

Solid Form Discovery and Selection

Sep-2020

About Us

- Located in San Diego, California, USA
 - One of the largest and most innovative biotech hubs in the United States
- Crystallization Research Services (fee-for-service)
 - Polymorph, salt and cocrystal screening and selection
 - Crystallization screening for amorphous/difficult to crystallize materials
- Dedicated Crystallization Company
 - Quality science
 - Personal attention to each client and project
 - Dedicated Project Manager for all projects



Image: Asha's Lab in San Diego, CA

www.AshaSD.com

Asha Pharma, LLC

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Founder Bio

- Asha was founded by Dr. Andy (Aniruddh) Singh
 - Over 15 years of experience in Crystallization, Solid Form Discovery, Particle Engineering and Preformulation
 - Ph.D. Chem E/Crystallization (IIT, Chicago) with Dr. Allan S. Myerson (world renowned crystallization expert)
 - Postdoc Chem E/Crystallization (MIT) with Dr. Bernhard Trout
 - Worked in Solid Form and Preformulation Groups at large pharma companies such as Bristol-Myers Squibb and Boehringer Ingelheim and multiple CROs
 - 7 journal articles, 13 posters and presentations, 7 patent applications (5 grants) and numerous internal technical reports
 - Ph.D. work highlighted by CrystEngComm
 - Invited talks at Purdue University and Industrial Symposiums
 - Reviewer for Crystal Growth and Design



Vision

- “Asha” means “Hope”
- Asha’s vision
 - Help our clients bring hope to patients
 - Enhance bioavailability of new drugs, help them reach market faster, reduce drug development costs
- Innovative and efficient proprietary workflows
 - Discover novel solid forms of pharmaceutical molecules and select optimal form for bioavailability enhancement & development
- We aspire to be the best in class solid form research company in the world

Asha Pledges

- **Highest Quality Science** - Each and every experiment will be designed with scientific thought. We shall always have fully trained, top quality scientists perform your work at Asha. There is no “B” team at Asha.
- **Crystallization Focus** - We are focused on crystallization services. At Asha, we don't make APIs, we don't make drug product and we don't sell instruments - we perform crystallization services and analyses.
- **72 Hours** - From the time we receive your Request for Proposal, we shall present you with our Proposal in 72 hours.

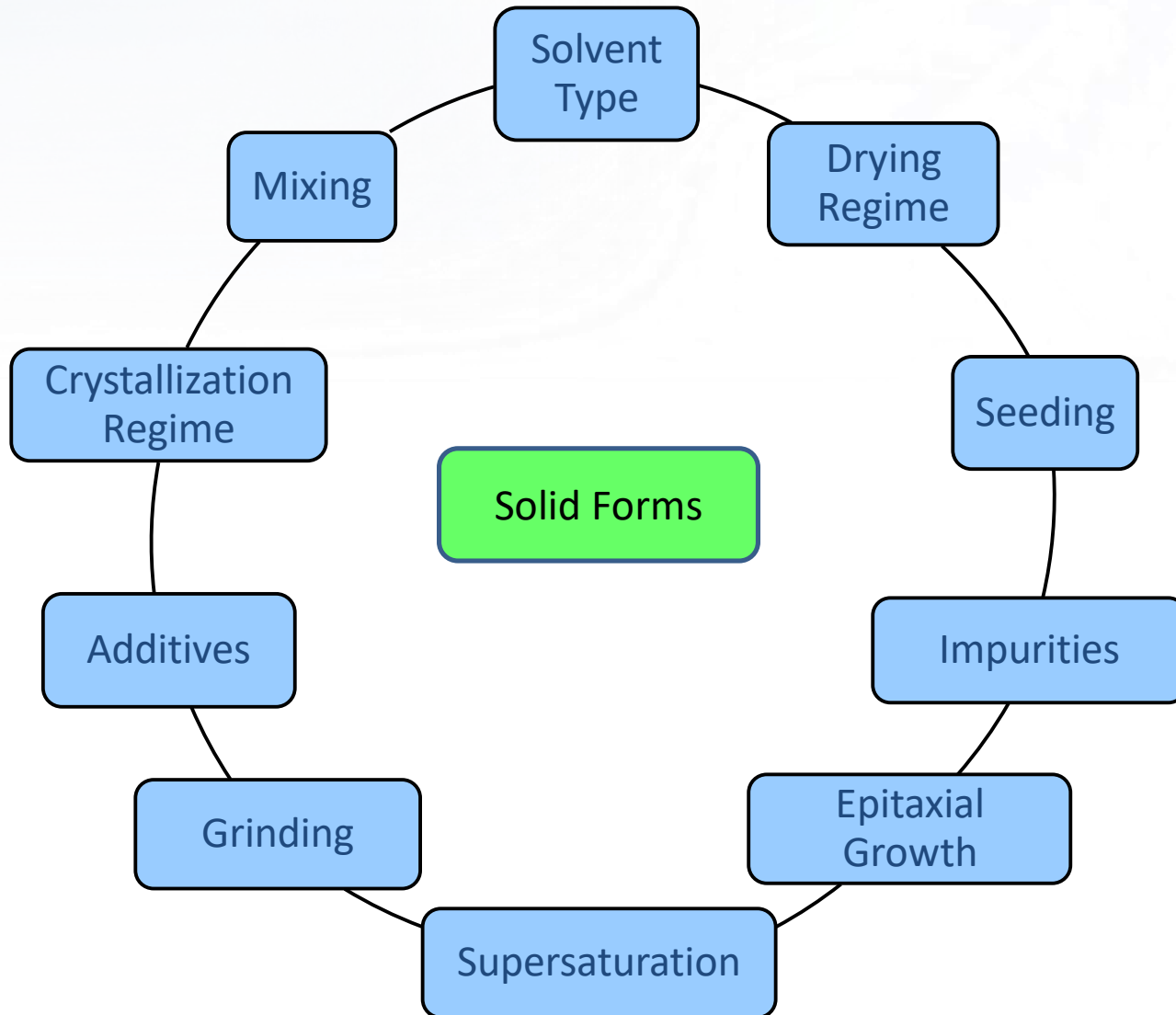
Asha Pledges

- **100% Pricing Integrity** - We shall never charge you for any work that you have not agreed upon in advance. We do our best working with you in the proposal drafting process to accurately capture scope. We don't believe in scope creep. Our pricing shall always be fair and transparent.
- **You are our Priority** - One client shall never be bumped for a "more important client" or to focus on an internal priority. Once the proposal is signed, your project is our priority. We have complete transparency in proposed project start times and timelines very early on in RFP process.
- **US Based** - We will keep your precious Intellectual Property in the United States. Asha is proud to be a 100% US Citizen owned American Company located in San Diego, CA.

Solid Form Problem

- Novel solid form discovery and selection
 - Essential part of drug development (significant legal, financial and medical implications)
 - Highly specialized work, frequently outsourced
- Can you make it? Is it stable? Is it fit for purpose?
- Outsourcing providers
 - Often non-innovative, inefficient workflows/one size fits all approach
 - Lack Scale-up Focus
- Smaller pharma companies (limited resources)
 - Often skip this critical task/get substandard data from CRO
 - Significant costs further downstream/promising drugs don't reach market

Solid Form Problem



Solution/Competitive Advantages

- Clients often have short timelines
- We are experts in:
 - Using risk based approach (risk identification and mitigation)
 - Finding optimal solution to solid form problem based on time and resources available
 - Answering: Can you make it? Is it stable? Is it fit for purpose?
 - Chemical Engineering expertise: Focus on scalability of solid forms/processes
 - We Screen AND help Select!
- Easily customizable workflows based on:
 - Drug molecule
 - Drug development timeline (Phase-Appropriate)

Solution/Competitive Advantages

- Asha's workflows combine:
 - Computer simulations
 - Efficient and highly scientific experimental design
 - Selective automation
- Particular focus:
 - Generating high quality scientific data
 - Enhancing bioavailability of poorly soluble molecules
 - Scale-up
- Asha is comfortable in both expert and partner roles
 - Welcome clients new to solid form research
 - Also welcome clients with internal experts in the field

- Polymorph Screening and Selection
 - Different crystalline structures of same chemical compound
 - Often have different physicochemical properties
 - FDA's 2007 Guidance on Polymorphism:
 - Influence of polymorphism on solubility, dissolution, bioavailability, manufacturing and stability
 - Asha uses diverse experimental design and high number of experiments¹
 - Discover polymorphs, hydrates and solvates
 - Determination of relative thermodynamic stability of neat forms under process relevant conditions
 - Determination of critical water activity for relevant hydrates
 - Crystallization process development for selected form

- Salt Screening and Selection
 - For ionizable molecules, salt screening can improve physicochemical or biopharmaceutical (e.g. improved bioavailability) properties of free form API
 - Asha uses diverse experimental design to help discover high number of viable salts
 - Two part approach: salt formation and crystallization
 - For API intermediates, Asha's team has experience using salt crystallization to replace expensive chromatography purification
 - **Most viable salt selection criteria:** yield, crystallization conditions, purity, counter ion acceptability, solid state stability, solubility, crystal morphology, particle size, filterability, powder flowability, hygroscopicity etc.
 - Crystallization process development for selected salt

- Cocrystal Screening and Selection
 - For non-ionizable or weak base/acid APIs
 - Cocrystals can help find suitable development candidates with desired physicochemical and biopharmaceutical properties
 - FDA's recently finalized (2018) guidance on cocrystals: significant interest in this field
 - Asha uses combination approach to help discover high number of viable cocrystals² :
 - Structure-based design
 - Experimental approaches
 - Crystallization process development for selected cocrystal

- Crystallization Screening for Amorphous Materials
 - Amorphous materials are difficult to develop, often have issues:
 - Purification, stability, undesired conversion to more stable forms etc.
 - Finding first crystals of amorphous material is particularly challenging
 - Asha's workflows:
 - Based on thorough understanding of thermodynamic and kinetic phenomena that control crystallization
 - Help optimize experimental conditions to crystallize such materials

Techniques/Equipment

The following are some of the techniques/equipment used in our workflows:

- Optical Microscopy
- Powder X-ray Diffraction (PXRD): Rigaku Miniflex w/autosampler
- Differential Scanning Calorimetry (DSC): Perkin Elmer Pyris 1 DSC w/Intracooler
- Thermogravimetric Analysis (TGA): Perkin Elmer TGA-7
- Thermo Haake AC 200 Programmable Chiller
- Dynamic Vapor Sorption (DVS) and Nuclear Magnetic Resonance (NMR)*



Image: Asha's Fully Equipped Solid State Lab with PXRD, DSC & TGA Instruments Shown

*Analysis run at partner lab

Techniques/Equipment

- Fume Hood
- Walk-in Refrigerator
- Analytical Balance
- Ultrasonic Bath
- Centrifuge
- Temp. Controlled Reaction Blocks (Including Jacketed)
- Digital Syringe Pump
- Magnetic Stir Plates
- Incubator/Oven



Image: Asha's Lab with Analytical Balance, Programmable Chiller, Optical Microscope and Incubator/Oven Shown

Resources and Partners

- Asha has a wet chemistry lab close to UC San Diego and access to backup instruments at the University (PXRD, DSC and TGA) – ensure uninterrupted service to clients
- Procurement, Lab Management/ Inventory supported by LabFellows



Image: Automated Bruker D8 Advance DaVinci
PXRD w/LYNXEYE XE-T Detector
leased by Asha at UCSD

Thank you!

To request a quote or for any other inquiries please email us at info@AshaSD.com or visit www.AshaSD.com



Image: Asha's Lunch and Learn Event in San Diego