



Assay Biology & Screening

Our assay biology team designs and executes high-quality biochemical, biophysical and cell-based assays using modalities such as FRET, AlphaLISA, SPR and LC-MS-based platforms. We have expertise in diverse suite of functional and phenotypic assays for second messengers, kinases, RTKs, TPDs and imaging, optimised for throughput and specificity. Our anti-infective screening covers bacteria, fungi, and parasites, supported by dedicated BSL-II facilities.

Therapeutic areas

- Inflammation & Pain
- Cardiovascular & Metabolic Disorders
- Anti-infectives
- Oncology
- Central Nervous System (CNS) Disorders

Target Classes

Our platforms are optimised for a wide range of molecular targets, including:

- GPCRs
- Ion channels
- Enzymes
- Transporters
- Nuclear hormone receptors (NHRs) & transcription factors
- Epigenetic targets

Assay Platforms & Technologies

Binding & Interaction Assays

- FRET assays
- Surface Plasmon Resonance (SPR)
- Radioligand binding (SPA and filtration)
- Fluorescence polarisation (FP)

Signal Transduction & Second Messenger Assays

- cAMP assay
- Intracellular calcium mobilisation
- Voltage-sensitive dye-based assay
- β -arrestin assay
- GTP γ binding assay

Enzyme & Activity-Based Assays

- ELISA (classical / HTRF / AlphaLISA)
- Ultra-sensitive luminescence
- HTRF/TR-FRET
- BRET
- Absorbance/ Fluorescence/ FP/ luminescence & radio-isotope readouts

Mechanistic & Biophysical Characterisation

- High-throughput protein degradation assay (JESS)
- LC-MS-based assays
- Inhibitor screening of protein-protein interactions (PPI)

Functional & Phenotypic Screening

- Anti-infective assays: antibacterial, antifungal, antiparasitic
- Expression profiling mRNA (qPCR)
- Cell-based imaging assays
- FACS-based assays

Specialised Assays

- Targeted protein degradation (TPD)
- Ion channel sensitisation / desensitisation
- 3D spheroid-based assays
- Toxicity assays

Therapeutic Areas

Inflammation & Pain

- **G Protein-coupled Receptors**

- Adenosine
- Cannabinoid
- Chemokine
- EP2/EP4
- Histamine
- Opioid
- Orphanin/Nociceptin receptor
- Bradykinin
- CRTH2
- C5a-R

- **Enzymes**

- SPR
- Autotaxin
- COX/LOX
- Fatty Acyl Amide Hydrolase (FAAH)
- STK, TK, RTK
- Haem oxygenase
- MIF2
- Monoamine oxidases
- Phosphodiesterase
- Phospholipase A2
- Tumour Necrosis Factor- α converting enzyme
- Pantetheinase
- Protease

- **Ion Channels**

- Na⁺, K⁺, Ca²⁺
- Purinergic channels
- TRP channels

- **Cytokines**

- Analysis in purified human monocytes
- Differentiated macrophages (M ϕ) and THP-1
- Human whole blood and hPBMC (fresh/frozen)
- Cytometric bead array for detection of cytokines from hPBMC
- Bovine PBMC
- Mouse splenocyte
- Rat microglia

- **Specialised Assays**

- Autotaxin - Whole blood
- Cell adhesion
- Chemotaxis (primary/native/target-based cell lines)
- MPO
- NETosis (SYTOX-based/image-based)
- Neutrophil/Monocyte: NOS, ROS
- Rat DRG assays: NO, BH4, neurotransmitter release assays
- Signal transduction assays (monocytes): ELISA/WB for p38, MAPKAP2, HSP27, ERK
- TNF-TNFR activation assay
- Protein degradation assay

Cardiovascular & Metabolic Disorders

- **G Protein-coupled Receptors**

- Angiotensin
- Cannabinoid
- GLP-1
- GPR 43/120/40
- MCHR1
- Melanocortin 1,4
- Neuropeptide Y 1,2
- Orexin 1&2
- Somatostatins
- Vasopressin

- **Enzymes**

- α -glucosidase
- Acetyl CoA Carboxylase (ACC)
- Angiotensin Converting Enzyme (ACE)
- Dipeptidyl Peptidase IV
- Fatty Acid Synthetase (FAS)
- GSK3 β
- Neprilysin
- PTP1B

- **Transactivation**

- Oestrogen receptor
- Glucocorticoid
- Mineralocorticoid
- PPAR receptors
- Progesterone receptor
- Thyroid receptor
- Vitamin D

- **Specialised Assays**

- Adipocyte differentiation in 3T3L1
- Adiponectin release estimation
- Biomarker: liver inflammation (Ammonia/KA/AA)
- Cholesterol efflux
- Collagen estimation from liver (soluble/insoluble)
- Glucose uptake in 3T3L1/L6
- Insulin release estimation

Central Nervous System

- **G Protein-coupled Receptors**

- 5HT receptors
- Adrenergic
- Dopamine
- GABA B
- mGluR
- Muscarinic
- Serotonin

- **Enzymes**

- Monoamine oxidases

- **Transporter**

- Serotonin uptake assay

- **Specialised Assays**

- Microglia cytokine assay
- Rat cortical neuron glutamate assay
- Rat trigeminal neuron biomarker assay
- Norepinephrine release assay

Anti-infectives

- **Antibacterial**

- Antibacterial susceptibility (including peptides), ESKAPE panel
- Anti-virulence screens
- Efflux assays
- Macromolecular synthesis pathway analysis
- MIC shift assay (target engagement)
- Panel of human and animal health pathogenic strains
- Post-antibiotic effect (PAE)
- Resistance mutation frequency assessment
- Synergy test
- Time-kill kinetics assay

- **Anticandidal**

- Antifungal susceptibility (human and plant pathogens)
- Anti-virulence screens
- Cross resistance assessment
- Germ tube formation assay
- MOA assays
- Resistance assessment assay
- Synergy test
- Time-kill assay (TKA)

- **Anti-parasite**

- Intracellular calcium
- Small- and large-scale culture
- *P. falciparum* LDH viability assay (WT and MDR strains)
- SYBR Green viability
- *T. brucei*

Oncology

- **Caspases & Cell Viability Assays**

- Cell proliferation assays: MTT, MTS, CellTiter-Glo (2D and 3D), CellTiter-Blue, LDH release, ATPlite, Calcein AM
- Panel of >30 in-house cancer cell lines

- **Metabolic & Redox Assays**

- CO₂ capture assay (glycine metabolism)
- Oxidoreductase assays: Thioredoxin reductase, Glutathione reductase

- **Epigenetic & Enzymatic Targets**

- N-myristoyltransferase
- Histone deacetylases (HDACs)
- Bromodomain proteins
- Matrix metalloproteinases (MMPs)
- Serine proteases
- PI3K

- **Reporter & Signal Transduction Assays**

- TEAD – luciferase
- MYC – luciferase
- NF-κB reporter assay
- Signal transduction assays: pERK, pEGFR (in cell lines)

- **Enzymes (Cell-free & Cell-based)**

- IDO & TDO
- AGC (PKNs, ROCK1)
- TK (Trk receptors, MERTK, FLT3), STK

- Kinases
- **Specialised Assays**
 - Protein degradation: Bromodomain, CCR9, EGFR
 - Label-free interaction (SPR): Serine protease

Comprehensive Anti-Infective Platforms

We offer extensive screening and profiling of compounds against a broad spectrum of pathogens, including:

- *P. falciparum* (wild type and resistant)
- *T. brucei*
- Gram-positive and Gram-negative bacteria
- Candidal pathogens

Capabilities include

- Large-scale in-house *Plasmodium* cultures for anti-malarial efficacy and resistance profiling
- PRR (Parasite Reduction Ratio) assays to measure viability and killing rates
- MIR (Minimum Inoculum for Resistance) assays to assess resistance risk under drug pressure
- MIC/MFC determination, germ tube assays, biofilm assays, and membrane integrity testing for antifungal agents
- Antibacterial susceptibility, resistance mutation frequency, synergy testing, and MoA studies
- Anti-virulence assays, including biofilm disruption, cell invasion, and quorum sensing
- Time-kill kinetics, efflux analysis, and PAE (post-antibiotic effect) studies
- Synergy testing through the checkerboard assay

Physiologically Relevant Models

We utilise diverse biological systems, including:

- Primary cells
- Cancer cell lines
- Overexpressed cell lines

Our target-specific screening platforms for modulators of pain receptors, cytokine receptors, and metabolic regulators are optimised for specificity and throughput assays.

Diverse Analytical Modalities

Our expertise includes:

- ELISA
- HTRF
- Ultra-sensitive luminescence
- High-throughput protein degradation assays (JESS)
- LC-MS-based assays

These are supported by industry-standard instrumentation, ensuring sensitivity, accuracy, reproducibility, and scalability for:

- Screening campaigns
- Mechanism of action (MoA) studies
- Pathway analysis across functional, phenotypic, and specialised assay types

Liability Profiling Assays

CYP Induction - CYP1A2, 2B6 & CYP3A4	HepaRG cell, mRNA-based detection (qPCR), with LDH release cytotoxicity assay in parallel
hERG - FP	Kit-based FP assay in 384-well format
Cytotoxicity assay	CTG assay using panel of cell lines in 384-well format
hRBC lysis assay	Plate-based study with Human blood in 96-well format
hNav1.5-HEK293 cell-based FLIPR assay	FMP dye-based FLIPR assay in 384-well format
mAMES (Xenometrix kit-based)	5 strains: (TA98, TA100, TA1535, TA1537, <i>E. coli</i> uvrA/ <i>E. coli</i> pkM101) w/wo S9
Glu/Gal assay	384-well plate-based assay using HepG2 cells
Phospholipidosis assay	Plate-based study with HepG2 cells and image-based readout
Neurotoxicity assay	Plate-based study with GFP-overexpressed SH-SY5Y cells and image-based readout

With customisable assay formats, validated readouts, and proven assay transfer expertise, TCG Lifesciences delivers precision, scalability, and actionable insights—bridging science and innovation to accelerate therapeutic discovery.