Making ideas work for a better world

BENCH TO BEDSIDE

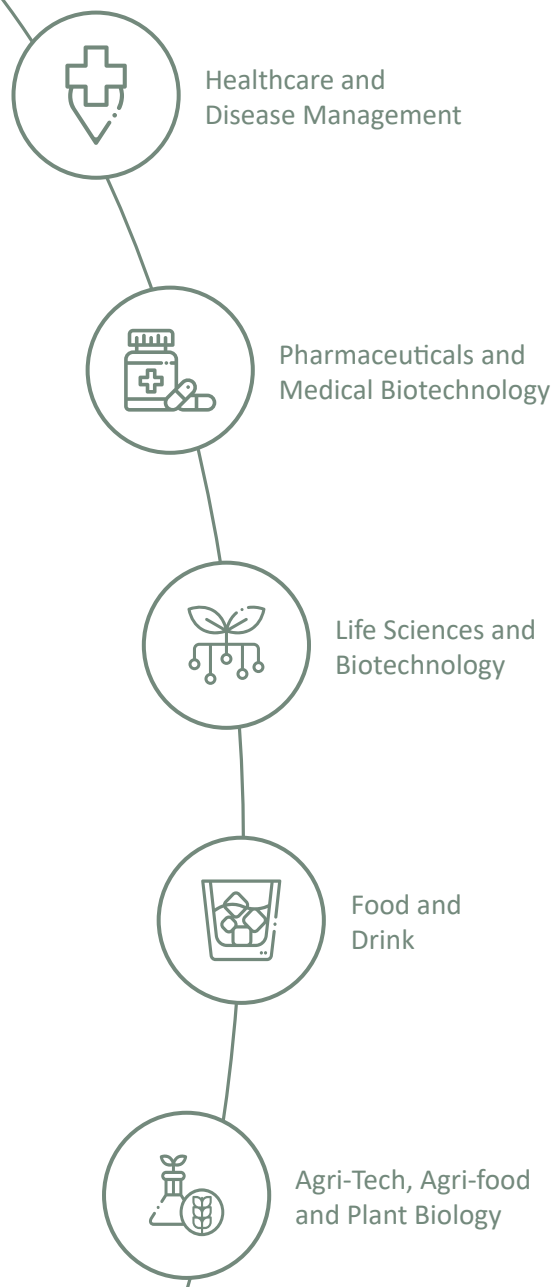
THE UNIVERSITY of EDINBURGH

EDINBURGH INNOVATIONS

Discover

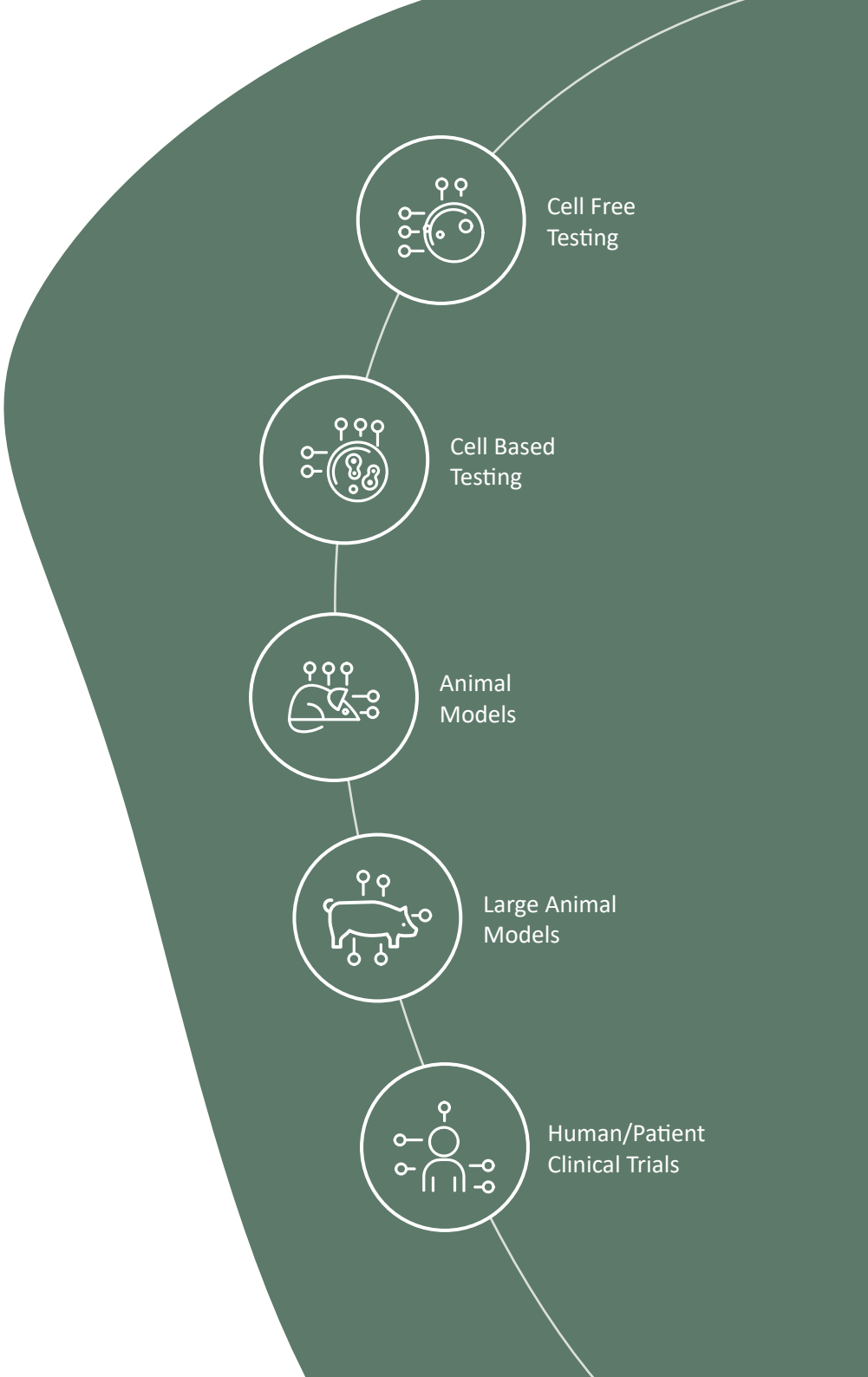
the University of Edinburgh's world class facilities that can support your projects from Bench to Bedside.

Access cutting edge facilities and technologies to make new discoveries and translational developments in human therapeutics.



Bench to bedside can be a complex journey but we're here to help guide you,

every step of the way.



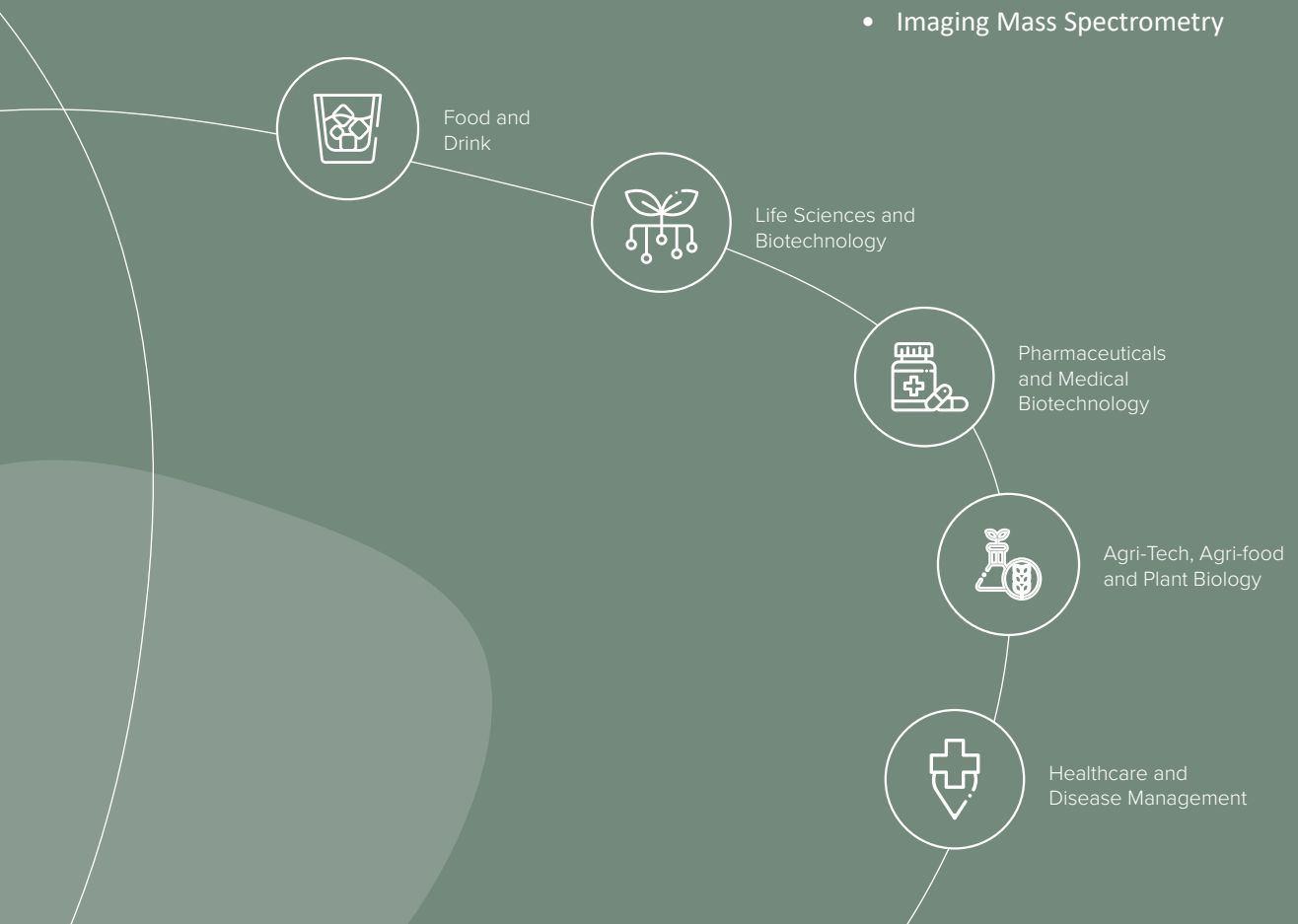
Cell Free Testing

The High Throughput Microarray facility houses cutting-edge protein, antibody and transcriptome microarray facilities for the analysis of complex signalling pathways and secreted factors across pre-clinical and clinical samples types.

Clinical Mass Spectrometry Core

TECHNOLOGIES AVAILABLE

- Sample preparation using liquid handling robot, workflow for 96-well sample handling
- Microflow liquid chromatography
- Liquid Chromatography
- Triple Quadruople Mass Spectrometry
- Targeted analysis of small molecules,
- Imaging Mass Spectrometry



EQUIPMENT AVAILABLE

For targeted analysis for GCP level studies:

- Waters Acquity class - QTrap 5500 and selexion
- Waters I Class -Sciex 6500+; Waters M-Class - Waters Xevo TQS
- Biotage Extrahera liquid handling robot,
- SPE Dual 96-well Dry Down
- Waters Positive Pressure 96-well manifold; Thermoshaker for 96 well plate

For Imaging Mass Spectrometry:

- Waters Synapt-G2Si +MALDI and DESI capability
- MALDI Sprayer
- Cryostat

TRAINING AVAILABLE

Targeted analysis in biological samples - sample preparation using solid phase extraction, automated protein precipitation and supported liquid extraction. Data analysis on Analyst (Sciex) and MassLynx (Waters)

Find out more about the Clinical Mass Spectrometry Core.

Proteomics and Metabolomics Core

TECHNOLOGIES AVAILABLE

- Quantitative proteomics: Stable isotope labelling (Tandem Mass Tagging, iTRAQ, SILAC, etc) methods
- Label-Free proteomics, by both Data-Dependent Analysis (DDA) and Data-Independent Analysis (DIA) strategies
- Ion-mobility mass spectrometry
- Enrichment of post-translationally modified proteins /peptides (glycosylation, phosphorylation, and oxidative modifications)
- Direct Analysis in Real Time (DART) Mass spectrometry
- Protein and peptide fractionations based on Strong Cation Exchange, Anion Exchange, Hydrophilic interaction chromatography (HILIC), reverse-phase separations at high and low pH
- Separation of native protein complexes by Size Exclusion chromatography

EQUIPMENT AVAILABLE

- nanoLC-MS (Bruker/Thermo) Q-ToF MS coupled to RSLCnano
- LC-MS (Bruker/Thermo) AmaZon ETD Iontrap MS coupled to Ultimate 3000 UHPLC
- DART-MS for direct analysis (IonSense) DART SVP Ion source coupled to Q-ToF MS
- Circular Dichroism Spectropolarimeter (JASCO J-710)
- AKTA FPLC (GE Healthcare FPLC)
- AKTA Prime (GE Healthcare Prime Plus)

TRAINING AVAILABLE

- Mass spectrometry basic and advanced operations
- Liquid chromatography (analytical and semi-prep)
- Mass spectral data analysis
- Protein and peptide sample preparations for proteomics
- DART Mass spectrometry user training
- Downstream data analysis training (inc hierarchical clustering and pathway analysis) available on discussion

Find out more about the Proteomics and Metabolomics Core.

Cell Based Testing

The phenotype screening facility is equipped with image-based screening platforms fully integrated with robotics and barcode tracking. This unit has the capability to develop bespoke image analysis and informatics packages to quantify phenotypes. This facility also has libraries of annotated reference molecules on assay-ready plates for drug discovery screens.

Phenotypic Screening Facility

TECHNOLOGIES AVAILABLE

The The Institute of Genetics and Cancer's Phenotypic Discovery Facility is highly proficient in cell-based phenotypic screening, working in collaboration with several academic and industry groups to identify novel therapeutics targets, progress hit-to-lead identification, classify drug mechanism-of-action and identify novel drug combinations and biomarkers.

Services provided:

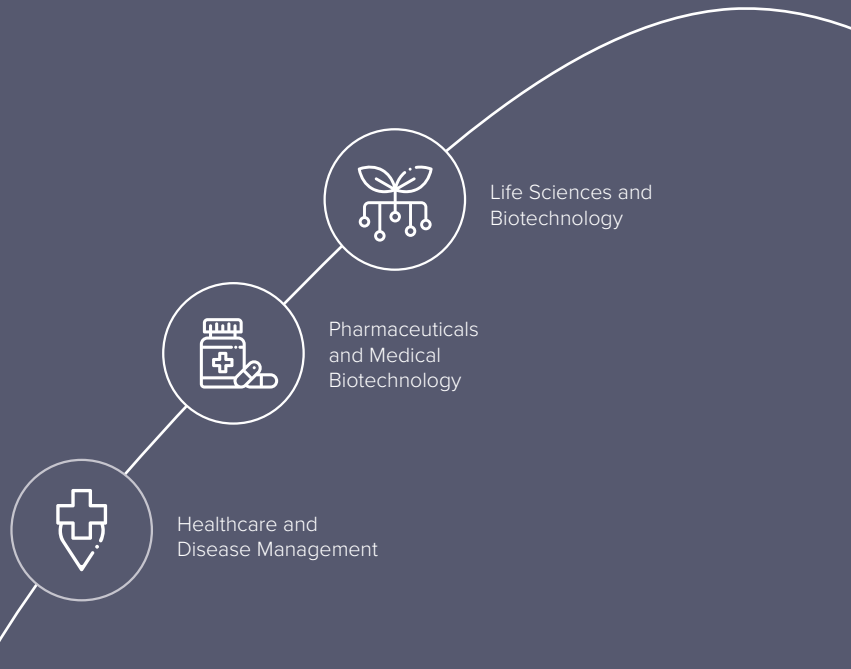
- Phenotypic Assay Development
- High-content image analysis
- Small molecule compound library provision and screening services
- Image-Informatics analysis of multiparametric high content phenotypic screening data

EQUIPMENT AVAILABLE

The facility is equipped with the latest kinetic (IncuCyte-Zoom) and High content (ImageXpress MicroXL) image-based screening platforms, fully integrated with plate handling robotics, barcode sample tracking and an image-analysis and informatics pipeline operating across the Institute of Genetics and Cancer's computer cluster.

In addition to using proprietary high content image analysis software solutions, the facility develops and applies novel image analysis and informatics solutions to quantify cellular phenotypes from complex co-culture and 3D models and to classify phenotypes from multi-parametric datasets.

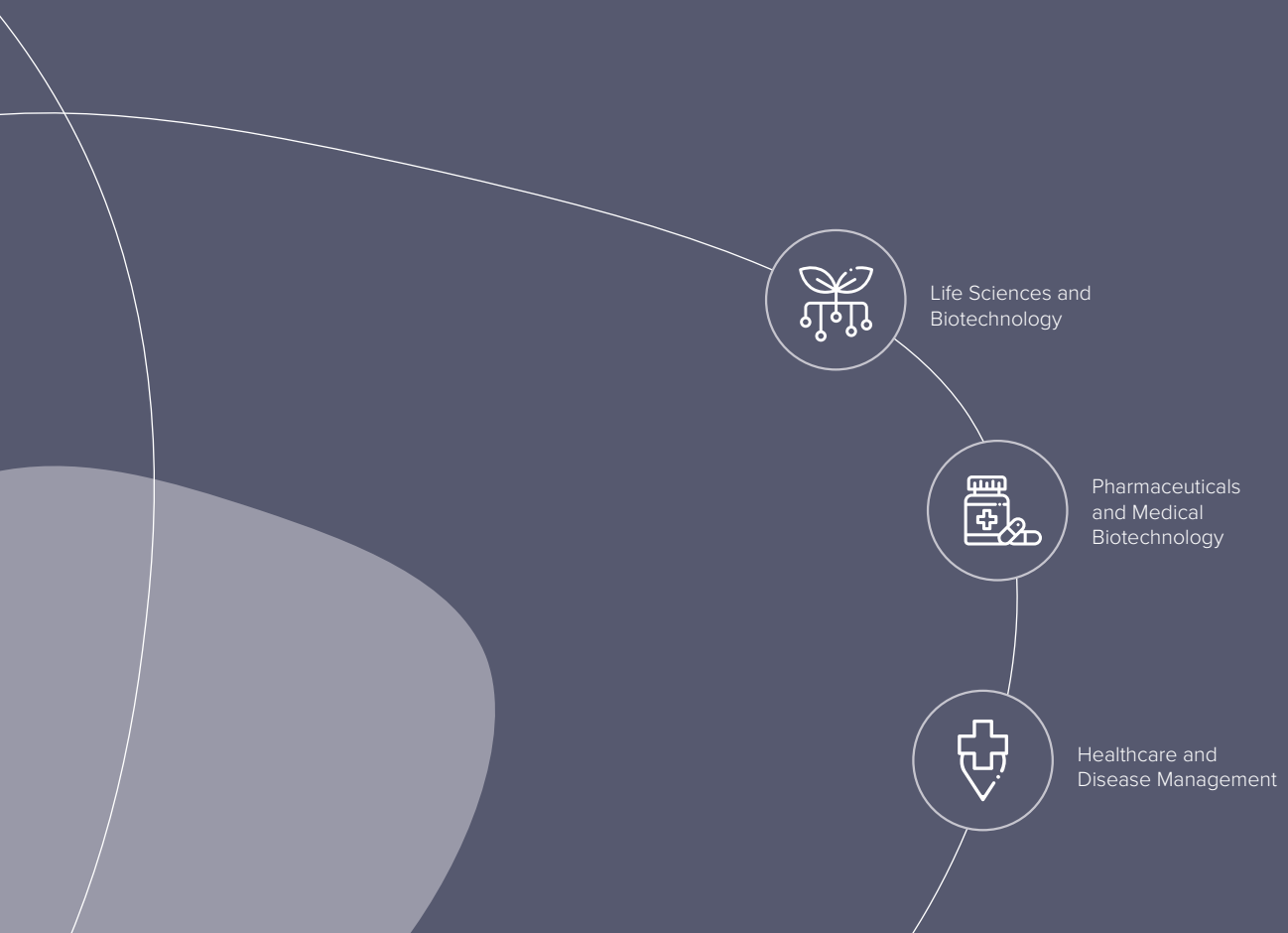
Find out more about the Phenotypic Screening Facility



HTPU Pathology Services Facility

TECHNOLOGIES AVAILABLE

The Host and Tumour Profiling Unit (HTPU) informs and drives clinical/translational research programmes, as well as technology developments and transfers to NHS Lothian. The unit works in close proximity to the Tissue Governance team, Edinburgh Experimental Cancer Medicine Centre (ECMC), Division of Pathology – Pathology & Phenomics Laboratory, and the clinical trials team at the Western General Hospital.



EQUIPMENT AVAILABLE

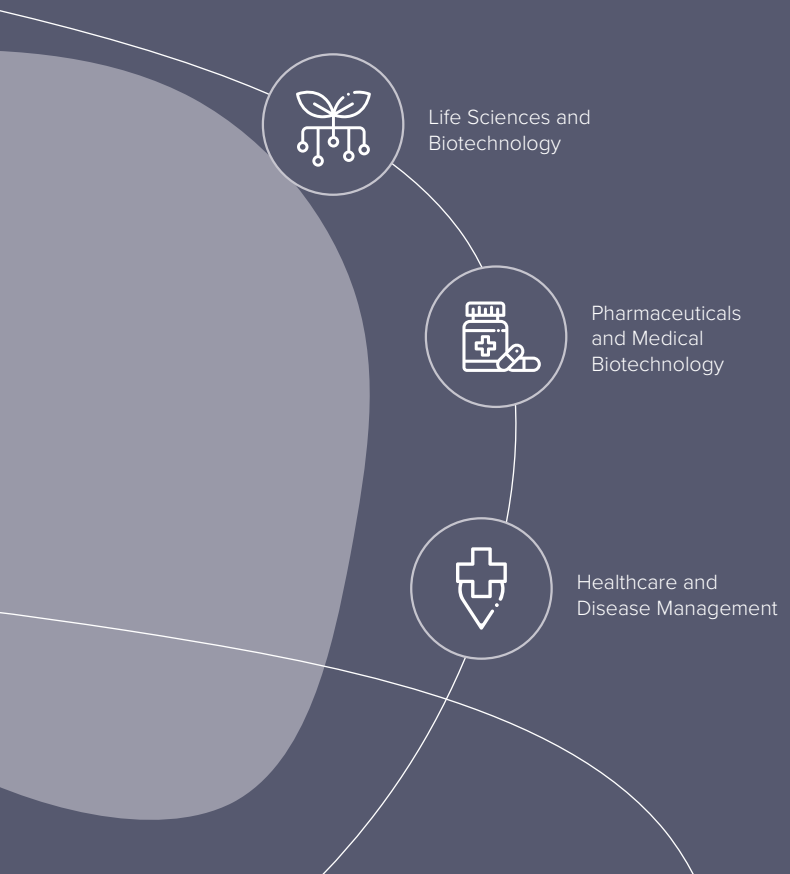
The Unit benefits from the latest tissue processing and histology methodologies as well as core capabilities such as:

- robotic, barcoded and multiplexed Reverse Phase Protein Array (RPPA) and mass spectrometry platforms
- tissue proteomic analysis, to ensure efficient, rapid and cost-effective delivery of clinical impact from target-organ and tumour profiling, including at the protein level
- unique multi-modal imaging equipment including automated whole tissue slide scanning, high content cell imaging and Raman-based chemical imaging for cancer, and for the detection of anti-cancer drugs in tissues
- sequencing, performed either via the Wellcome Trust Clinical Research Facility for panel-based sequencing or Edinburgh Genomics' Illumina X10 capabilities for whole genome sequencing

The Host and Tumour Profiling Unit provides high throughput services for rapid characterization at phenotypic and omic levels using the latest integrated robotic technologies with easy to interpret outputs. The staff running the facility are highly skilled in supporting the development of protocols to maximise interrogation of data.

Find out more about the HTPU Pathology Services Facility.

Confocal and Advanced Light Microscopy (CALM)



TECHNOLOGIES AVAILABLE

The CALM facility is a central resource providing optical bioimaging services.

Analytical techniques based on light microscopy are the most widely used tools for visualisation of biological specimens in biomedical sciences. They provide scientific results and images with high spatio-temporal information from intact cells, tissues and organisms on a scale from centimetres down to nanometres, and with a temporal resolution of days to milliseconds.

To give access to the required optical analysis 'tool kit', the CALM Facility provides infrastructure and services for biological optical imaging. We not only provide the technical systems and expertise required for a wide range of imaging applications, but also give assistance and advice regarding:

- multi-dimensional image acquisition
- live specimen imaging
- fluorescent labelling techniques
- planning of larger-scale imaging experiments
- image restoration and data handling & analysis
- microscopy-related training and teaching

We also provide a full image acquisition and image processing service for internal and external customers, tailored to their requirements.

For any queries or registration please contact us at qmricalm@ed.ac.uk.

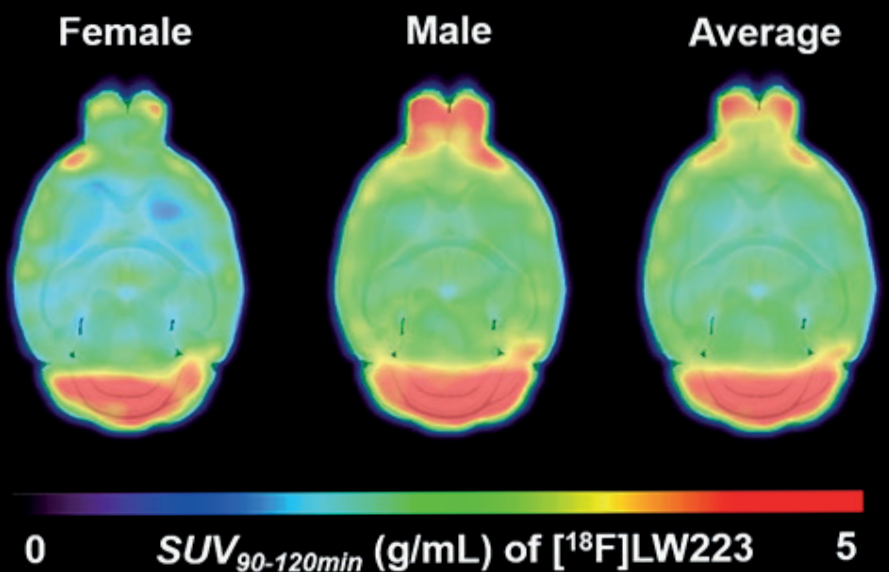
EQUIPMENT AVAILABLE

- Confocal laser scanning microscopes for semi-automated multi-dimensional image acquisition (3D, t,) at high spatial resolution. These systems are prepared for spectral unmixing, multiplexing and ratiometric FRET measurements, as well as for environmental sample control for live specimen imaging
- Fast spinning disk confocal system for multi-dimensional image acquisition with a laser-based manipulation module, which allows sample manipulation such as ablation or photo-activation (under full environmental control).
- Automated widefield microscope with environmental enclosure equipped with a three-gas mixer to control carbon dioxide, nitrogen and/or oxygen gas supply.
- Light-sheet microscope for studying live Zebrafish embryos at high temporal and spatial resolution.
- Workstation to handle the entire post-acquisition workflow of image data: image restoration, processing, 4D visualisation and quantitation

TRAINING AVAILABLE

Training, assistance or a full acquisition service, carried out by our experienced staff, is available on all our equipment

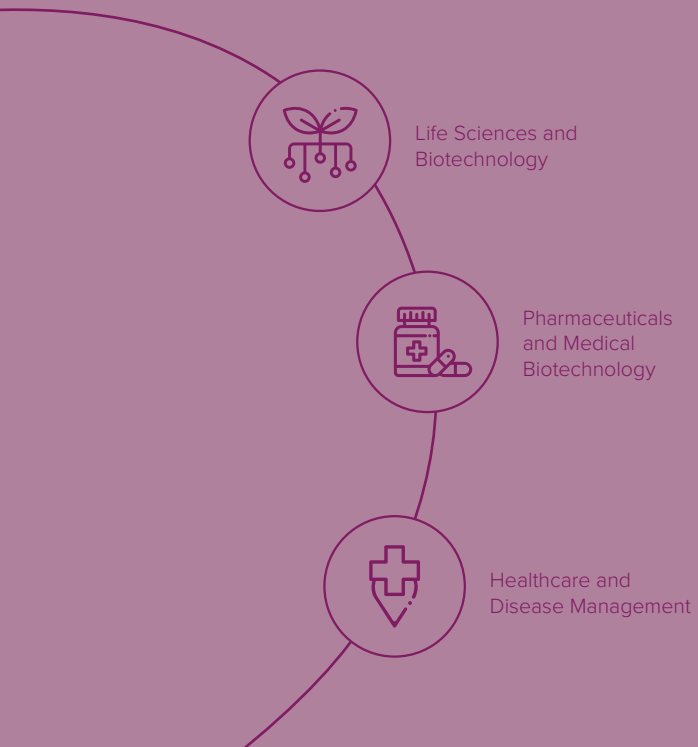
Find out more about the Confocal and Advanced Light Microscopy (CALM).



Animal Models

The Pre-clinical imaging facility is one of a suite of state-of-the facilities dedicated to live-imaging of small animal models. It houses high-field magnetic resonance imaging (latest scanner 9.4Tesla), ultrasound, micro PET/CT imaging and optical imaging. In vivo non-invasive imaging of structure and function of all organs and tissues of the body.

Bioresearch and Veterinary Services



FACILITIES AVAILABLE

- State of the art rodent facilities (mice and rats)
- Large aquatic facility (zebrafish and xenopus)
- Recent modernisation including use of individually ventilated cages
- Specialist procedure rooms and surgeries
- Flexible space
- In house state of the art imaging facilities
- Tick@lab database for colony management and experimental records
- Regular health screening

Public awareness website

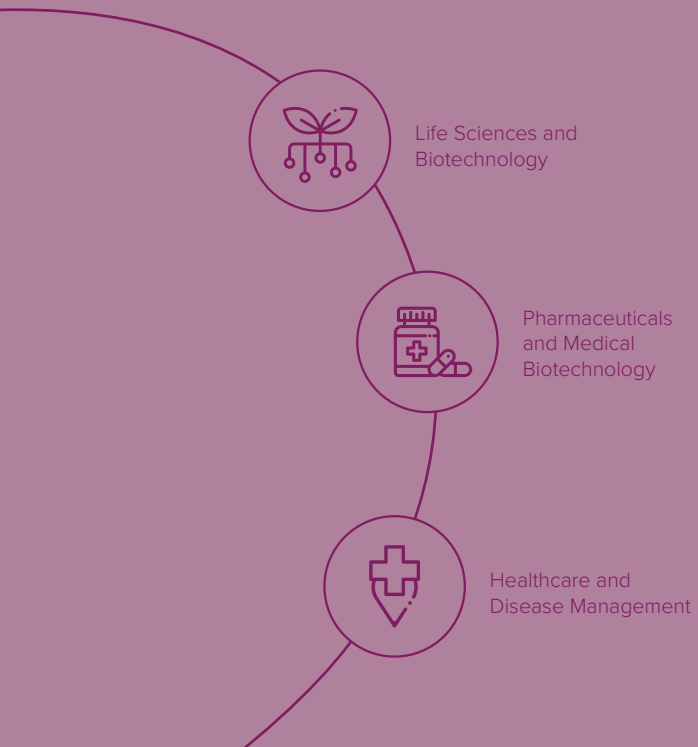
SERVICES AVAILABLE

- Professional technical staff including Personal Licence Holders
- Home Office administration and guidance
- Experienced Named Veterinary Services in house
- In house training for Licence Holders
- Wild type ordering
- Import/Export Service
- Central Transgenic Core for transgenic production and rederivation

TRAINING AVAILABLE

Find out more about the Bioresearch & Veterinary Services.

Central Transgenic Core



TECHNOLOGIES AVAILABLE

Predominantly at the Roslin Institute, we generate/rederive animals for all BVS facilities in Edinburgh and can also export animals to other facilities within the UK and elsewhere.

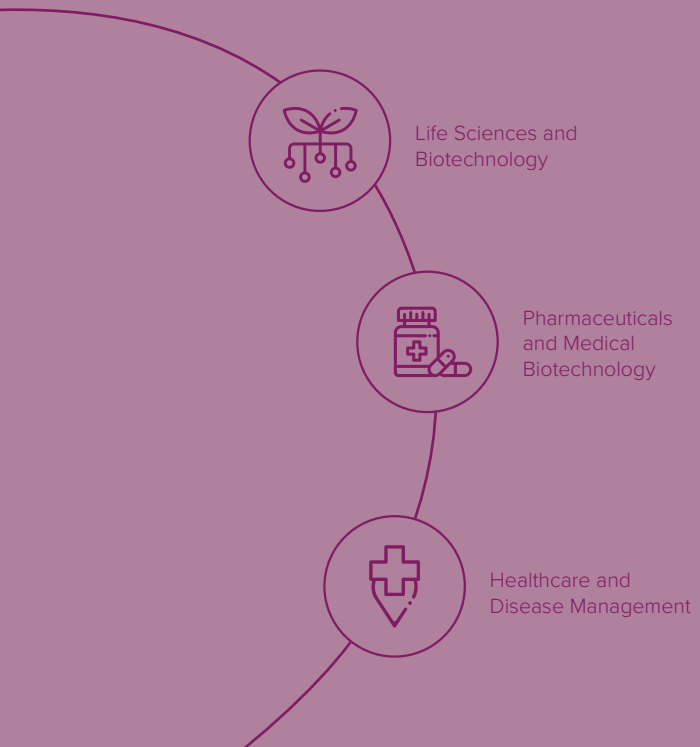
- Transgenic mouse production (zygote microinjection, ES cell injection, zygote electroporation, embryo transfer)
- Transgenic rat production (zygote microinjection, electroporation, embryo transfer)
- Cryopreservation of sperm and embryos, rederivation of frozen embryos or sperm via IVF (cryopreservation and rederivation currently only if animals are/will be housed in a BVS facility)

EQUIPMENT AVAILABLE

- Microinjection rigs
- Nepa21 electroporator
- Rodent surgery room
- Cryostorage tanks

Find out more about the Central Transgenic Core.

Edinburgh Preclinical Imaging



TECHNOLOGIES AVAILABLE

- Preclinical MRI
- PET/CT
- Ultrasound
- Optical imaging

EQUIPMENT AVAILABLE

The Edinburgh Preclinical Imaging houses very advanced imaging systems that allows imaging of live animals in very controlled environments to generate robust and accurate data for phenotype analysis. The 9.4T MRI allows for remarkable detail and is unique to the University of Edinburgh.

The following equipment is available for all access:

- 9.4T Bruker Preclinical MRI
- Mediso nanoScan PET/CT
- FujiFilm/VisualSonics VEVO 3100
- Biospace Optima
- Perkin Elmer FMT2500
- Bruker Multispectral System FX

TRAINING AVAILABLE

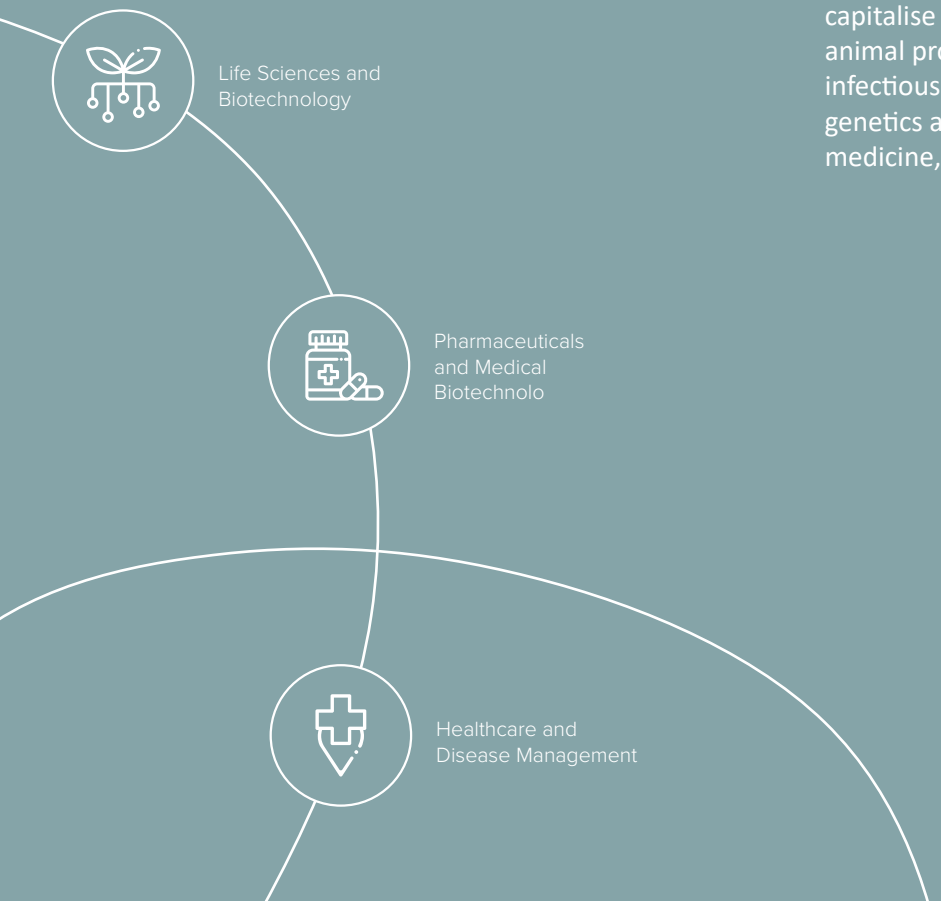
For optical imaging systems, users are trained before first use. For all other scanners, the experiments are performed by an experienced technician.

Find out more about the Edinburgh Preclinical Imaging.

Large Animal Models

The Large Animal Research Imaging Facility (LARIF) a unique facility in Europe with the capability for experimental surgery, monitoring and imaging of large animals in a custom built building with technical and veterinary support 24-7 all year round.

Large Animal Research Imaging Facility



TECHNOLOGIES AVAILABLE

Large Animal Research Imaging Facility (LARIF) is a unique facility in Europe with the capability for experimental surgery, monitoring and imaging of large animals (MRI, CT, Fluoroscopy and Ultrasound).

It is a custom-built facility including ICU and Cat2 containment suites with technical and veterinary support 24-7, all year round.

The LARIF offers users the opportunity to capitalise on a wide range of expertise in farm animal production, health and welfare including infectious diseases and zoonoses, vaccines, genetics and genome editing, imaging, radiology, medicine, surgery and critical care.

EQUIPMENT AVAILABLE

Facilities available to facilitate large animal imaging and research:

- Imaging Technology: A range of imaging resources for the study of large animals
- Infectious Diseases: An isolation suite for challenging animals with pathogens
- Surgical Facilities: The LARIF has two operating theatres for surgery and general anaesthesia of large animals
- Genetic Modification: Facilities for genetic engineering of livestock
- Critical Care Unit (CCU): The LARIF Critical Care Unit specialises in prolonged anaesthesia and intensive care

Find out more about the Large Animal Research Imaging Facility (LARIF).

Human/Patient Clinical Trials

The Edinburgh Clinical Trials Unit (ECTU) is underpinned by research governance and provides expert support to develop, design and deliver world-class clinical trials. The unit provides trial management, medical statistics, health economics and data management & programming. Strong links with NHS Lothian allows access to curated patient data sets for research purposes.

The ECTU service is complementary to the Central Research Facility (CRF) in providing clinical staff and space to delivery clinical trials, with around 110-120 active clinical projects ranging from Phase I to Phase IV per year.

Edinburgh Clinical Trials Unit

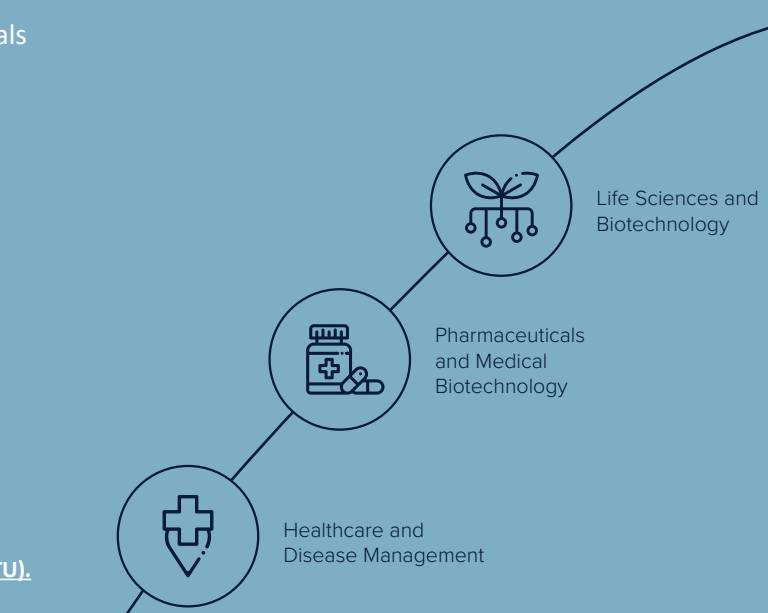
TECHNOLOGIES AVAILABLE

There are 60 members of staff specialising in the design, development and execution of clinical trials. With an experienced team, ECTU is able to support design, analysis, reporting and data management services. The unit also offers advice to researchers and trial teams and aims to share best practice throughout Lothian.

The ECTU is a busy unit, capable of running many projects at any time, examples include:

- Randomised and non-randomised clinical trials
- Long-term surveillance, population and epidemiology studies Clinical Trials of Investigational Medicinal Products, CTIMPs, and non-CTIMPS
- Data enabled trials
- Observational studies
- Methodological studies
- Meta-analyses
- Studies Within A Trial (SWAT)

Find out more about the Edinburgh Clinical Trials Unit (ECTU).



Clinical Research Facility

TECHNOLOGIES AVAILABLE

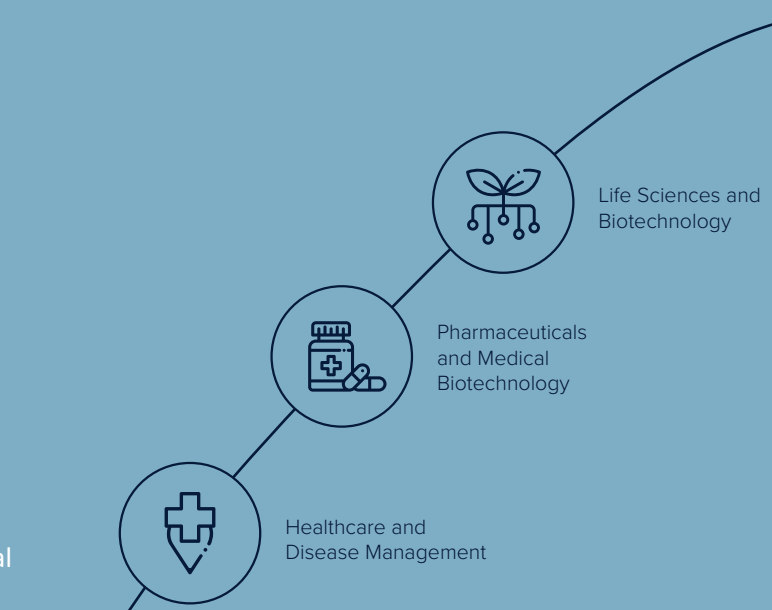
The CRF is uniquely placed to run clinical trials with a mix of NHS and University of Edinburgh staff spread over two sites, running 100 clinical studies per year across:

- Nursing and Clinical
- Genetics
- Imaging and Image Analysis
- Mass Spectrometry
- Education
- Epidemiology and Statistics
- Information Technology
- Research Support

The facility provides expert staff and controlled space for trials with a booking system in place. It also benefits from its relationship with the Biomedical Research Centre (BRC), an English based clinical trials management platform and its growing relationship with the ECTU.

Typically the facility is of benefit to those keen to enter into innovative areas such as 'one health', applying animal models for translational health applications. It has also been involved in a number of COVID trials.

Find out more about the Clinical Research Facility (CRF).



Edinburgh Imaging

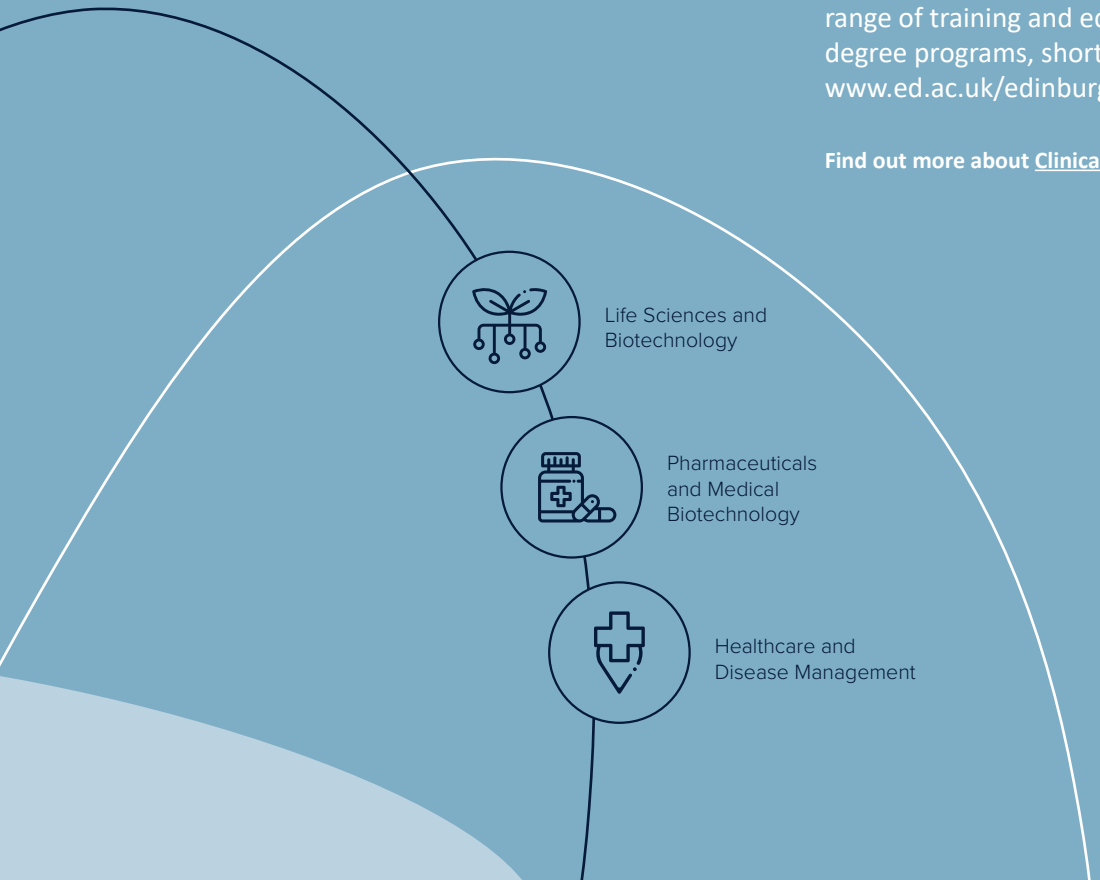
TECHNOLOGIES AVAILABLE

Edinburgh Imaging technologies includes MR, CT, PET, & retinal scanners, with functional imaging capabilities ranging from fMRI to PETCT and Scotland's only PETMR. Our Good Manufacturing Practice (GMP) accredited radiochemistry production facility develops, manufactures & distributes novel radiotracers in addition to producing a range of clinically routine products.

TRAINING AVAILABLE

The Edinburgh Imaging Academy offers a wider range of training and educational opportunities; degree programs, short courses, CPD, PPD. www.ed.ac.uk/edinburgh-imaging/academy

Find out more about Clinical Imaging.



EQUIPMENT AVAILABLE

- 3T neuro-optimised MRI
- 3T wide bore MRI
- 3T PET MR
- PET CT (x2)
- (CT via PETCT)
- Radiochemistry suite – GMP plus R&D lab
- Retinal Imaging suite
- Image Analysis Labs and support
- Extensive Data management infrastructure (storage, backup, processing)

FACILITIY	SERVICES	Commercial applications	 Healthcare and Disease	 Pharmaceuticals and Medical Biotechnology	 Life Sciences and Biotechnology	 Food and Drink	 Agri-Tech, Agri-food and Plant Biology
CELL FREE TESTING							
MASS SPECTROMETRY AND PROTEIN CHARACTERISATION	• MALDI or Liquid Extraction Surface Analysis (LESA) • Spatial distribution of endogenous molecules, drugs and metabolites • 3D statistical analysis and construction of 3D images • Intact mass determination • Bottom-up and top-down proteomics		✓	✓	✓	✓	✓
PROTEOMICS AND METABOLOMICS CORE	• Qualitative and quantitative proteomics analysis for global expression profiling. • Analysis of post-translational modifications on proteins (either targeted or global). • Protein and peptide purifications and fractionations at analytical and semi-prep levels. • Metabolite quantifications from biological and clinical samples. • Intact protein analysis for quality control and purity assessment. • Rapid biochemical screening of samples (solid or liquid) by DART MS with applications in a wide variety of small molecules analysis in food, toxicological screening of drugs and forensics.		✓	✓	✓	✓	✓
HTPU MICROARRAY	• Reverse Phase Protein Arrays • Forward Phase Antibody Microarrays • NanoString • Each microarray platform enables rapid and robust quantification of biomarkers at transcriptomic and post-translational pathway levels across multiple sample sets.		✓	✓	✓	—	—
CELL BASED TESTING							
HTPU PATHOLOGY	• Tissue processing • Histology methodologies • Robotic, barcoded and multiplexed • Unique multi-modal imaging equipment including automated whole tissue slide scanning, high content cell imaging and Raman-based chemical imaging for cancer		✓	✓	✓	—	—
PHENOTYPIC SCREENING	• Phenotypic Assay Development • High-content image analysis • Small molecule compound library provision and screening services • Image-Informatics analysis of multiparametric high content phenotypic screening data		✓	✓	✓	—	—
BIO-IMAGING & FLOW CYTOMETRY	• BD LSR Fortessa (16 colour Analyser) - 4 lasers, 16 filters Sample loading via tubes. • BD FACS Aria IIIu 4-laser/11 detector Cell Sorter - The cell sorter is contained within the Bio imaging Suite G.063 in Room no G.067 and has a dedicated operator who will set up the machine and run your samples. • BD LSR Fortessa X20 (16 colour Analyser) with high throughput sampler - 4 lasers, 16 filters. Sample loading via tubes or 96 well plate.		—	✓	✓	—	✓

FACILITIY	SERVICES	Commercial applications	 Healthcare and Disease	 Pharmaceuticals and Medical Biotechnology	 Life Sciences and Biotechnology	 Food and Drink	 Agri-Tech, Agri-food and Plant Biology
CELL BASED TESTING							
FLOW CYTOMETRY CORE	• Multi-parameter measurement of biological particles • Cell counting • Cell sorting • Detection of biomarkers • Protein engineering		✓	✓	✓	—	✓
MICROBIOLOGY LABORATORY/ PATHOLOGY	• Isolation and identification of bacterial and fungal pathogens from animal and environmental samples. • Bacteriology and mycology of companion animal, livestock, equine, avian, zoo and exotic species. • Technologies available: • Bacterial and fungal isolation Identification and susceptibility testing		✓	✓	✓	✓	✓
IMMUNODETECTION AND HISTOLOGICAL IMAGING	• High quality tissue processing, sectioning and histology staining for a range of samples. • Tissue processing to paraffin wax and sectioning but in some cases processing and embedding alone is all that is required. • Microtome sectioning for routine light microscopy staining, or unstained for subsequent immunodetection. • More specialised requests within SuRF includes immunofluorescence, RNAscope, PALM and frozen sections. • Sections for light microscopy staining will be routinely stained with H & E but other stains such as PAS, PBR, Masson Trichrome, MSB etc,.		✓	✓	✓	—	—
BHF CARDIOVASCULAR BIOMARKER LAB	• Clinical diagnostic testing, GLP • Clinical accreditation to provide bioassays • Equipment used Abbott ARCHITECT analyser - The ARCHITECT ci4100 offers a maximum throughput of up to 900 tests per hour, including 800 clinical chemistry and 100 immunoassay tests. Featuring a load-up capacity of 180 samples with 35 priority positions, the ARCHITECT ci4100 has up to 115 refrigerated reagent positions plus Integrated Chip Technology (Na+, K+ and Cl-). The analyser is capable to analyse multiple biomarkers simultaneously for pre-clinical and clinical samples (Serum, plasma, urine, body fluid).		✓	✓	✓	—	—
CONFOCAL AND ADVANCED LIGHT MICROSCOPY (CALM)	• Multi-dimensional image acquisition • High resolution subcellular imaging • Live specimen imaging • Image data processing and quantitation • Teaching and training on optical imaging		✓	✓	✓	—	—
ANIMAL MODELS							
CENTRAL TRANSGENIC CORE	Generation of transgenics, crypreservation of lines, rodents		✓	✓	✓	—	—

FACILITIY	SERVICES	Commercial applications: Healthcare and Disease	Pharmaceuticals and Medical Biotechnology	Life Sciences and Biotechnology	Food and Drink	Agri-Tech, Agri-food and Plant Biology
ANIMAL MODELS						
PRECLINICAL IMAGING	Preclinical MRI, PET/CT, Ultrasound and Optical imaging	✓	✓	✓	—	—
AGRF (AQUA CULTURE GENETICS RESEARCH FACILITY)	• Egg incubators x2 • On growing freshwater recirculation aquarium • Disease-challenge freshwater recirculation aquarium	✓	✓	✓	✓	✓
BIORESEARCH AND VETERINARY SERVICES)	• Professional technical staff including Personal Licence Holders • Home Office administration and guidance • Experienced Named Veterinary Services in house • In house training for Licence Holders • Wild type ordering • Import/Export Service • Central Transgenic Core for transgenic production and rederivation	✓	✓	✓	—	—
LARGE ANIMAL MODELS						
LARIF	• Imaging Technology: A range of imaging resources for the study of large animals • Infectious Diseases: An isolation suite for challenging animals with pathogens • Surgical Facilities: The LARIF 2 X operating theatres for surgery and general anaesthesia of large animals. • Genetic Modification: Facilities for genetic engineering of livestock. • Critical Care Unit (CCU): The LARIF Critical Care Unit specialises in prolonged anaesthesia & intensive care	✓	✓	✓	—	✓
HUMAN/PATIENT CLINICAL TRIALS						
ECTU	Execution of trial phases I, II, III and IV. Portfolio of over 100 active projects: • Randomised and non-randomised clinical trials • Long-term surveillance, population and epidemiology studies • Clinical Trials of Investigational Medicinal Products, CTIMPs, and non-CTIMPS • Data enabled trials & Studies Within A Trial (SWAT) • Observational studies & Methodological studies • Meta-analyses	✓	✓	✓	—	—
CRF	• Nursing and Clinical; • Genetics; • Imaging & Image Analysis; • Mass Spectrometry; • Education and Training; • Epidemiology & Statistics; • Information Technology and Research Support	✓	✓	✓	—	—
CLINICAL IMAGING	Image processing and imaged analysis for medical imaging techniques such as MRI, CT and PET as well as various retinal imaging modalities such as fundus imaging, OCT and OCT-A.	✓	✓	✓	—	—

Get in touch

This brochure lists some of the University of Edinburgh's cutting-edge facilities that are available to enable and accelerate innovation.

Edinburgh Innovations can help facilitate the best solution to your research demands whether it be a routine or bespoke service.

If you have any enquires related to access and use of facilities please contact:

Dr Gurman Pall

Consultancy Manager
College of Medicine and Veterinary Medicine
Edinburgh Innovations

Gurman.Pall@ei.ed.ac.uk

- Healthcare and Disease Management
- Pharmaceuticals and Medical Biotechnology
- Life Sciences and Biotechnology
- Food and Drink
- Agri-Tech, Agri-food and Plant Biology

THE UNIVERSITY of EDINBURGH

EDINBURGH INNOVATIONS

Edinburgh Innovations is the University of Edinburgh's commercialisation service.

We benefit society and the economy by helping researchers, students and industry drive innovation. We seek opportunities, we build partnerships for mutual benefit, we make the journey easy, and we add value at every stage.

Edinburgh Innovations
Murchison House
10 Max Born Crescent
Edinburgh EH9 3BF

edinburgh.innovations@ed.ac.uk
www.edinburgh-innovations.ed.ac.uk

LinkedIn™