



Assays and services to accelerate the development of your pharmaceutical product

In vitro ADME, LC/MS-MS bioanalysis & metabolite identification service list

Q² Solutions provides services designed to help you get the data you need and to drive informed development decisions for your pharmaceutical product. Our integrated drug metabolism solutions include high-throughput screening assays, human clearance predictions, drug-drug interaction risk assessments and metabolite profiling to support clinical safety. In addition to the services listed below, we can also provide bundled services for discovery and regulatory-phase packages to enable decision-making in early discovery through IND and beyond.

Bioanalytical/Pharmacokinetics Services	
Discovery Phase Bioanalysis by LC-MS/MS	Details
Tiered bioanalysis service available	Levels 0 – 3 (all non-regulated)
Bioanalytical with optional Pharmacokinetic Analysis: Plasma, Tissues	Species selectable, non-compartmental analysis
Bioanalytical with optional Pharmacokinetic Analysis: Dried Blood Spot	Species selectable, non-compartmental analysis

In Vitro ADME Services	
High-Throughput Screening Assays	Details
Solubility/Permeability Assays:	
Solubility: Turbidimetric	10 μ M to 100 μ M in buffer
Permeability: MDCK	MDCK (wild type), MDCK-II cell lines
Permeability: PAMPA	Pre-coated PAMPA plate system
Metabolic Stability Assays:	
Metabolic Stability: Single Point	Hepatocytes or microsomes; Species selectable
Metabolic Stability: Intrinsic Clearance	Hepatocytes or microsome; Species selectable
Metabolic Stability: Plasma or S9	Species selectable
Inhibition Assays (enzyme):	
P450 Inhibition: Reversible Single Point	Single concentration, P450 selectable (up to seven)
P450 Inhibition: Reversible IC ₅₀	Multiple concentrations, P450 selectable (up to seven)
Time Dependent P450 Inhibition: Single Point	Single concentration, CYP3A
Time Dependent P450 Inhibition: Multiple Point	CYP3A, CYP2B6, CYP2C8, CYP2C9, CYP2C19
Time Dependent P450 Inhibition: IC ₅₀ Shift	CYP3A or CYP3A4, 2D6 and 2C9 cocktail assays
Inhibition Assays (transporter):	
Transporter Inhibition: Bile Salt Export Pump (BSEP) Inhibition	Vesicles
Reaction Phenotyping Assays:	
P450 Reaction Phenotyping: Substrate Depletion	Microsomes with inhibitors for CYP2C9, CYP2D6, CYP3A
Other Assays:	
Protein Binding: Plasma, Microsomes, Brain Homogenate, HSA, AAG	Equilibrium dialysis HTDialysis or RED devise; Species selectable
Blood to Plasma Ratio	Species Selectable
Bundled Tier 1 Screening Assays:	
Metabolic stability, permeability, CYP inhibition	Human liver microsomes, MDCK, CYPs 2C9, 2D6, 3A in cocktail

In Vitro ADME Services <i>continued</i>	
Late Stage Discovery to Regulatory Phase Assays	Details
Metabolic Stability Assays:	
Metabolic Stability: Intrinsic Clearance	Hepatocytes and microsomes; Species selectable (\pm ABT optional)
Metabolic Stability: Glucuronidation (UGT) Clearance	Microsomes (liver, intestine, kidney); Species selectable (\pm BSA)
Metabolic Stability: Low Turnover Drugs	Hepatocyte coculture systems (H μ REL); Species selectable
Inhibition Assays (enzyme):	
P450 Inhibition: Hepatocytes Suspended in Plasma	CYP2C9, CYP2D6, CYP3A; combined reversible and TDI inhibition model
P450 Inhibition: Reversible IC ₅₀	Definitive IC ₅₀ for up to 7 P450s/8 assays
P450 Inhibition: Reversible K _i	Definitive K _i for selected P450s
Time Dependent P450 Inhibition: IC ₅₀ Shift	IC ₅₀ shift following 30 min pre-incubation (part of reversible inhibition IC ₅₀ assay)
Time Dependent P450 Inhibition: Kinetics	CYPs 1A2, 2B6, 2C8, 2C9, 2C19, 2D6 and 3A; k _{inact} / K _i and CL _{inact}
Time Dependent P450 Inhibition: Mechanism	Metabolic intermediate (MI) complex formation, CYP3A4
UGT Inhibition: Reversible IC ₅₀	UGT1A1, 1A3, 1A4, 1A6, 1A9, 2B7; Definitive IC ₅₀ using human liver microsomes
Induction Assays:	
P450 Induction: mRNA discovery screen in human hepatocytes	CYP1A2, CYP2B6, CYP3A4 message RNA assay following 24 hour treatment
P450 Induction: mRNA in 3 human hepatocyte donors with Relative Induction Score	CYP3A4, CYP2B6, CYP1A2, CYP2C8, CYP2C9, CYP2C19 mRNA, 48 or 72 hour treatment with basic DDI modeling (\pm CYP activity evaluation)
Reaction Phenotyping Assays:	
Hepatocytes with pan-CYP inhibitor (ABT)	Estimate CYP vs. non-CYP mediated fraction of metabolism
P450 Reaction Phenotyping: Substrate Depletion	Combination of rCYPs to predict HLM f _{m,CYP} using RAF and/or chemical inhibitors
P450 Reaction Phenotyping: Metabolite Formation	Combination of rCYPs and/or chemical inhibitors
Estimation of Fraction Metabolized by CYP3A4 and CYP3A5	Combination of rCYPs and/or chemical inhibitors (ketoconazole and CYP3A4i)
Aldehyde Oxidase (AO) Reaction Phenotyping: Human	Human cytosol or hepatocytes \pm Hydralazine (AO inhibitor)
Other Assays:	
Protein Binding: Equilibrium Dialysis by HTDialysis Method	Plasma, microsomes, HSA, AAG; Species selectable; human clinical plasma
Blood to Plasma Ratio	Human
Bundled IND-Enabling Assays:	
In Vitro DDI: CYP inhibition, time-dependent inhibition (TDI) and induction	HLMs and human hepatocytes; Assays meet regulatory guidelines for IND

Metabolite Profiling and Identification Discovery Services	
Discovery to Regulatory Phase Assays	Details (Waters Synapt G2-S and Thermo OrbiTrap and Q-Exactive HRMS)
Metabolite Profiling and Identification: Microsomes and Hepatocytes	Species selectable; S9, cytosol, or hepatocyte coculture systems available
P450 Reaction Phenotyping: Metabolite Formation	Microsomes with inhibitors for CYP1A2, CYP2C9, CYP2D6, CYP3A
Metabolite Profiling and Identification: In Vivo Services	Plasma, urine, bile, feces, and/or tissue homogenate; Species selectable
Metabolite Profiling and Identification: Exploratory Profiling	Exploratory assessment using unlabeled drug; Preclinical or clinical samples
Metabolite Profiling and Identification: Radioprofiling and MetID	Preclinical or clinical samples; Typically plasma, urine, bile, and/or feces
Reactive Intermediate Screen: Glutathione or Cyanide Trapping Agent	Microsomes; Species selectable
Reactive Intermediate Screen: Covalent Binding	Radiolabel covalent binding in microsomes or hepatocytes, species selectable

A full range of bioanalytical and ADME services

Q² Solutions operates one of the world's largest and most respected bioanalytical and ADME laboratory networks. From our global locations, we serve many of the largest pharmaceutical, specialty pharmaceutical and biotechnology companies in North America, South America, Europe and Asia. Our highly trained scientists utilize a range of leading-edge technology, automation and state-of-the-art techniques.

- **In Vitro ADME Assays and Metabolite Identification Services** in support of rapid drug discovery ADME property optimization and regulatory filings
- **Bioanalytical Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)** services for the quantitative determination of small molecule drugs and macromolecule therapeutics in support of pharmacokinetic (PK) studies
- **Immunoassay Services** for Enzyme-Linked ImmunoSorbant Assays (ELISA), mesoscale (MSD), electrochemiluminescence (ECL), and neutralizing antibody assays (NAB) in support of PK and immunogenicity studies
- **Biomarker Services** for LC/MS and ligand-binding assays for the quantitative determination of bioanalytical biomarkers

Contact us

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Validated bioanalytical services are available by visiting:
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