

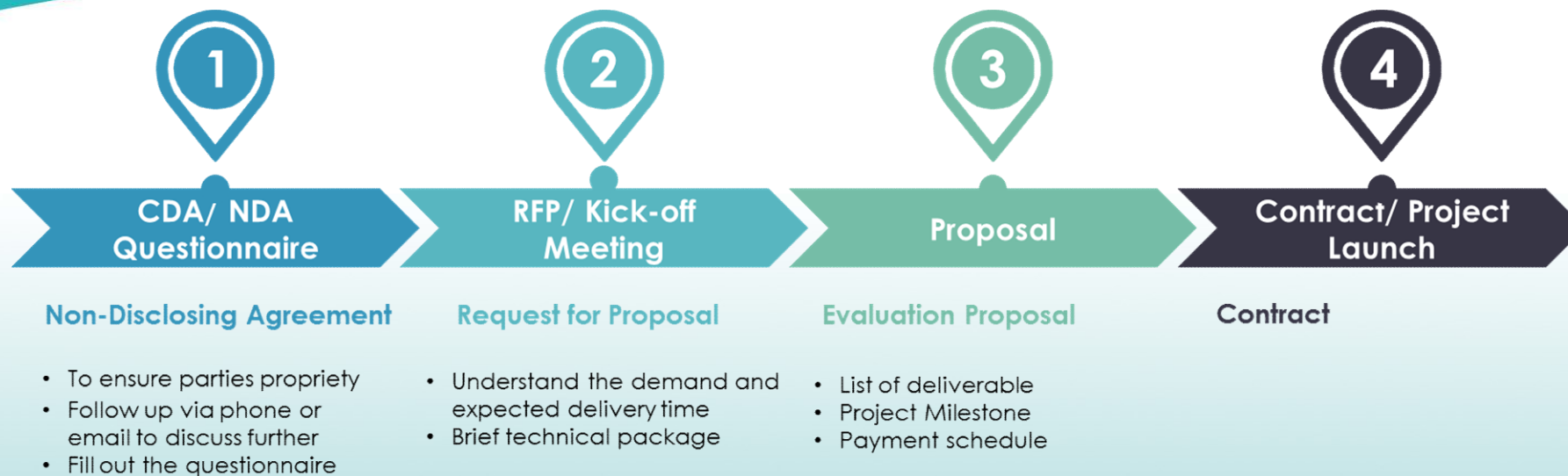
CMO/CDMO Services



- Synthesis/fermentation of pharmaceutical intermediates and active ingredients
- Process modification/ development
- Process scale-up and validation
- Analytical method development and validation
- Manufacturing API or intermediate from pre-clinical, clinical and commercial
- Manufacturing from grams to tons of API and intermediates
- Stability test under ICH guideline
- Regulatory filing and CMC documentations



Inquiry Flow



Core Capabilities



Biotechnology

- Strain Improvement
- Fermentation Process Development & Commercialization
- Purification Process
- Liquid Phase Peptide Development

Synthesis

- Process Research, Development and Optimization
- All of Reaction
 - Catalytic Hydrogenation
 - Bromination
 - Solid Phase Peptide synthesis
- Not include Fluorination

Key Technologies



- Acetylation
- Acylation
- Alkylation
- Amidation
- Carbonylation
- Carboxylation
- Chiral Synthesis
- Condensation
- Cyclisation
- Decarboxylation
- Dehydrogenation
- Diazotisation
- Diels-Alder-Reactions
- Esterification
- Etherification
- Formylation
- Friedel-Crafts Reaction
- Grignard-Reaction
- Halide exchange
- Hydrazine chemistry
- Hydrogenation
- Hydrogenation, catalytic
- Nitration
- Organometallic chemistry
- Reduction
- Vilsmeier-Reaction
- Peptide syntheses

Equipment For Synthesis



- **Reactors**

- Glass-lined reactors: Total volume 24,000 L
- Stainless steel reactors 140,000 L

- **Dryer**

- Hot-Air Tray Dryer
- Vacuum Tray Dryer
- Double-cone Dryer

- **Mills**

- Hammer Mill
- Fitz Mill
- Jet Mill

- **Centrifuges**

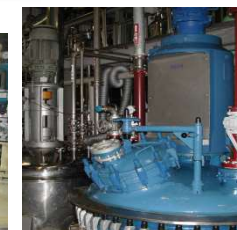
- Hastelloy Centrifuges
- Stainless Steel Centrifuges



50 L Glass Lined Reactor



3,000 L Glass Lined Reactors



5,000 L Glass-lined and Stainless Steel Reactors for Purification Process



75 L Stainless Steel Reactor



Stainless Steel Reactors



50 L Glass Lined Reactor



Freeze Dryers



6 inch MPLC system

Equipment For Biotech



- **Fermentation**
 - Total 137,000 L Fermentation Volume
 - 1,250 – 30,000 L Fermentors
 - ABEC Bioreactor
- **Purification**
 - Filter Press
 - Disk Centrifuge
 - Ultra-filtration
 - Preparative HPLC
- **Lyophilization**
 - Lyophilizer
- **Others**
 - Endotoxin Detection System
 - GEA Niro High Pressure Homogenizer



5 L Fermentor

22 L Fermentor

600 L Fermentor



20,000 L & 30,000 L Fermentors

ABEC 75L, 250L & 1250 L Bioreactors



Purification Equipment



Ultra Filtration



Pyros Kinetix Flex Automatic
Endotoxin Detection System

Equipment For Analytical



C.C.S.B.

- X-ray Powder Diffraction
- LC/MS
- GC
- GC/MS
- HPLC
- UPLC



GC/MS



LC Mass



UPLC



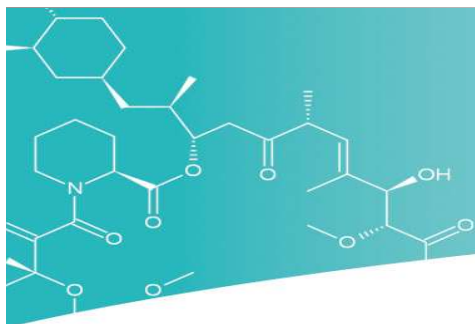
GE AKTA Purifier UPC 100



BioTek Synergy H1 Hybrid Reader



KwickLab Cross Flow System



THANKS FOR YOUR ATTENTION