MONASH University

MONASH RESEARCH PLATFORMS

CENTRE FOR DRUG CANDIDATE OPTIMISATION

The Centre for Drug Candidate Optimisation (CDCO) is a collaborative research platform based within the Monash Institute of Pharmaceutical Sciences that provides biopharmaceutical lead optimisation expertise to academic, commercial and not-for-profit drug discovery programs.

Drug candidate optimisation is a key component of modern drug discovery, playing a critical role in compound design, selection and progression. Optimising physicochemical, metabolism and pharmacokinetic properties of drug candidates is essential in guiding medicinal chemistry, developing formulation and delivery strategies, and informing dosing regimens to ensure safety and efficacy.

KEY INSTRUMENTATION

- Acoustic ejection mass spectrometer (SCIEX EchoMS)
- Five LC/MS instruments with UPLC coupled to triple quadrupole, QDa or time of flight mass spectrometers
- Automated small animal in vivo blood sampling using BASi Culex™
- Automated in vitro assays using a Hamilton MICROLAB® STAR liquid handling robot
- Automated sample preparation using liquid handling robots
- In silico and in vitro methods for profiling physicochemical properties
- Plate based assays for CYP450 metabolic stability, metabolite profiling and metabolic drug interactions
- Cell culture facilities for permeability assessment (Caco-2)

EXPERTISE

The CDCO has over 20 years of experience in biopharmaceutical and pharmacokinetic lead optimisation to support collaborative drug discovery. The CDCO team is comprised of experienced scientific staff with expertise in physicochemical profiling, drug metabolism, drug delivery, pharmacokinetics and bioanalysis. We utilise fully validated scientific platforms supported by a Quality Management System to help researchers advance their drug discovery programs. Rather than a one-size-fits-all model, we work with collaborators to tailor study designs to the needs of each project and ensure we are running the right study at the right time. Our focus is on the timely delivery of high impact, decision-quality data to inform and enhance medicinal chemistry and biology programs, with the aim of discovering and developing high quality drug candidates to address significant medical need.

WORKING WITH US

- Collaborative research
- Fee for service

SPECIALIST SERVICES

The CDCO fosters scientific innovation in drug discovery through multidisciplinary collaborations. We provide translational expertise in drug absorption, distribution, metabolism and excretion (ADME) properties of drug candidates.

Physicochemical profiling

The physicochemical properties of drug candidates, including solubility, partitioning, ionisation and stability, underpin all aspects of drug formulation, delivery and disposition. Poor physicochemical properties can contribute to low bioavailability and unfavourable distribution.

Drug metabolism, metabolite identification and metabolic drug-drug interactions

Rapid metabolism is a major limiting feature of many drug candidates and can lead to low oral bioavailability, a short half-life or the production of potentially toxic metabolites. Serious adverse events can also arise through metabolic drug-drug interactions. Understanding metabolic liabilities by identifying metabolites and elucidating metabolic pathways provides a rationale for structural modifications to reduce associated risks.

Bioavailability and pharmacokinetics

Pharmacokinetic (PK) properties dictate the route and frequency of administration, how extensively a drug is distributed throughout the body and how long efficacious concentrations are maintained.

An appropriate PK profile is essential in achieving the desired therapeutic response. Defining drug absorption, distribution and clearance processes and mechanisms in preclinical models provides insight into dose and dosage from selection, optimisation of dosing regimens, and prediction of human PK properties.

Bioanalysis

Rapid, specific and quantitative analysis is required to support all aspects of ADME lead optimisation. Specialised LC-MS/MS instrumentation enables the rapid development of specific methods for the analysis of candidate drugs and their metabolites in complex biological matrices.

CENTRE FOR DRUG CANDIDATE OPTIMISATION
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