

# A TECHNOLOGY-DRIVEN CDMO DELIVERING INTEGRATED END-TO-END SERVICES



## A Legacy Of Success

- 30+ years experience in oral drug development
- 70+ contract development projects
- 65+ commercial products globally across multiple therapeutic areas
- Capacity up to 4 billion units per year
- 98% Right First Time rate
- 7 sites in the US and Europe
- 800 global employees
- Leading partner to 100+ pharmaceutical companies with NCEs, NDAs, 505(b)(2), specialty pharma, generics and OTCs
- Our leadership team has decades of global experience in the life sciences industry

## Adare+Frontida: Better Together

- Shared experience in development and manufacturing of oral solid dosage forms with integrated commercial supply
- Expanded technical expertise and dedicated project management teams
- Increased development and manufacturing capacity
- Modified/Controlled Release
- Taste Masking
- Patient-Centric Dosage Forms
- High Potency (Pilot & Commercial Scale)
- Multi-Layer Tablets
- Packaging, Serialization, and Logistical Support

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



TASTE MASKING

CUSTOMIZED DRUG RELEASE

SOLUBILITY ENHANCEMENT

PATIENT-CENTRIC DOSING SOLUTIONS

FOR IMPROVING PALATABILITY

FOR OPTIMIZING THERAPEUTIC PERFORMANCE

FOR IMPROVING SOLUBILITY

FOR IMPROVING PATIENT ADHERENCE





# DEVELOPMENT SERVICES

## Comprehensive R&D Services

- Preformulation
- Formulation development of
  - » Solid dose tablets
  - » Capsules
  - » Liquids
  - » Solutions
- Pediatric formulation
- Product design
- Formulation optimization
- Sourcing of APIs & excipients
- Analytical method development & validation
- Support including physical characterization
- IMPD manufacture and QP release
- ICH stability programs at all conditions
- Prototype development
- Small-scale non-GMP & GMP development capabilities



## An experienced team dedicated to your development projects:

- Integrated R&D validated through to commercial manufacturing
- Full-service capabilities for even the most complex product creation
- In-house regulatory affairs team with proven global track record
- Flexible business model customized to fit your program
- QbD principals applied with formulation development



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER





# ABUSE DETERRENT TESTING

Specialized analytical testing that minimizes the potential for abuse



In-vitro abuse-deterrent testing ensures that drug products are evaluated for all potential routes of misuse.



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

Our in-vitro testing services include:

- API assay qualification / validation
- Physical manipulation & particle size reduction
- Large Volume Extraction
- Syringeability
- Smoking & Vaping
- Chewing Simulation
- Isolation & Purification of API
- Data & Reports



## CAT.one Studies

- Prototype Selection
  - » Limited set of experiments to evaluate performance relative to RLD
  - » Compositional proportionality
- Exploratory Studies
  - » Designed to identify strengths and weaknesses of a formulation
  - » Informs downstream study protocols
- Pivotal Studies
  - » Designed to provide sufficient data for regulatory review
  - » Clinical sample evaluations possible



# MANUFACTURING CAPABILITIES



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

## Standard Services

- Granulation and mixing
- Fluid bed processing
  - » Wurster
  - » Top Spray
- Hot Melt Extrusion
- Pan coating
- Blending (Bin and Static)
- Tableting
- Multi-layer tablets
- Capsule filling
- Oven drying
- Small-scale GMP manufacturing
- Primary Packaging
- Tech Transfer



## Specialized Services

- Microencapsulation of solids and liquids
- Orally disintegrating tablets (ODT)
- Dry syrup/suspensions
- MMTS™ Minitabs
- DEA controlled substances
  - » Manufacturing registration authorized for Schedules II-V
  - » Analytical Labs authorized for Schedules I-V
- High Potency: 1 mcg/m<sup>3</sup> and above
- Fixed-dose combination manufacturing
- Liquid filling in hard-shell capsules with banding
- Solvent granulation and coating processes
- Food sprinkle dosage forms



# HIGH POTENCY SOLUTIONS



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

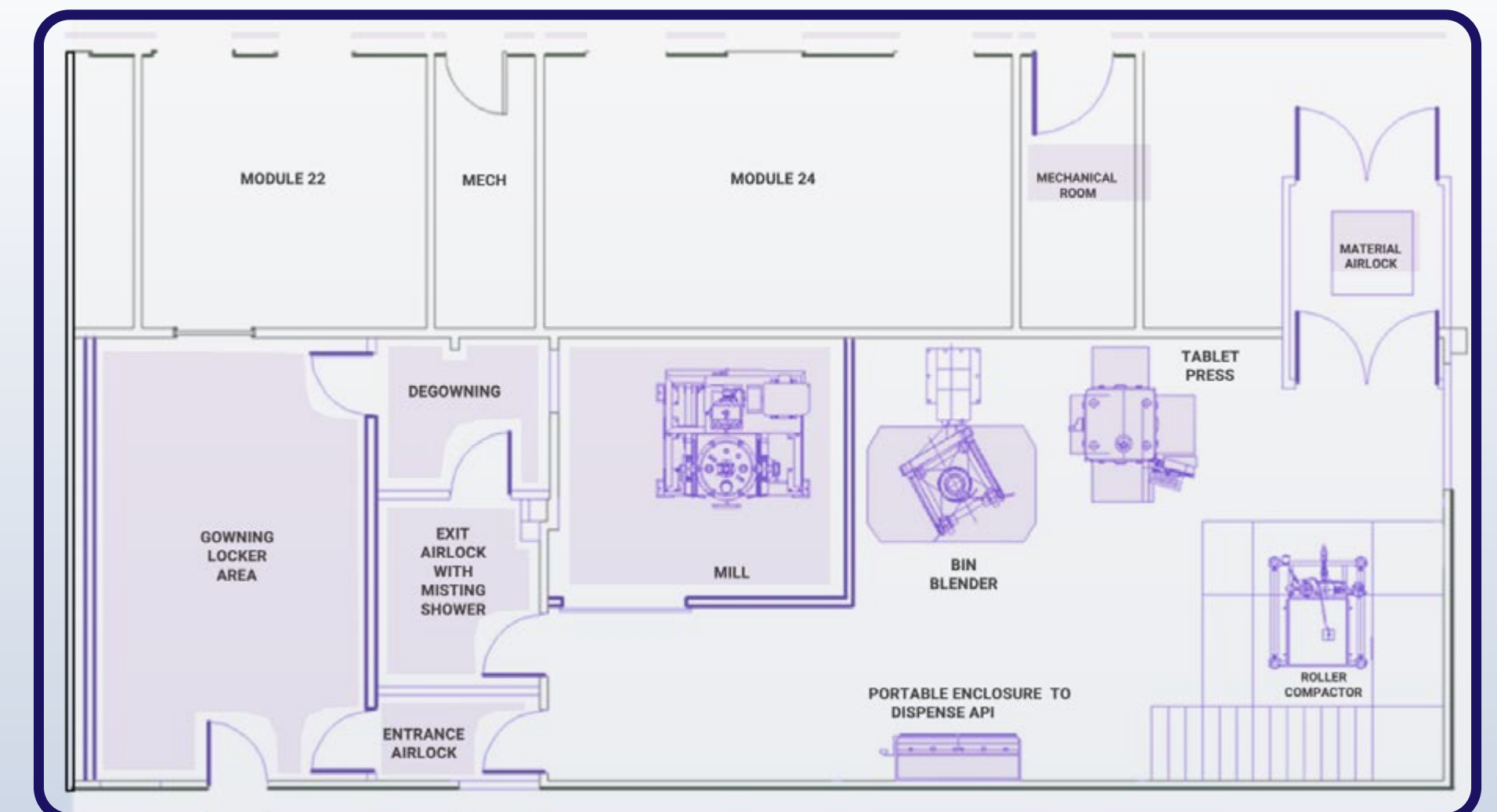
## Pilot & Commercial Scale

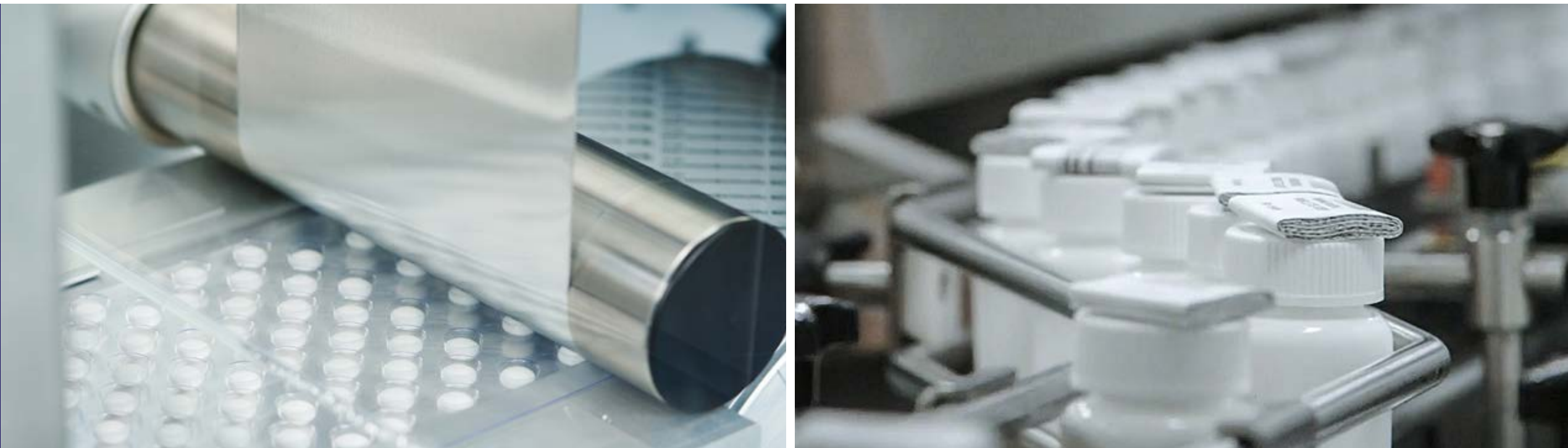
- Dedicated GMP manufacturing and development areas for dry blend high potency products
- Substances with occupational safety levels down to 1 mcg/m<sup>3</sup>, subject to safety/facility assessment
- Authorized to develop and produce pain management and CNS therapies

## Potent Suite

- Milling Room
- Roller Compactor » Fitzpatrick
- Bin Blender
- Tablet Press » IMA Synthesis 500
- High Potent Airlocks, Locker Room, and Material Airlock

Our Orthodox St site in Philadelphia PA features a dedicated state-of-the-art suite specifically for the development and manufacturing of high potency drug products





# PACKAGING & LOGISTICS



BLISTER PACKAGING LINE



MULTILANE STICKPACK MACHINE

## Logistics Support

- Regulatory support
- Market forecasting
- Stability testing
- Expanded labeling support
- Warehousing
- Distribution

## Offering clinical and commercial packaging services

- Two FDA-registered packaging facilities
- A full range of solid-dose packaging solutions
  - » High-speed bottle filling
  - » Blister packaging
  - » Stick pack and cartoning operations
  - » Specialty packaging
  - » DEA Schedules II-IV
  - » Thermo and cold forming
  - » Serialization competent



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER





# REGULATORY SUPPORT

## Proven expertise in regulatory and quality

- Substantial global experience in all aspects of regulatory strategies required for NDA filing (including 505(b)(2)) and ANDA filings
- Expertise to file both European and US submissions
- Support for a complete filing or for CMC section filing, depending on need
- Support in maintaining approved submissions globally
- Proven global track record with the FDA, AIFA in Italy, EMA in Europe, ANVISA for Brazil, the Eurasian Economic Union (EAEU), and PMDA for Japan
- Audited by more than 15 customers per year across the sites

## Strict adherence to cGMP regulations

- Experts in international protocol and standards
- Outstanding environmental credentials
- Compliant handling of controlled substances and solvents



## Full-service clinical support for complex product creation

- Full-service capabilities for even the most complex product creation
- The resources to engage in full-scale clinical product development
- Understanding of current regulatory, scientific, and market access challenges
- Regulatory support at early and late stage product development
  - » Pre-IND FDA meeting support
  - » IND filing to Pre-NDA support
  - » Management of NDA submissions
- Strategic and tactical consulting
- Clinical support through the entire product development process

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER





# OUR FACILITIES

## A GLOBAL FOOTPRINT THAT ENSURES THE SECURITY OF YOUR SUPPLY

Seven development & manufacturing sites in the US and Europe

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

<p><b>Lenexa, KS</b></p> <ul style="list-style-type: none"> <li>• 5k sq ft</li> <li>• R&amp;D center</li> <li>• Non-GMP development scale</li> <li>• Long-acting injectables</li> </ul>	<p><b>Vandalia, OH</b></p> <ul style="list-style-type: none"> <li>• 179k sq ft</li> <li>• R&amp;D center</li> <li>• Commercial scale manufacturing</li> <li>• Organic solvent capabilities</li> <li>• Manufacturing Permit for DEA Schedules II-V</li> </ul>	<p><b>Philadelphia, PA (Orthodox St)</b></p> <ul style="list-style-type: none"> <li>• 128k sq ft</li> <li>• R&amp;D center</li> <li>• Commercial scale manufacturing</li> <li>• High potency manufacturing site</li> <li>• Manufacturing/Packaging of DEA Schedules II-IV</li> </ul>	<p><b>Philadelphia, PA (Dungan Rd)</b></p> <ul style="list-style-type: none"> <li>• 175k sq ft</li> <li>• Packaging &amp; Warehousing</li> <li>• 4 packaging lines &amp; 1 powder filling line</li> <li>• Packaging of DEA Schedules III-IV</li> </ul>
<p><b>Aurora, IL</b></p> <ul style="list-style-type: none"> <li>• 33k sq ft</li> <li>• R&amp;D center</li> <li>• Commercial scale manufacturing</li> <li>• Fluid bed technology center</li> <li>• Manufacturing Permit for DEA Schedules II-V</li> </ul>	<p><b>San Giuliano, IT</b></p> <ul style="list-style-type: none"> <li>• 93k sq ft</li> <li>• Commercial scale manufacturing</li> <li>• Organic solvent capabilities</li> <li>• Focused on controlled release technologies</li> <li>• Tablet &amp; capsule filling</li> </ul>	<p><b>Pessano, IT</b></p> <ul style="list-style-type: none"> <li>• 220k sq ft</li> <li>• Expanded R&amp;D capabilities</li> <li>• Clinical &amp; commercial scale manufacturing</li> <li>• Organic solvent capabilities</li> <li>• Controlled substances</li> </ul>	







ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# SITE CAPABILITIES

Adare offers a wide range of capabilities across a global network of sites

DOSAGE FORMS	VANDALIA	AURORA	LENEXA	PESSANO	SAN GIULIANO	ORTHODOX	DUNGAN
API IN CAPSULE						D M	
EMULSIONS & MICROEMULSIONS			D			D	
INJECTABLES			D				
LIPID FORMULATIONS			D				
LIQUID-FILLED HARD CAPSULES						D M	
BILAYER TABLETS	D					D M	
ORALLY DISINTEGRATING TABLETS & CHEWABLES	D M	D M		D M	M	D M	
SOLUTIONS & SYRUPS			D			D M	
STANDARD ORAL SOLIDS (TABLETS & CAPSULES)	D M	D M	D	D M	M	D M	
SUSPENSIONS (STANDARD & MICRO)	D		D			D M	
MULTIPARTICULATES	D M	D M	D	D M	M	D M	

SERVICES	VANDALIA	AURORA	LENEXA	PESSANO	SAN GIULIANO	ORTHODOX	DUNGAN
ABUSE DETERRENT TESTING						D	
BIOAVAILABILITY/SOLUBILITY ENHANCEMENTS	D					D	
CAPSULE BANDING						D M	
FLUID BED	D M	D M		D M			
HIGH POTENCY (from 1 mcg/m <sup>3</sup> )						D M	
MODIFIED RELEASE SYSTEMS	D M	D M	D	D M	M	D M	
PACKAGING	D			D		D	M
TABLET PRINTING						D M	

TECHNOLOGIES	VANDALIA	AURORA	LENEXA	PESSANO	SAN GIULIANO	ORTHODOX	DUNGAN
ADAPTDOSSE™	D M					D M	
ADVATAB®	D M			D M			
DIFFUCAPS®	D M	D M		D M	M		
DURAGRAN™		D M					
MICROCAPS®	D M			D M			
MINITABS™	D M	D M		D M	M	D M	
OPTIMUM®	D		D				
PARVULET®	D M			D M		D M	
STRATUM™			D				
UNISUN®			D				

**D** DEVELOPMENT SCALE **M** COMMERCIAL MANUFACTURING



# SOLUBILITY ENHANCEMENT

Adare's innovative technology platform can enable and improve the solubility of drugs with low solubility or an extreme pH-dependent solubility profile, providing:

- Substantial global experience in all aspects
- Effective oral dosing of poorly soluble drug candidates
- Equivalent therapy at lower doses
- Faster onset of action
- Minimization of food effect
- Adjustable dosage strength and dissolution profile to achieve the desired in vivo pharmacokinetic profile
- Enhanced drug solubility in sections of the gastrointestinal tract through combined use with other Adare technologies
- A wide range of dosage forms, including:
  - » Capsules
  - » Orally disintegrating tablets
  - » Rapidly disintegrating tablets
  - » Sprinkles



## Solubility Enhancement Technologies

- Diffucaps<sup>®</sup>
- Bench-to-pilot scale Spray-drying
- Hot Melt (Leistritz ZSE 18)
- Dyno-mill
- Conventional approaches using:
  - » Solubilizers
  - » Cyclodextrins
  - » Surfactants
  - » Super-disintegrants



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER





ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

# PATIENT-CENTRIC SOLUTIONS

## Specialized product solutions for patients with unique needs

- Differentiated delivery systems
  - » Taste Masking
  - » Customized Drug Release
  - » Solubility Enhancement
  - » ODTs and Novel Dosage Forms
- High dose, IR, and/or customized release
- Drug formulations exhibiting unique release profiles can be combined in a single dosage form
- Patient-friendly, ideal for those who experience difficulty swallowing regular capsules and tablets

## Customized drug release profiles

- Specialized delivery systems overcome formulation challenges
- Optimize efficacy, safety, and dosing frequency
- Unique release profiles can be combined in a single dosage form
- Improve onset of action, variability of absorption between patients, and food effects variation
- Optimize therapeutic performance and increase patient acceptability





ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# SOLUTIONS CENTER

Adare provides a full spectrum of dosage formulation technologies that are designed to address a wide variety of drug delivery requirements

	ADAPTDOSE™	ADVATAB®	DIFFUCAPS®	DURAGRAN™	MICROCAPS®	MINITABS™	OPTIMUM®	PARVULET®	STRATUM™ (INJECTABLE)	UNISUN® (INJECTABLE)
TASTE MASKING			✓	✓	✓		✓			
SOLUBILITY ENHANCEMENT			✓							
MODIFIED RELEASE			✓	✓	✓	✓	✓		✓	✓
PEDIATRIC FORMULATIONS		✓	✓	✓	✓	✓	✓	✓		
COMBINATION PRODUCT	✓		✓	✓		✓	✓			
POOR ACCEPTABILITY		✓		✓	✓	✓	✓	✓	✓	✓
SWALLOWING ISSUES		✓						✓		
DOSING FLEXIBILITY			✓	✓	✓	✓	✓		✓	✓
CHEMICAL INCOMPATIBILITIES			✓	✓	✓	✓	✓			
ORALLY DISINTEGRATING		✓								
DOSING CONVENIENCE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CONTROLLED SUBSTANCES	✓	✓	✓		✓	✓	✓	✓		

# Microcaps<sup>®</sup>

TASTE MASKING TECHNOLOGY

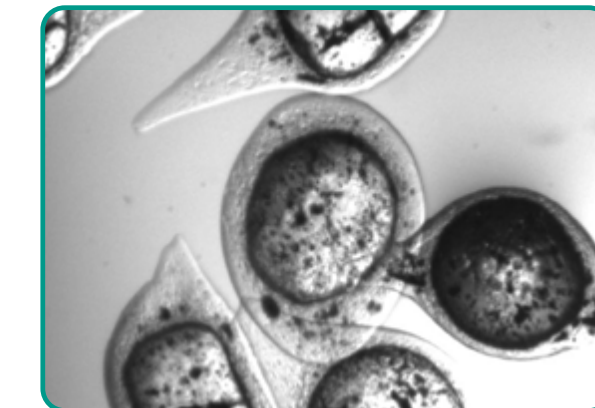
ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# SPECIALIZED TECHNOLOGIES

Individual drug particles deliver a smooth, pleasant mouthfeel, with no aftertaste

- A free-flowing powder containing microencapsulated API (or API substrate) in a wide range of particle sizes
- Can be applied to multiple dosage forms for both immediate and modified-release profiles, including:
  - » Powders
  - » Dry syrups
  - » Orally disintegrating tablets
  - » Parvulet<sup>®</sup> doses (a soft, food-like texture)
- Provides dose flexibility and convenience
- Achieved by the uniform and efficient coating of drug particles by coacervation (phase separation) to build polymeric membranes of varying porosity and thickness



*KCl During Microencapsulation*



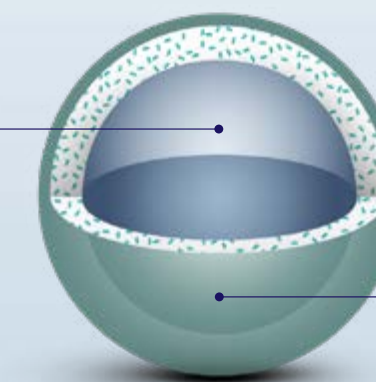
*Microcapsule After Drying*

## Microencapsulation by coacervation:

- Uniform coating of a solid particle or liquid droplet with a rigid semi-permeable polymer
- Creates a physical barrier
  - » Effective taste masking
  - » Customized release profile
  - » Turn non-aqueous liquids into powders
  - » Combine incompatible APIs

*Drug Particle*

- crystal
- granulate
- liquid



*Polymer Membrane*



**ADARE IS THE LEADER IN ORGANIC PHASE COACERVATION FOR PHARMACEUTICAL PRODUCTS**



# Optimum<sup>®</sup>

ORAL DOSE MICRO ENCAPSULATION

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

<b>Microcaps</b> TASTE MASKING TECHNOLOGY	<b>Optimum</b> ORAL DOSE MICRO ENCAPSULATION	<b>Diffucaps</b> CUSTOMIZED RELEASE TECHNOLOGY	<b>Minitabs</b> MMTS™ MULTI MINI TABLET SYSTEM	<b>Duragran</b> FLEXIBLE PARTICLE SIZING
<b>Adaptdose</b> MULTI-DELIVERY PLATFORM	<b>AdvaTab</b> ORALLY DISINTEGRATING TABLETS	<b>Parvulet</b> PATIENT-CENTRIC DOSING SOLUTIONS	<b>Stratum</b> INJECTABLE MICRO ENCAPSULATION	<b>Unisun</b> OTIC INJECTABLE TECHNOLOGY

# SPECIALIZED TECHNOLOGIES

## You don't have to sacrifice taste to achieve a dispersed solid oral dosage form

- Microspheres with high drug loading suitable for taste masking, enteric coatings, and extended release oral applications
- Offers numerous modified release options that can be used in a wide variety of final dosage forms
- Overcomes many of the inefficiencies and deficits of traditional formulation techniques
- Can match an extended release tablet's performance in a suspension format

## Optimum delivers on the promise of precision microparticles at a previously unachievable scale

- Particle sizes down to 75 µm with Span values as low as 0.40
- Uses a nitrogen "carrier" stream
- Analogous to spray congealing
- No drying step or coating required
- Compatible with waxes, lipids, stearates, and gelatins
- Good for oral small molecules, nutraceuticals, agricultural applications, flavorings, and heat stable molecules

## FORMULATION FLEXIBILITY



## DOSING FLEXIBILITY



# Diffucaps<sup>®</sup>

CUSTOMIZED RELEASE TECHNOLOGY

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# SPECIALIZED TECHNOLOGIES

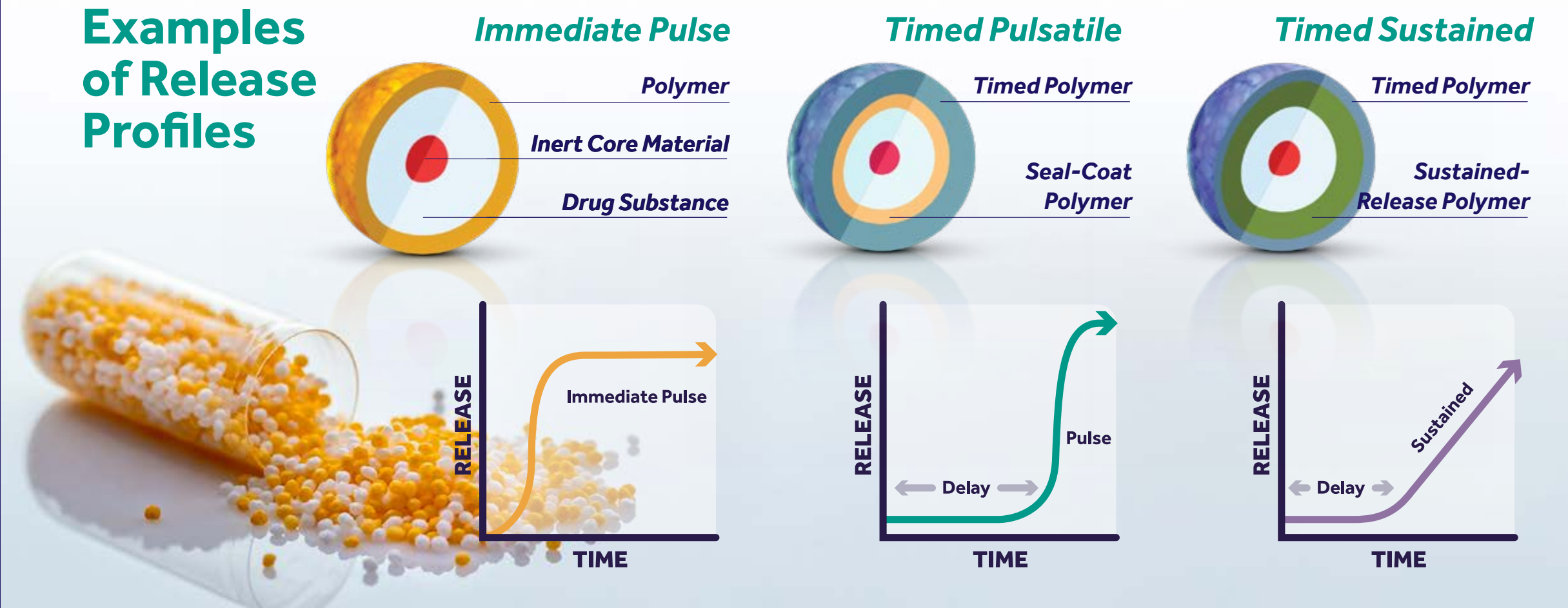
## Diffucaps<sup>®</sup> controls drug delivery and optimizes release profiles

- Adjustable dosage strength and dissolution profile to achieve the desired in vivo pharmacokinetic profile
- Available as a capsule, orally disintegrating tablet, rapidly disintegrating tablet, or as a sprinkle
- Enhances drug solubility in sections of the gastrointestinal tract through combined use with other Adare technologies
- Reduces gastric mucosal irritation and food effect

## Multiparticulate system with release-controlling polymers

- One or more functional polymer membranes are applied to a drug core, resulting in a small, multi-layered bead
- Solubility-modulation technology can be used to create an optimal pH
- Organic acid layer is placed underneath the drug layer, while the alkaline buffer is placed over the drug layer
- Coatings ensure that the individual layers are not depleted until release of the drug is complete

## Examples of Release Profiles





# Minitabs<sup>™</sup>

MMTST<sup>™</sup> MULTI MINI TABLET SYSTEM

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

**Microcaps**  
TASTE MASKING TECHNOLOGY

**Optimum**  
ORAL DOSE MICRO ENCAPSULATION

**Diffucaps**  
CUSTOMIZED RELEASE TECHNOLOGY

**Minitabs**  
MMTST<sup>™</sup> MULTI MINI TABLET SYSTEM

**Duragran**  
FLEXIBLE PARTICLE SIZING

**Adaptdose**  
MULTI-DELIVERY PLATFORM

**AdvaTab**  
ORALLY DISINTEGRATING TABLETS

**Parvulet**  
PATIENT-CENTRIC DOSING SOLUTIONS

**Stratum**  
INJECTABLE MICRO ENCAPSULATION

**Unisun**  
OTIC INJECTABLE TECHNOLOGY

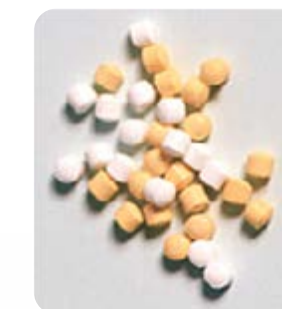
# SPECIALIZED TECHNOLOGIES

## Adare is a pioneer in flexible multiparticulate dosage forms

- Flexible dose delivery
  - » capsules
  - » sachets
  - » sprinkles
- Allows for a wide range of customized release profiles within a single capsule
- Precise delivery at lower dosage strengths through a range of tablet sizes
- Wide range of customized release profiles within a single capsule allows for titration of a broader range of dosages

## Multiparticulate system with release-controlling polymers

- Functional membranes are applied to 1.0-2.0 mm cylindrical tablets to control release rates
- The small size facilitates the development of products that can offer multiple drugs or varying release profiles within a single capsule
- High drug-loading capability with the possibility to combine with a high-density formulation for high-strength formulations



**2 mm**  
*Minitablets*



**1.5 mm**  
*Microtablets*



**1.2 mm**  
*Ultra Microtablets*

*Release Control Polymer*

*Minitablet*

- high drug load
- granulation or hydrophilic matrix

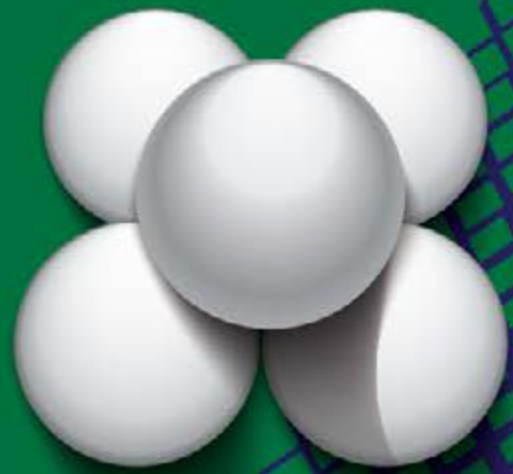


MINITABS CAN BE COMBINED WITH

CUSTOMIZED RELEASE  
**Diffucaps**<sup>®</sup>







# Duragran<sup>™</sup>

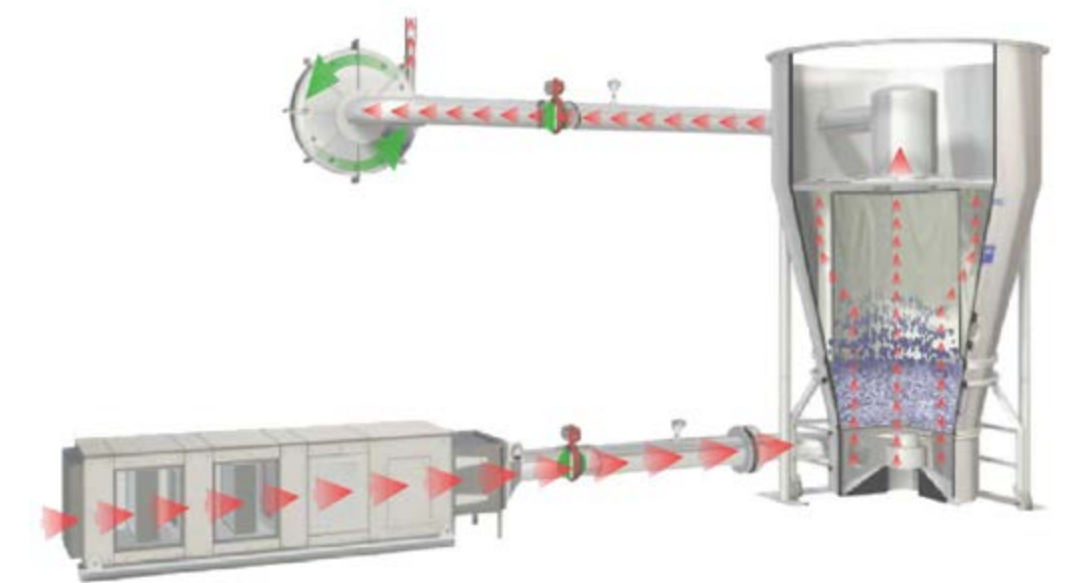
FLEXIBLE PARTICLE SIZING

# SPECIALIZED TECHNOLOGIES

**MORE UNIFORMITY AND PRECISE CONTROL OF TARGETED PARTICLE SIZES WHILE PROVIDING PRODUCTION TIME AND COST SAVINGS**

**Reduce the amount of excipients and/or process steps used to build beads or controlled release granules**

- Fast Dissolve Tablets (ODTs) where a small, durable taste-masked granule is desired
  - » The Duragran<sup>™</sup> process enables us to make a fine granule (less than 0.5mm) that contains very few superfines
  - » The material is coated in a subsequent process with the appropriate taste masking material, combined with the appropriate flavored cushioning granulation, and then compressed into tablets



- Formulations with API loading as high as 90% or more
  - » As an alternative to the extrusion/spheronization process
- Larger granules can be formed and then coated in a subsequent process to provide the desired targeted release profile
- Granules can provide a unique product look
  - » Large, colored granules in a white tablet with minimal color bleed into the white portions of the tablet
  - » These colored granules can be for appearance only or formulated to provide a delayed-release portion of the dose



ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# Adaptdose™

MULTI-DELIVERY PLATFORM



ABOUT ADARE PHARMA SOLUTIONS

DEVELOPMENT SERVICES

ABUSE DETERRENT TESTING

MANUFACTURING CAPABILITIES

HIGH POTENCY SOLUTIONS

PACKAGING & LOGISTICS

REGULATORY SUPPORT

OUR FACILITIES

SITE CAPABILITIES

SOLUBILITY ENHANCEMENT

PATIENT-CENTRIC SOLUTIONS

SOLUTIONS CENTER

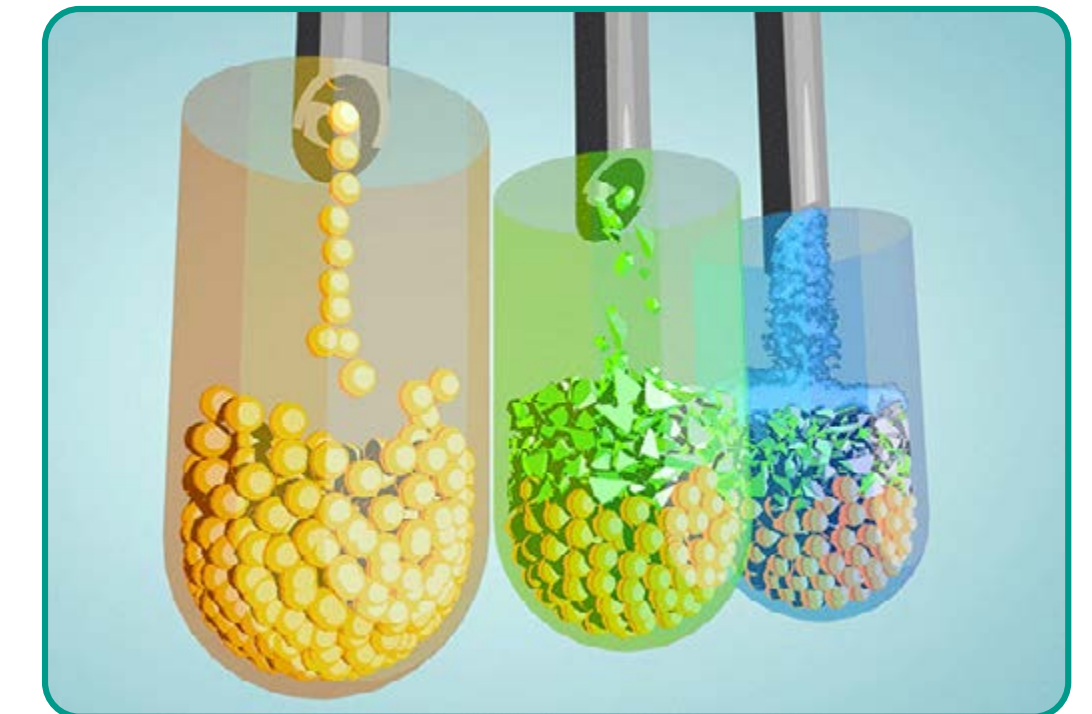


# SPECIALIZED TECHNOLOGIES

**A HIGHLY FLEXIBLE, MULTI-DELIVERY ENCAPSULATION TECHNOLOGY THAT ELIMINATES THE NEED FOR POST PHASE I TRIAL REFORMULATIONS**

**Providing speed, precision, and flexibility in product development**

- 3-hopper system: 1 capsule
  - » Add mini-tabs and granules with varying functional coatings
  - » Combine 2-3 different molecules
  - » Combine 2-3 different media (i.e., granules, powder)
- New product development
  - » Early-phase dose escalation and adaptive clinical studies
  - » Create patient-friendly and adjustable miniature tablet formulations
  - » Make quick adjustments in product dosing



- Generic product development
  - » Varying functional coats will help achieve extended-release profile
  - » Ability to use both mini-tablets and spheres interchangeably and to add as separate populations, reducing process development efforts
- Accuracy
  - » 100% visual inspection of mini-tab fills and sensitive onboard unit-dose weight verification





# AdvaTab<sup>®</sup>

ORALLY DISINTEGRATING TABLETS

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

**Microcaps**  
TASTE MASKING TECHNOLOGY

**Optimum**  
ORAL DOSE MICRO ENCAPSULATION

**Diffucaps**  
CUSTOMIZED RELEASE TECHNOLOGY

**Minitabs**  
MMTS™ MULTI MINI TABLET SYSTEM

**Duragran**  
FLEXIBLE PARTICLE SIZING

**Adaptdose**  
MULTI-DELIVERY PLATFORM

**AdvaTab**  
ORALLY DISINTEGRATING TABLETS

**Parvulet**  
PATIENT-CENTRIC DOSING SOLUTIONS

**Stratum**  
INJECTABLE MICRO ENCAPSULATION

**Unisun**  
OTIC INJECTABLE TECHNOLOGY

# SPECIALIZED TECHNOLOGIES

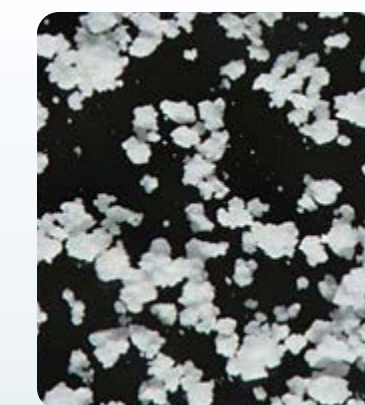
## AdvaTab<sup>®</sup> Advanced ODT technology

- Composed of finely micronized particles rapidly dispersing into a smooth, viscous suspension
- An easy-to-take dosage solution:
  - » Masks bitter drug taste
  - » Rapidly dissolves in the mouth without water
- Easy ingestion for pediatric, geriatric, and dysphagic patients
- AdvaTab tablets have been proven bioequivalent to immediate or sustained release formulations

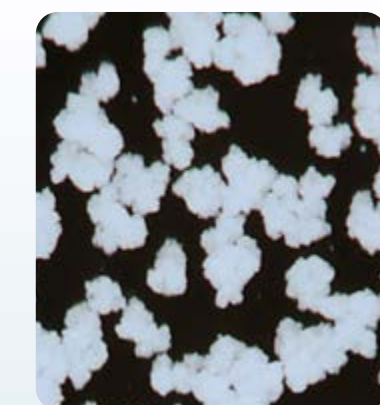
## Patented formulations and manufacturing process

- AdvaTab incorporates uniformly dispersed, coated drug particles in a low-moisture, rapidly disintegrating matrix
- Formulated for acceptable taste and a disintegration time of under 30 seconds
- Suitable for push-through blister packs and multiple-packing configurations
- Up to 500 mg drug-loading capability

## Micrographs of Formulation Stages



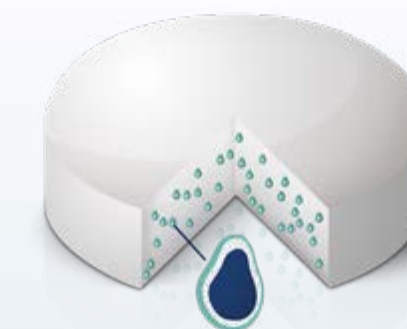
**API Granule**  
(Irregular Shape)



**Microcaps API**  
(Complete & Uniform Taste-masking)



**AdvaTab ODT**  
(Final Dosage Form)



*AdvaTab with embedded Microcaps Technology*

**COMBINE ADVATAB WITH THESE ADARE TECHNOLOGIES FOR IMMEDIATE RELEASE OR CONTROLLED RELEASE OPTIONS**

CUSTOMIZED RELEASE  
**Diffucaps<sup>®</sup> | Microcaps<sup>®</sup>**





# Parvulet<sup>®</sup>

PATIENT-CENTRIC DOSING SOLUTION

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# SPECIALIZED TECHNOLOGIES

## Parvulet addresses multiple challenges

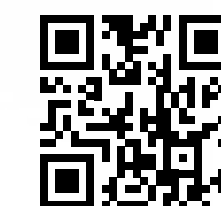
- Ideal for patients with swallowing difficulties
  - » Dysphagic patients
  - » Mucositis patients
  - » Pediatric and geriatric populations
- Allows for high drug loading
- Accurate dosing with every treatment
- Improves patient adherence
- Texture is easy to swallow
  - » *Masked for taste and smell*

## Parvulet is a patient-friendly format

Studies show a high percentage of patients in the geriatric and pediatric populations experience difficulty in swallowing.

Oral solid dosage form with final texture similar to that of applesauce:

- Easily administered in 30 seconds
- Swallowing aid built into formulation
- Mimics natural swallowing mechanism with no choking hazards
- Available in dispersible granules and tablets



Parvulet provides the ideal solution for patients who have difficulty swallowing. For a video demonstration of Parvulet in action, scan the code to the left, or [click here.](#)



## COMBINE PARVULET WITH OTHER ADARE TECHNOLOGIES



# Stratum<sup>™</sup>

INJECTABLE MICRO ENCAPSULATION

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER



# SPECIALIZED TECHNOLOGIES

## Stratum<sup>™</sup> offers controlled and pulse release options in an injectable form

### Controlled Release

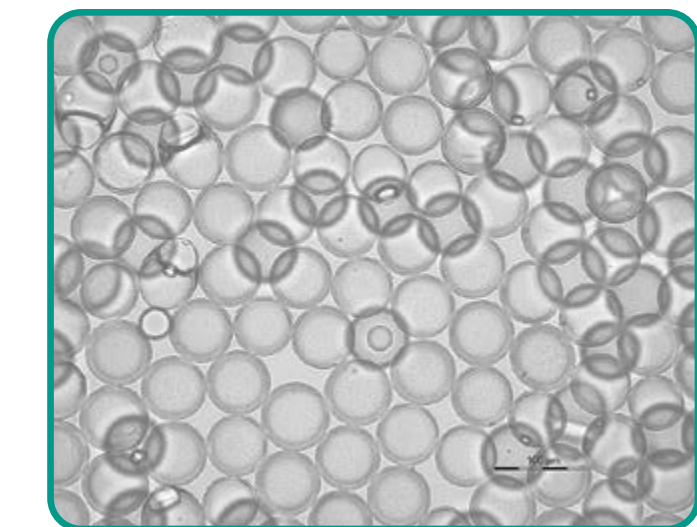
- Titrates drug release kinetics to enable novel long-acting injectable drug delivery products
- Creates uniform, monodisperse microspheres
- Offers sustained release for any desired length of time (days, weeks, months, up to year) via discrete control over release rate, including linear kinetics
- Perfect for pharmaceuticals where compliance is critical:
  - » contraception
  - » antipsychotic
  - » addiction and bacterial resistance medications

### Pulse Release

- Delayed release of API for true pulse release
- Shell composition tuned to release API after a month or more
- Improves patient compliance by reducing number of injections, including self-boosting vaccines and long-acting ocular injections

## Stratum microparticles open up a whole new world of possibilities

- Particle sizes down to 10  $\mu\text{m}$  with  $\pm 5\%$  deviation from the mean diameter
- Uses a water "carrier" stream
- Analogous to emulsion processes
- Requires lyophilization
- Compatible with PLGAs, PLAs, PCLs, PCPHs, alginates, gelatins, and other biopolymers
- Good for injectable small molecules, proteins, peptides, vaccines, and heat stable molecules



Uniform 50  $\mu\text{m}$  microspheres



# Unisun<sup>®</sup>

OTIC INJECTABLE TECHNOLOGY

# SPECIALIZED TECHNOLOGIES



Unisun leverages enhanced Stratum<sup>™</sup> microparticles for treating the inner ear

- Combines Stratum microspheres with a film-forming agent, or a film-forming agent on its own
- Film-forming agent uses a non-irritating aqueous base
- Film-forming agent dries quickly on warm biological surfaces
- Can be used to inject and set up highly concentrated depots of a drug
- Good for small molecules, proteins, peptides, and vaccines

## Unisun<sup>®</sup>: A Breakthrough In Intratympanic Delivery

- Unisun combines the use of uniform drug-loaded microspheres with a fast film-forming agent, allowing for both precise control of drug release and low cost, intratympanic delivery
- Unisun can be used with many drugs that treat otic disorders, including:
  - » Meniere's disease
  - » Sudden sensorineural hearing loss
  - » Tinnitus
  - » Autoimmune inner ear disease



In testing, uniform 30µm microspheres remained on the tympanic membrane after 35 days.

ABOUT ADARE PHARMA SOLUTIONS	DEVELOPMENT SERVICES	ABUSE DETERRENT TESTING
MANUFACTURING CAPABILITIES	HIGH POTENCY SOLUTIONS	PACKAGING & LOGISTICS
REGULATORY SUPPORT	OUR FACILITIES	SITE CAPABILITIES
SOLUBILITY ENHANCEMENT	PATIENT-CENTRIC SOLUTIONS	SOLUTIONS CENTER

<p><b>Microcaps</b><sup>™</sup> TASTE MASKING TECHNOLOGY</p>	<p><b>Optimum</b><sup>®</sup> ORAL DOSE MICRO ENCAPSULATION</p>	<p><b>Diffucaps</b><sup>®</sup> CUSTOMIZED RELEASE TECHNOLOGY</p>	<p><b>Minitabs</b><sup>™</sup> MMTS<sup>™</sup> MULTI MINI TABLET SYSTEM</p>	<p><b>Duragran</b><sup>™</sup> FLEXIBLE PARTICLE SIZING</p>
<p><b>Adaptdose</b><sup>™</sup> MULTI-DELIVERY PLATFORM</p>	<p><b>AdvaTab</b><sup>®</sup> ORALLY DISINTEGRATING TABLETS</p>	<p><b>Parvulet</b><sup>®</sup> PATIENT-CENTRIC DOSING SOLUTIONS</p>	<p><b>Stratum</b><sup>™</sup> INJECTABLE MICRO ENCAPSULATION</p>	<p><b>Unisun</b><sup>®</sup> OTIC INJECTABLE TECHNOLOGY</p>