

BMPK Facility Data for Grants

The Bioanalytical, Metabolomics, and Pharmacokinetics Shared Resource (BMPK) provides bioanalytical analysis, modeling and consultation services to support discovery-based research and pre-clinical/clinical research and drug development. These services include study design and method consultation, formulation development and preparation, determination of proper sample storage conditions, sample analysis, data compilation and correlations, and PK/PD modeling. Collaboration between BMPK and investigators, faculty and staff are conducted through one-on-one meetings to prospectively plan and develop projects and grants, or to evaluate ongoing study conduct, milestones and outcomes.

BMPK offers a wide variety of analytical methods as well as capabilities to develop and validate new assays. BMPK provides highly sensitive measurements for numerous chemotherapeutic agents and their metabolites, along with endogenous compounds in a wide assortment of sample matrices (e.g., whole blood, plasma, serum, urine, cell pellets and media, xenografts, and a variety of tissue types from biodistribution studies) using innovative LC-MS, LC-MS/MS, UPLC, HPLC, CMIA, ELISA, and atomic absorption techniques.

Non-compartmental analysis (NCA) and PK/PD modeling and simulations are performed to gain insight into the mechanism of action and life cycle of cancer therapeutic agents as singular entities or in combination with other compounds, and to assess inter-individual and random variability within study populations. The information gained from past studies is used to optimize the design aspects of future research and clinical trials including dosing strategies and the selection of patient populations. BMPK serves as an essential component of CCSG's research efforts developing complementary collaborations between its bioanalytical and pharmacokinetic capabilities and the skill sets of other Shared Resources, such as Genomics, Biostatistics and Statistical Genomics, and Laboratory Animal.

BMPK General Instrumentation:

The BMPK laboratory is equipped with the following items: 3 biosafety cabinets; 3 exhaust fume hoods; an incubator; several microcentrifuges and table-top centrifuges; multiple refrigerators, -20 °C freezers, and -80 °C freezers with security alarm monitoring systems; two analytical balances; water baths; 96-well and tube nitrogen evaporators; a speed-vac evaporator; pH meter; shakers and rotators; a Waters de-ionization (DI) water system, an in-house reverse osmosis (RO) water system; a yellow light room for handling of photosensitive compounds/materials; manual and electronic single-place and multi-channel pipets; solid phase extraction plate systems; a Bead Ruptor and pencil sonicators for tissue homogenizations; and water bath sonicators.

BMPK Analytical and Sample Handling Instrumentation:

- Sciex 5500 QTrap triple quadrupole (ESI/APCI-LC/MS/MS): contains a binary pump, a second binary pumping system for column switching procedures, a degasser, a vial/96-well plate autosampler with rinse pump, a column heater/cooler, and divert valves
- Sciex 5500 triple quadrupole (ESI/APCI-LC/MS/MS): contains a binary pump, a second binary pumping system for column switching procedures, a degasser, a vial/96-well plate autosampler with rinse pump, a column heater/cooler, a UV detector, and divert valves
- Thermo Scientific TSQ Vantage triple quadrupole (ESI/APCI-LC/MS/MS): contains a binary pump, a degasser, a vial/96-well plate place autosampler, a column heater/cooler, and divert valves
- Sciex API3000 triple quadrupole (ESI LC/MS/MS): contains a dual binary pumping system, a degasser, a vial/96-well plate place autosampler, a column heater, and divert valves

- Waters Ultra Performance Liquid Chromatography (UPLC) system: contains a dual binary pump, a degasser, a vial/96-well plate place autosampler, a column heater, and fluorescence and UV detectors
- Waters BioAlliance High Performance Liquid Chromatography (HPLC) system: contains a dual binary pump, a degasser, a vial/96-well plate place autosampler, a column heater, and fluorescence and UV detectors
- Abbott i1000SR Architect chemiluminescent magnetic microparticle immunoassay (CMIA) clinical analyzer
- Perkin Elmer Analyst 600 graphite furnace atomic absorption system
- Biotek Synergy 96-well plate reader providing fluorescence and UV detection
- Tomtec Quadra 4 robotic 96-well pipet sample handling system

BMPK Modeling Software:

- Phoenix WinNonlin: non-compartmental and compartmental modeling
- NONMEM: nonlinear mixed effect modeling software for population analysis to determine sources of variability in the PK and PD of drugs
- ADAPT 5 and S-ADAPT: individual compartmental PK and PK/PD modeling
- SAS 9.3: used to manage and clean databases, and create graphics and tables