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Since 2017, Gifford Bioscience has been building its reputation as the specialist contract research organisation (CRO) in receptor binding and occupancy studies.

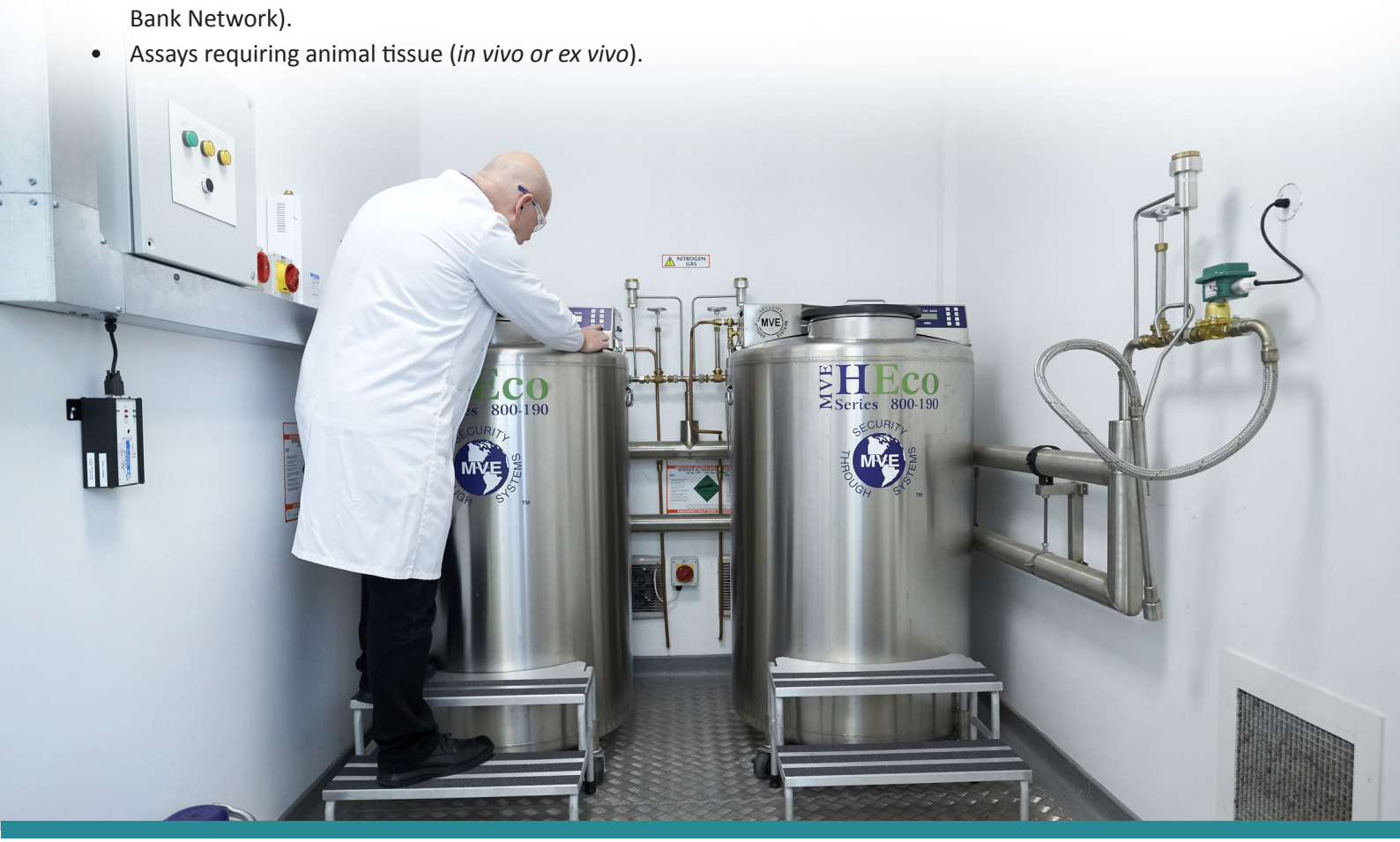
Our services comprise radioligand binding assays; cellular uptake and release assays; SPR (Biacore) assays; autoradiography and receptor occupancy studies.

We are committed to delivering the best science. With this aim, we adhere tightly to our core specialism and our researchers all hold PhDs.

We undertake standard or custom assays, either to our client's existing specification or after a discussion over assay design.

Supporting capabilities include:

- Cell culture and transfections.
- Growth of bacterial cultures and plasmid DNA isolation.
- In-house production of membrane preparations.
- Labeling of proteins, antibodies and peptides with radioiodine (^{125}I and ^{131}I) for use in our *in vitro* and *ex vivo* receptor binding studies.
- Protein purification using the ÄKTA FPLC system.
- Assays requiring human tissue samples (working with the Human Biomedical Resource Centre and the UK Brain Bank Network).
- Assays requiring animal tissue (*in vivo or ex vivo*).



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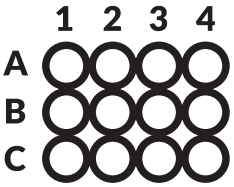


Radioligand binding

Radioligand binding assays enable rapid and cost-efficient determination of compound affinities, receptor density and kinetic parameters for receptor-ligand interactions in cells and tissues. Assay protocols can be competition, saturation or kinetic.

Competition binding assays

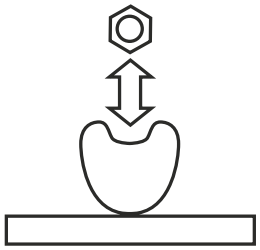
- Determination of IC_{50} and K_i values for test compounds against a membrane receptor.
- Membrane receptor preparations obtained from cells or tissues.
- Assays are robust and reproducible compared with less direct alternatives.

Saturation binding assays

- Yields both affinity (K_d) and density (B_{max}) for receptor-ligand interactions for membrane receptors.
- Identification of competitive versus non-competitive (allosteric) mechanisms for binding interactions.
- Determination of occupancy versus concentration relationships for radiolabeled proteins or antibodies to cell surface receptors in cell culture.

Kinetic binding assays

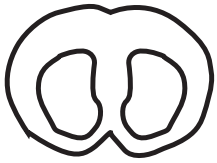
- Association (k_{on}) and dissociation (k_{off}) rates.
- Identification of allosteric effects on ligand dissociation.



SPR (Biacore)

SPR (Biacore) assays provide a label-free method for determining the affinity and binding kinetics of a ligand for its receptor.

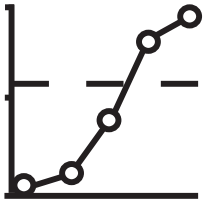
- Measures real-time binding association and dissociation rates using Surface Plasmon Resonance (SPR).
- Complementary to radioligand equilibrium binding affinity, providing additional binding dynamics.
- An alternative to radioligand binding where a radioligand is unavailable or radiolabeling adversely affects the ligand structure.



Receptor autoradiography

Receptor autoradiography enables the distribution and density of receptors for a radiolabeled ligand to be determined in tissue sections.

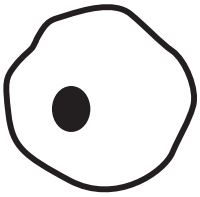
- Measurement of receptor density in specific brain regions.
- Visualization of known and unknown binding sites for a labeled ligand in tissues.
- Effect of chronic drug treatments on receptor density and affinity across brain or tissue regions.
- Determination of agonist efficacy on GPCRs via [^{35}S]GTPγS binding.



Receptor occupancy

Receptor occupancy assays measure the percentage to which a test drug occupies its target receptor in the brain or peripheral tissues. Occupancy is determined by measuring the proportion of unoccupied receptors with binding of a radiolabeled tracer.

- Central receptor occupancy estimation over a range of drug doses or time points.
- Establish pharmacokinetic and pharmacodynamic relationships of a drug candidate.
- *Ex vivo* autoradiographic determination of receptor occupancy in different brain regions or across multiple receptors.



Cellular uptake and release

Radiometric uptake and release assays are used to quantify the potency and efficacy of test compounds on cellular uptake processes, neurotransmitter release or ion channel activity.

- Determination of IC_{50} values for test compounds against cellular or synaptosomal uptake of tritiated neurotransmitters and metabolites.
- Quantification of drug effects on ligand-gated ion channel activity via ^{86}Rb efflux.
- Quantification of cell-mediated cytotoxicity via ^{51}Cr release.

Our premises at The BioHub Birmingham

Gifford Bioscience Limited is located at a purpose-built facility on the University of Birmingham's Research park. The laboratory is fitted out with the full array of standard and specialist equipment to meet our needs: liquid nitrogen; remotely monitored freezers at -152 °C and -80 °C; dedicated tissue culture room; cryostat; liquid scintillation counter; HPLC; flow cytometer; bright field and fluorescence microscopy. The facility was opened in 2015, having been funded through a substantial EU grant.

50% of our clients are in the USA. A further quarter are based in EU.

88% of our business is repeat business, coming from the scientists we have worked with before.

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