

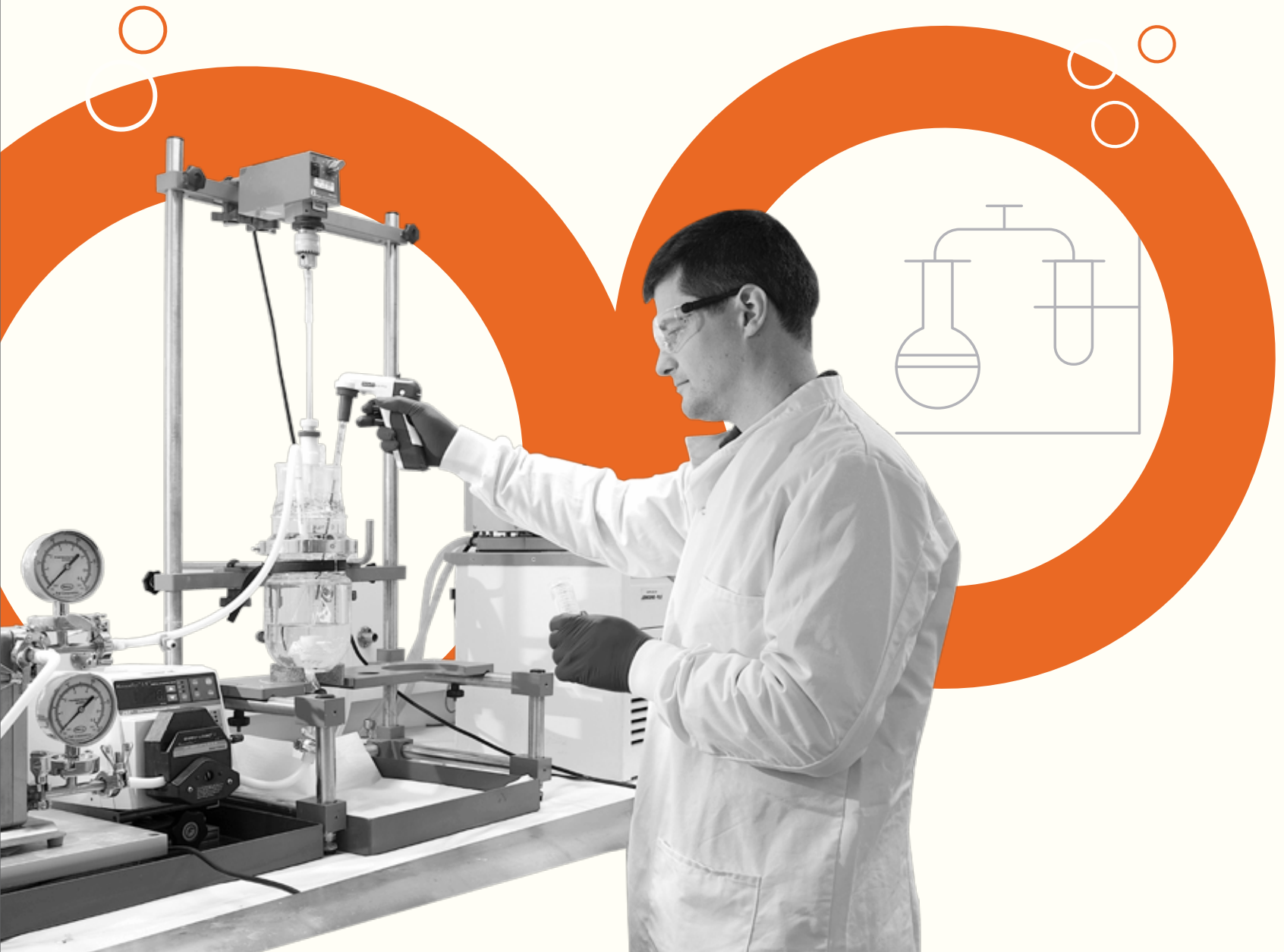


Piramal
Pharma Solutions

**DISCOVERY
SERVICES**

COMMITTED TO QUALITY

DELIVERING EXCELLENCE



SYNTHETIC CHEMISTRY

- Synthesis of discovery compounds, building blocks, libraries, reference standards, impurities, stable metabolites, D2 and C13 compounds
- Expertise in – Aliphatics, Carbohydrates, Heterocycles, Macrocycles, Small Peptides, Natural Products and its analogs, Nucleosides, and Small Molecules.
- Asymmetric Synthesis and Chiral Resolution
- Cross-coupling reactions: Sonogashira, Buchwald, Heck, Suzuki, Grubbs RCM, Grignard
- Protective group strategies
- Separations (chiral prep HPLC mg scale and Chemical Resolution; SFC for g-scale)

SYNTHETIC CHEMISTRY DIFFERENTIATOR:

- Design of synthesis to reduce the number of steps and identify common intermediates
- Avoidance of column chromatography and prep purifications by crystallization and trituration techniques, to save time and cost
- Detailed study of analytical data to identify desired product, as well as side products
- 2D NMR experiments to assign the correct structure of complex compounds and also distinguish the isomers

ANALYTICAL CHEMISTRY

- Two Bruker 400 MHz NMRs (1H, 13C, 19F, 31P, 15N, 2D NMR)
- LC/MS, HPLC, GC
- Analytical Method Development, Isolation and Characterization of unknown impurities
- Purity determination of Non-UV active compounds by ELSD detector
- Chiral Purification (mg to g scale)



BIOLOGY

ADME

- Physicochemical Screening: Aqueous solubility (Thermodynamic and Kinetic method), Log P (Octanol/water) & Log D (Octanol/PBS)
- Permeability: PAMPA & CaCo – 2; MDCK (wild type)
- Protein Binding: Plasma Protein Binding (Equilibrium Dialysis) & Microsomal Binding (Equilibrium Dialysis)
- Drug Metabolism: Hepatocyte Stability, Microsomal Stability, S9 Fraction Stability, Plasma Stability, Whole Blood Stability
- Drug-Drug interaction: CYP inhibition assays (Fluorescent and LCMS/MS-based), Reaction Phenotyping, CYP Time Dependent Inhibition (IC₅₀ shift) - 3A4 and 1A2 isoforms
- Others: P-Glycoprotein Substrate; P-Glycoprotein Inhibition; Preliminary BCS Permeability (non-GLP); Metabolite Identification (without structure elucidation)
- **Bioanalytical Services for Small Molecules (non-GLP):** Method Development; Method Validation; Bio-sample Analysis

ROUTE SCOUTING

- Works on SELECT (Safe; Environmental; Legal; Economic; Control; Throughput) principle.
- Rapid access to unknown scaffold structures and initial delivery of gram quantities
- Reduced steps & timelines for key intermediates for immediate scale-up to ensure enough material is available for completion of medicinal chemistry activity
- Decreases the cost of intermediates during early screening, eliminating scale-up issues from critical path during SAR studies

IN-VITRO BIOLOGY

Biochemical and Cell-Based Assays can be developed based on program requirement.

- Biochemical Assays: Types of assays are Spectrophotometric and Fluorimetric
- Detection methods: Fluorescence (FRET, TR-FRET) & Absorbance (UV/VIS)
- Assay targets: Kinases and Phosphatases
- Cell-Based Assays: Proliferation (Tetrazolium based), Death (Cytotoxicity) - Apoptosis (Caspase 3 & 9) & Necrosis (Calcein AM, Trypan blue exclusion, ATP depletion, LDH release)
- Signaling & second messenger generation (cAMP/cGMP) Chemokine/Cytokine Release (ELISA); GPCRs (Functional Assays)

SCALE UP

- PDS Ahmedabad has a dedicated Kilo-lab with 100L (one), 50L (one) and 20L (one) Jacketed Cylindrical glass reactors with distillation and Vacuum tray dryer to support the non-GMP synthesis of compounds in grams to kilograms (5 kg) for preclinical toxicology studies and route scouting.





OUR GLOBAL PRESENCE

1 LEXINGTON
 STERILE DEVELOPMENT
 & MANUFACTURING
 USFDA

2 RIVERVIEW
 HPAI DEVELOPMENT
 & MANUFACTURING
 USFDA

3 AURORA
 API DEVELOPMENT
 & MANUFACTURING
 USFDA, MHRA

4 MORPETH
 API & FORMULATION
 DEVELOPMENT
 MANUFACTURING
 USFDA, MHRA

5 GRANGEMOUTH
 ADC DEVELOPMENT
 & MANUFACTURING
 USFDA, MHRA

6 AHMEDABAD
 DRUG DISCOVERY
 & FORMULATION
 DEVELOPMENT
 MPA Sweden

7 MUMBAI
 API & FORMULATION
 DEVELOPMENT

8 MAHAD*
 VITAMINS & MINERALS
 PREMIXES
 USFDA, WHO-GMP

9 ENNORE
 API DEVELOPMENT
 & MANUFACTURING

10 DIGWAL
 API DEVELOPMENT
 & MANUFACTURING
 USFDA, MHRA

11 PITHAMPUR
 FORMULATION
 MANUFACTURING
 USFDA, MPA Sweden

12 SHANGHAI
 SOURCING OFFICE

Note: * Dietary Ingredients



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