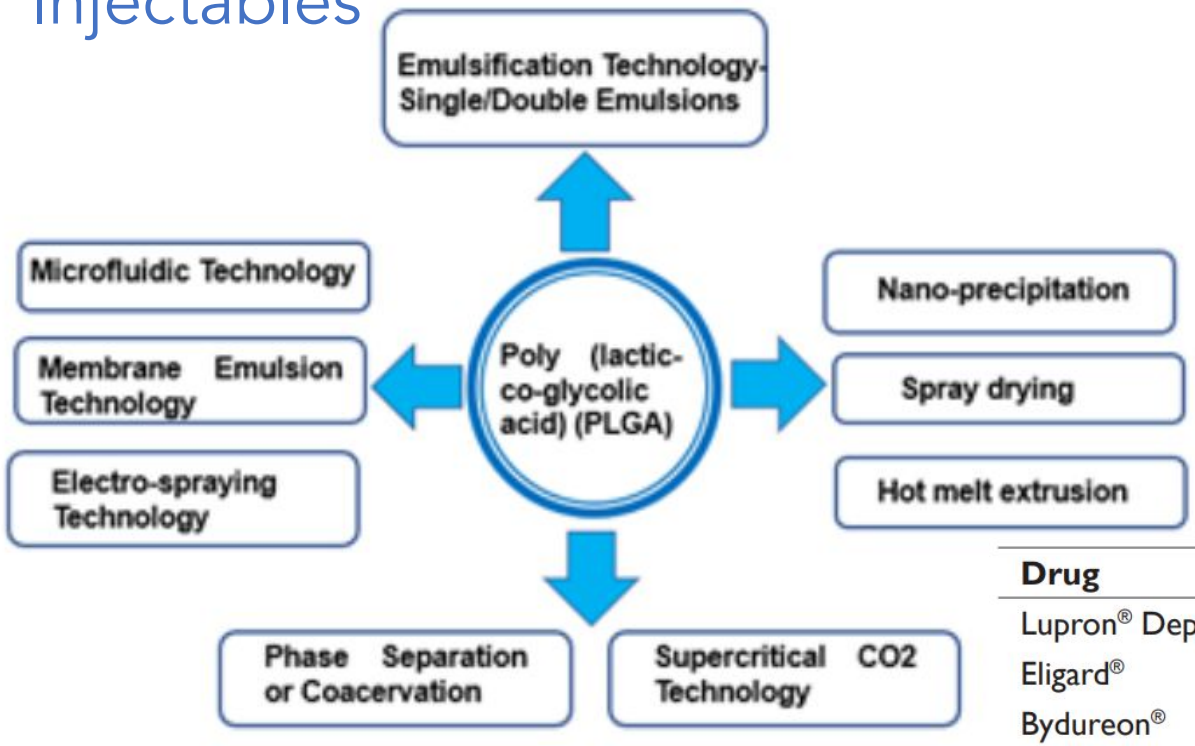
LipidSol® (Cubosome) comprised of non-lamellar structured nanocarriers, stabilized with polymeric outer corona surface, possess significantly higher surface area for loading small molecules and proteins than traditional liposomes

LipidSol® (Immunogenic Liposome) designed with anti-bodies can target specific diseased tissues, and thereby, reduce the eminent toxicity to healthier cells, and can safely be administered and result in enhanced efficacy of drugs.

LipidSol® (Stealth Liposome) with options to design with PEG-lated phospholipids, can trigger longer circulation time without being taken up by RES, and thereby, continue the delivery of molecules for extended period, applicable specially to those designed for controlled release and long acting injectable molecules

LipidSol® (Lipoplex) designed with cationic phospholipids can effectively complex, protect and transport DNA and mRNA to targeted cells

PLGA – A Biodegradable Polymeric Excipient for Long Acting Injectables



J. Huang, PhD and Shaukat Ali, PhD,

J. Anal Pharm Res. 2023;12(2):72–78
DOI: 10.15406/japlr.2023.12.00426

Drug	Active	Indication	Duration/Dose
Lupron® Depot	Leuprolide acetate	Prostate cancer	1-m to 6-m/ 7.5 - 45 mg
Eligard®	Leuprolide acetate	Prostate acetate	1-m to 6-m, /7.5-45 mg
Bydureon®	Exenatide	Type 2 Diabetes	1-w/2.0 mg
Trelstar®	Triprorelin pamoate	Prostate cancer	1-m to 3-m/3.75-22.5 mg
Sandostatin® LAR	Octreotide acetate	Neuroendocrine tumor	1-m/20-30 mg
Signifor® LAR	Pasireotide pamoate	Acromegaly/cushing disease	1-m, 10-60 mg
Zoladex®	Goserelin acetate	Prostate, breast cancer	1-m, 3-m/3.6 mg, 10.8 mg
Superfact® Depot	Buserelin acetate	Prostate cancer	2-m, 3-m/6.3 mg, 9.5 mg
Arestin®	Minocycline HCl	Antibiotic	1 mg

Ascendia Leadership

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>100 Years combined pharma R&D and commercialization experience (with >50% of the staff are PhD or MBA)		
Jim Huang, Ph.D.	Founder, CEO &CSO	Roche, AstraZeneca, Baxter, Pfizer
Robert Bloder	Chief Business Officer Board Advisor	Pfizer, ESP Pharma, AVEVA, APOTEX Innovating for patient affordability
Beverly Langevin, Ph.D.	Executive Director Formulation/ Project Management	SANOFI
M. Asif, Ph.D.	Executive Director, Analytical R&D/QC	MERCK, MannKind Corporation, Pfizer, astellas
Steven Goldner, Ph.D.	VP, Quality	NOVARTIS, Pfizer, Johnson & Johnson
Shaukat Ali, Ph.D.	Sr. Director Scientific Affairs and Technical Marketing	The Liposome Company Inc Princeton, élan, Penwest, PROTARGA, Lavipharm, BASF We create chemistry
Chris Cannon, MD	Medical Advisor	TIMI, BWH, Harvard

505b2 Products Examples for License

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Approach

- Identify successful commercial assets that have solubility/bioavailability or route of administration challenges
- Identify programs that address unmet medical needs with unique product positioning and significant market value after reformulation
- Leverage 505(b)(2) regulatory pathway for streamlined development plan

Assets

✔ ASD-002 – Clopidogrel for Acute Coronary Syndrome
- US Market: RLD-Plavix (7 billion 2012)
- 1st IV formulation-new route of admin for hospital use
- US patent approved US20170014343A1 (up to 2033)
- Potential to add new Indications (PAD, Stroke, etc.)

✔ ASD-004 – Cyclosporin for Dry-Eye Syndrome
- US Market: RLD-Restasis (1.4 billion 2017) (only 16% responder rate)
- Enhanced efficacy/bioavailability, BID to QD, clear eyedrop with less side effects
- US patent approved US20190201338A1 (up to 2034)

✔ ASD-005 – Carvedilol for Congestive Heart Failure/Hypertension
- US Market: RLD-Coreg (1.7 billion 2017)
- 1st sustained release injectable-new route of admin for hospital use
- US patent approved US20200000706A1 (up to 2036)

Unique Positions

- Generation of a rich 505(b)(2) drug pipeline with these nano-platforms
- Leverage Ascendia formulation development, analytical testing and cGMP manufacturing capabilities to rapidly advance from feasibility to clinic
- Flexible deal structures and risk sharing models

Equipment List - Formulation

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- Fluid-bed granulation and coating
- High shear granulation
- Microfluidizer
- Roller compaction
- Conical mill
- Tablet compression
- Capsule filling
- Spray dryer
- Liquid Capsule Filler

- High pressure homogenizer
- Covaris sonicator
- Hot-melt extrusion
- Solvent evaporation
- Nano-particle bead-milling
- Lyophilization (freeze-drying)
- Autoclave
- Isolators for potent compounds
- Cleanroom ISO 5,7 and 8 for sterile and non-sterile process

Inc. 5000

Brilliant technologies
Excellent service
Superior quality
Trust

Equipment List – Analytical

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- HPLC and UPLC (Empower 3)
- GC
- LC-MS/MS
- FTIR / ATR
- UV/Vis spectrophotometry
- Karl Fischer moisture determination
- USP Dissolution
- UV (fiber optic) Dissolution
- Differential scanning calorimetry (DSC and mDSC)
- Particle Size Distribution (PSD)
- Nanozetasizer
- NMR
- XRPD
- Total Organic Carbon (TOC) Analyzer
- Polarized Light Microscopy (PLM)
- Charge Aerosol Detector (CAD)
- Finished dosage form testing: density, hardness; friability, disintegration, viscosity, etc.
- ICH stability chambers

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Ascendia Facility Floor Plan

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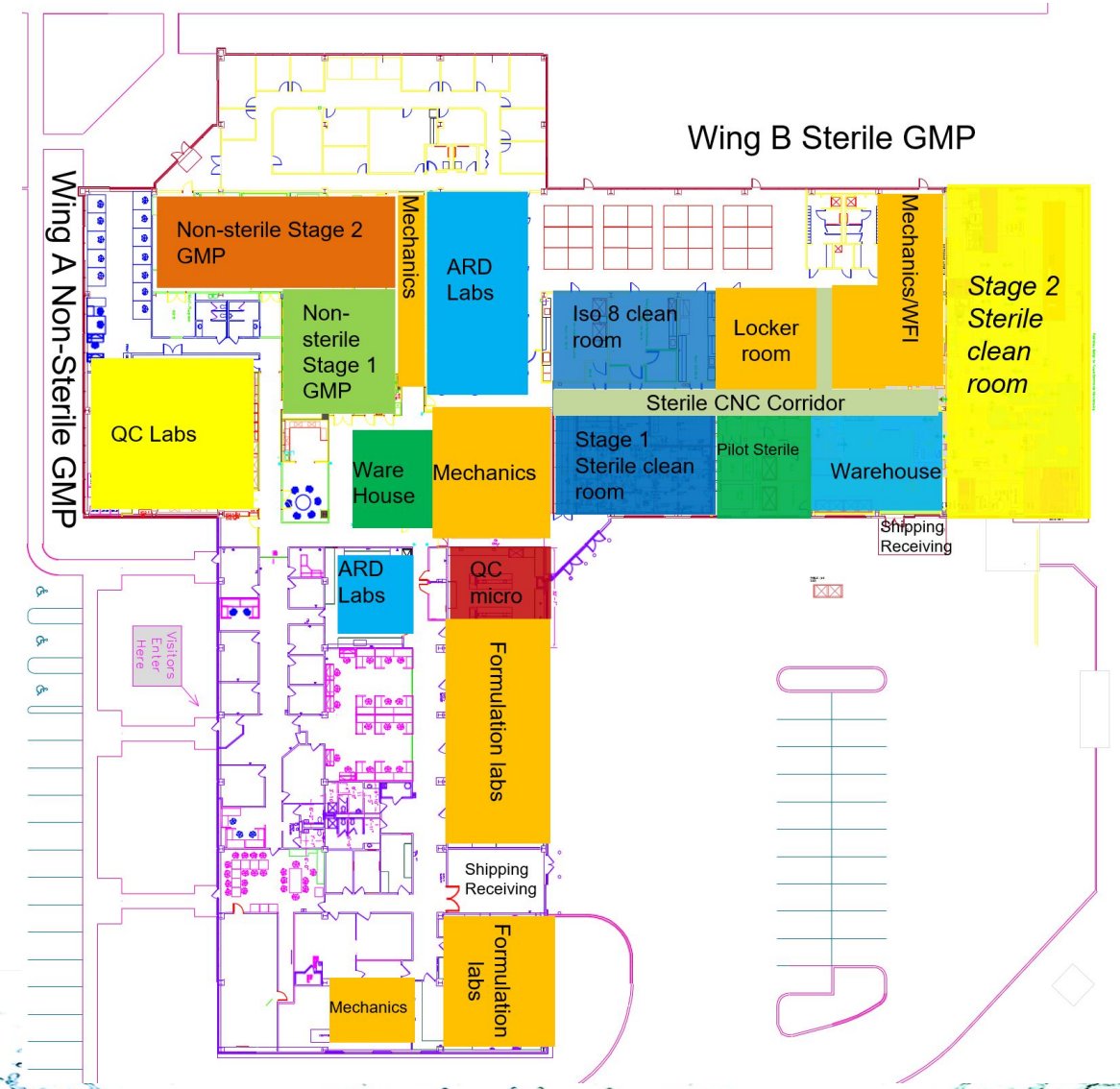

Sterile Manufacturing

Capacity

	Pilot sterile	S1-Sterile	S2-large Sterile
# of suites	5 suite (with freeze dryer)(PFS/Vial)	4 suite (PFS/Vial)	5 suite (Vial)
Classification	100/10,000	100/10,000	100/10,000
Capabilities/output	Up to 5,000 units per batch	Up to 24,000 units per batch	Up to 150,000 units per batch
Size main processing area	1,500 sq.ft.	1,500 sq.ft.	10,000 sq.ft.

Non-sterile Manufacturing Capacity

	Non-Sterile Early Phase I/II	Non-sterile P2-commercial
# of suites	5 suites	8 suites
Classification	100,000	100,000
Capabilities/output	Pilot batch size, up to 100,000 units per batch	>=100,000 units/batch
Size main processing area	4,000 sq.ft.	15,000 sq.ft

Thank You!


Making the impossible possible.
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