

Scientific facilities available at the Babraham Institute



Bioinformatics

The Babraham Institute provides unique research facilities of national importance. These have been developed with significant investment from the BBSRC. The Bioinformatics group provides a central resource of expertise in computational biology and statistics to all research groups at the Babraham Institute. We also offer a commercial consultancy service for companies both on site and those based further afield. The benefits of the Bioinformatics group's software and services have ranged from facilitating ground-breaking cell biology research that could benefit human health to helping a spin-out company market its products.

Areas of expertise

The Bioinformatics group has a wide range of experience covering virtually all aspects of modern bioinformatics and statistics in both academic and commercial settings. We have particular expertise in high-throughput sequencing including primary processing and all transcriptomics and epigenetics techniques.

We can provide everything from advice on appropriate analysis strategies and tools, to a full in-house analysis service, along with the development of custom software and pipelines.

Services on offer

- Statistical advice or analysis
- Development of custom bioinformatics tools – to provide types of analysis not currently available, or to make existing bioinformatics tools more easily accessible
- Experimental design or data analysis consultation
- Data processing and analysis – a member of the group can analyse your data for you
- Bioinformatics and statistical training

Pricing

Charges are based on the number of hours of analyst time (currently charged at £94.50 + VAT). All analysis can be viewed in our interactive helpdesk system so you can monitor your jobs as they progress. We are happy to provide estimates for work and discuss projects with no obligation.

Training opportunities

Bioinformatics training is a key activity within the group. We run a regular series of training courses covering sequence analysis, high-throughput sequencing, statistics, programming and other topics likely to be of use to both bench scientists and bioinformaticians. These courses are able to accommodate both researchers at the Babraham Institute, Babraham Research Campus and external organisations.

Courses are regularly run on site at the Institute, and all courses can also be run at external sites provided that suitable training facilities are available. Full course details and materials for all Babraham bioinformatics training courses can be viewed on the Bioinformatics group website:
www.bioinformatics.babraham.ac.uk



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Biological Chemistry

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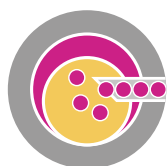
Biological Support Unit

The Biological Support Unit (BSU) provides housing and care for rodents at a highly defined health status, offering the highest standards of welfare, excellence in husbandry and procedural technique to support both academic scientific research programmes and private companies.



Flow Cytometry

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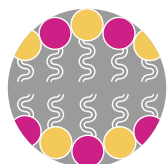
Gene Targeting

The Babraham Gene Targeting Facility provides a complete service to generate novel genetically altered mouse strains for biopharmaceutical companies and academic institutes.



Imaging

The Imaging Facility provides supported access to state-of-the-art fluorescence imaging technologies and offers expertise in live and fixed cell imaging.



Lipidomics

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Mass Spectrometry

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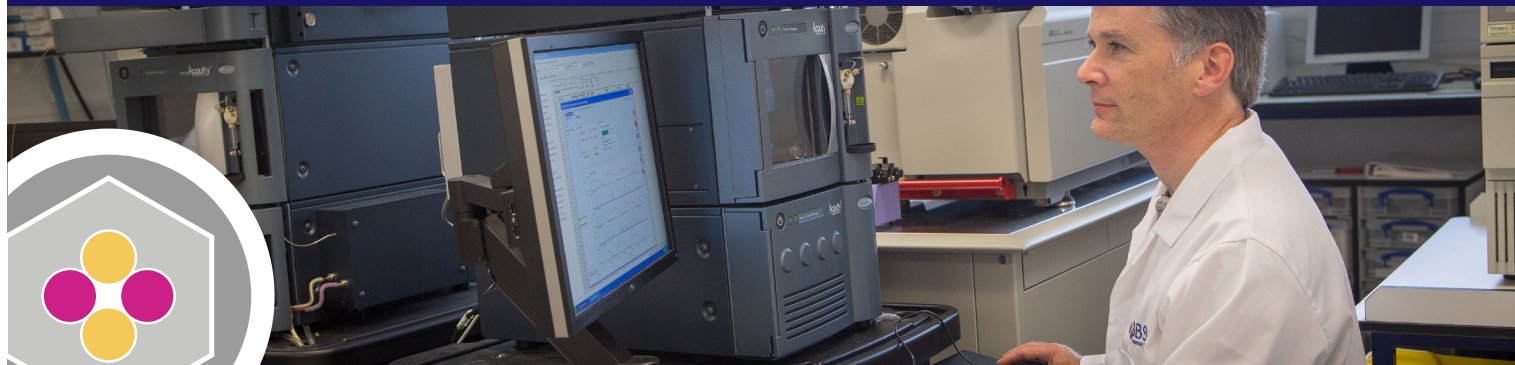


Sequencing

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Areas of expertise

At our core we are experienced synthetic chemists applying our skill set to solve biological problems. We have a purpose-built chemistry laboratory in which we can carry out almost any chemical reaction on a research scale.

A key requirement in developing new analytical techniques, or in identifying new chemical structures found within cells, is to make standards. We routinely make standards for mass spectroscopy; mass spectroscopy being particularly good at providing the sensitivity and selectivity required to study the small amounts of materials found within cells.

We also design chemical probes to explore biological pathways and develop new assays to measure changes in biological systems.

Services on offer

- Synthesis of hard to source compounds
- Synthesis of isotopically-labelled standards for mass spectroscopy
- Development of new analytical methods
- Determining molecular structures
- Advice and research capability in the biological chemistry field

Pricing

Because of the nature of our biological chemistry projects is variable, each is priced on an individual basis.



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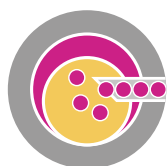
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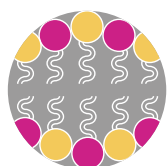
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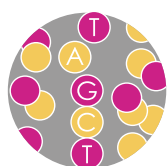
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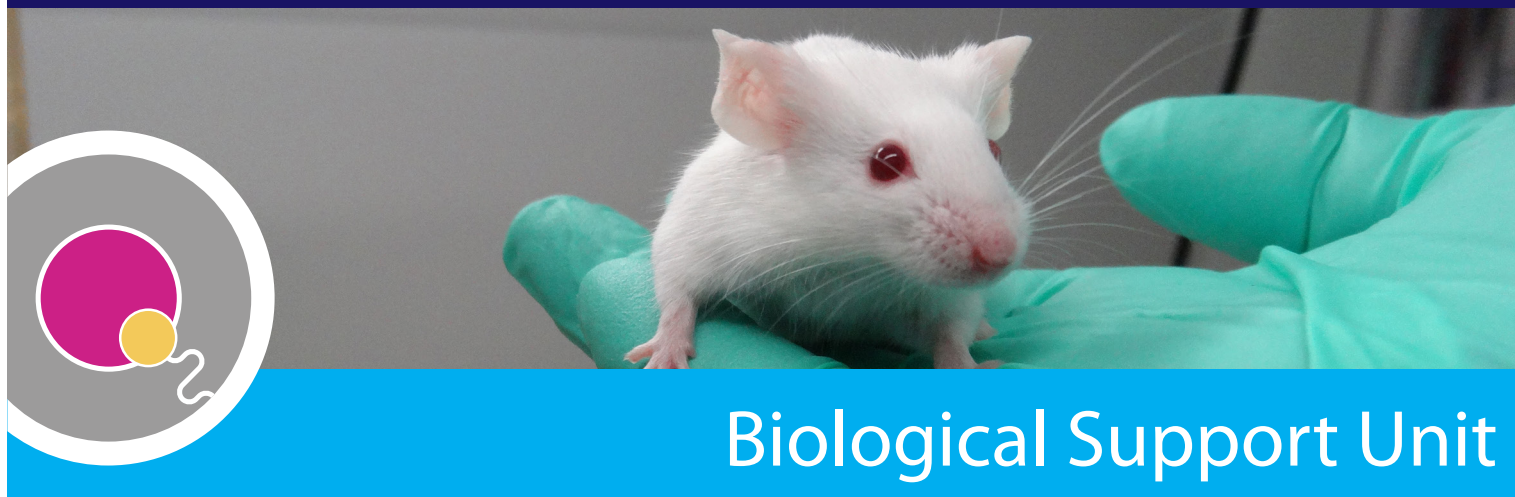


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Areas of expertise

The animal technicians within the Facility provide technical support to researchers. The technicians gain nationally recognised qualifications awarded by the Institute of Animal Technology and hold Home Office Personal Licences which permit them to perform regulated procedures.

Key staff hold further positions of responsibility under the Institute Establishment Licence. These include NACWO (Named Animal Care and Welfare Officer) and NTCO (Named Training and Competence Officer) roles.

The technicians have expertise in animal health barrier maintenance and husbandry. They are fully trained in the use of state-of-the-art animal housing systems and containment procedures.

Equipment and services on offer

Equipment

- Independently ventilated caging systems and containment facilities
- High level bio-secure and independently ventilated caging systems and containment facilities
- Flexible film isolators
- Open cage environments
- Containment Level 2 human pathogen suite
- Containment cabinets, change stations and down-draft benching

Services

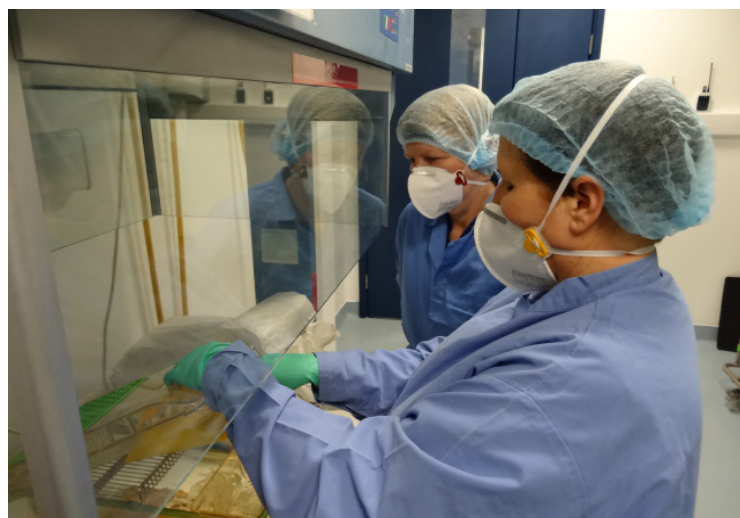
- A range of procedural services are available to include rederivation of mouse lines and embryo cryopreservation.

Pricing

Details of prices for procedures, animal husbandry and room or cage hire are available on request. Husbandry costs, including diet, bedding and cage maintenance, are covered by a weekly charge per cage.

Clients have the flexibility to carry out experiments themselves, or to pay for facility technicians to carry out procedures on their behalf.

Renting of animal/procedure space in the Facility can be arranged on an exclusive, long-term basis, or alternatively clients may wish to rent space in shared areas.



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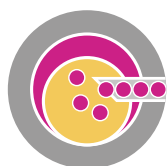
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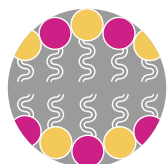
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Areas of expertise

The Flow Cytometry Facility has state-of-the-art analysers and provides a cell sorting service. Expert advice is available for experimental design, equipment training, post-acquisition analysis of data and help with interpreting flow data.

Equipment

Analysers

- 3 x BD LSRFortessa (5 laser, 20 parameters with HTS module)
- BD LSRII (4 laser, 12 parameters)

Cell Sorters

- BD FACSAriaIII (4 lasers, 18 parameters)
- BD Influx (5 lasers, 17 parameters)
- BD FACSAria Fusion (5 lasers, 20 parameters)

Other Equipment

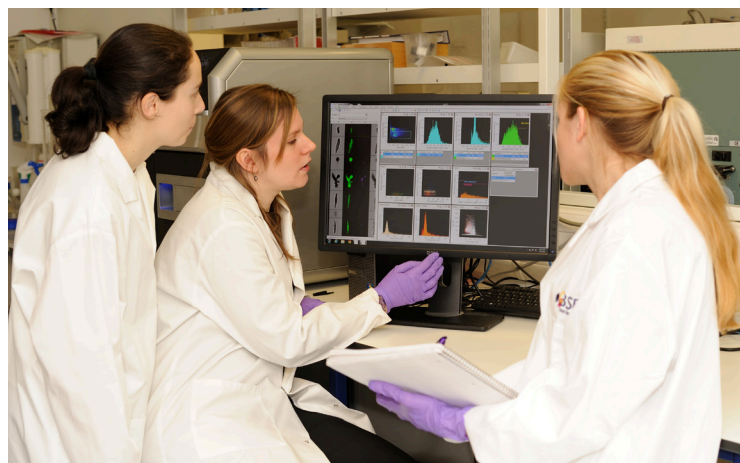
- Merck Millipore Amnis Imagestream MkII
- Merck Millipore Muse Cell counter and Casy Counter
- Miltenyi Biotec AutoMacs

Pricing

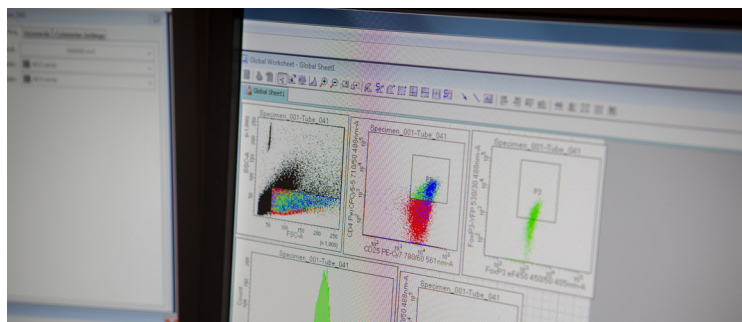
Pricing for the use of the Facility's services is available on request.

Flow Cytometry Training Courses

These interactive, lecture- and exercise-based courses are given by experts in the field who can share their in-depth knowledge of an evolving technology. These courses are ideal for those using flow cytometry in industry and academia.



There are two modules available which are linked and have been designed to build up knowledge of flow cytometry to ensure that the delegate is confident to design, carry out, analyse and present their flow cytometry data. For more information about the courses, dates and prices please visit: www.babraham.ac.uk/science-services/flow-cytometry/flow-training



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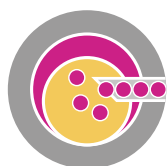
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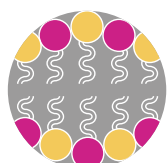
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Areas of expertise

The Facility has many years of expertise and know-how in generating genetically altered animal models. We are able to offer services and assistance on the design and generation of gene targeting constructs, *in silico* design and cloning, embryonic stem (ES) cell targeting, molecular analysis of ES cell clones, creation of germline chimeras, and DNA pronuclear injection for transgenic mouse generation. The Facility provides excellent scientific advice at all stages during the process and can deliver validated genetically altered mouse models in times comparable with industry-leading turnaround times.

Services on offer

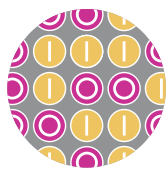
- Expression vector generation
- Targeting vector generation
- Pronuclear Microinjection into 129Ola or C57Bl/6 strain
- Electroporation and ES cells culture
- 129Ola or C57Bl/6 ES cells targeting and screening
- Injection of ES cells into blastocysts
- Animal husbandry and confirmation of germline transmission
- Microinjection of RNA, protein or DNA into oocytes and early embryos

We offer the generation of the following types of mouse model:

- Knockout mouse models
- Knockin mouse models
- Humanised mouse models
- ROSA26 targeting
- Transgenic mouse models
- KOMP/EUCOMM



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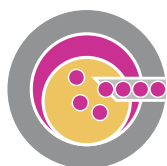
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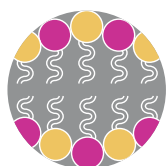
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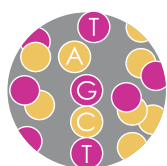
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The Technology

The Imaging Facility offers a number of different imaging technologies including confocal, wide-field, Total Internal Reflection Fluorescence (TIRF) and super resolution.

We also have a sophisticated High Content Imaging system for automated image capture from a large number of samples prepared in a multi-well format. The Facility has a range of software solutions for image processing and analysis and can provide a bespoke image analysis service.

All imaging systems are configured to be as flexible as possible to cater for a wide range of applications and most are compatible with live cell imaging, with the provision of incubation systems to maintain temperature and CO₂.

Pricing

The equipment and services provided by the Imaging Facility are available for commercial use on an hourly basis subject to availability.

For training, supervised use and work undertaken on behalf of companies there is a standard rate of £90 per hour + VAT.

Most instruments can be used unsupervised at a reduced rate of £65 per hour + VAT. Following satisfactory induction, equipment can be booked directly by campus companies via the Babraham campus intranet.



Equipment & Software

High Content Imaging

- GE InCell 6000

Confocal

- Olympus FV1000
- Nikon A1-R confocal
- Andor spinning disk

Multi-photon

- Zeiss LSM 7 with Coherent Chameleon and OPO

Super Resolution

- Nikon N-SIM/N-STORM

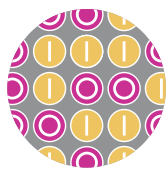
Other

- Zeiss MicroBeam Laser Capture Microdissection
- Olympus xCellence wide-field
- Andor TIRF

Analysis software

- Imaris, Volocity and Huygens

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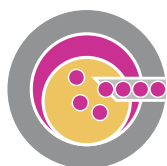
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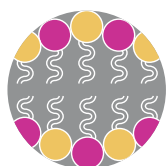
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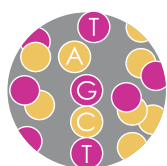
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The Technology

For high-throughput analysis of major structural and metabolic lipids, the crude lipid extracts are dissolved in suitable solvents and directly infused into mass spectrometers for ESI-HR/AM-MS/MS analysis.

For analysis of minor and trace lipids with biomedical significance, the lipid extracts are separated into different classes by normal phase HPLC based on the polarity of the head group, and then infused into mass spectrometers for analysis.

For non-polar to low polar lipids and some metabolites, GC-MS/MS approaches are used for analysis with or without derivatisation.

Equipment

- Thermo Orbitrap Elite hyphenated with Shimadzu Prominence HPLC with 5 pumps
- AB Sciex 6500 QTRAP hyphenated with Shimadzu Prominence HPLC with 5 pumps
- Thermo TSQ Quantum GC-MS/MS system (shared)
- Advion TriVisa NanoMate
- Thermo SpeedVac
- Eppendorf Centrifuge 5430R and 5804A
- Harvard Phd/Ultra syringe pump

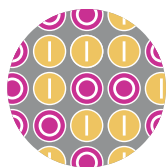
Pricing

The Lipidomics Facility can analyse most lipids and metabolites with biomedical interest and can provide quotes for specific projects.

As different analytes requires different sample pre-treatment and different analytical approaches to obtain satisfactory results, costs vary according to the proposed project.



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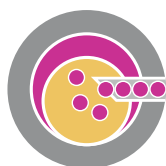
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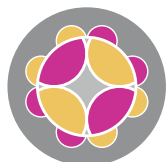
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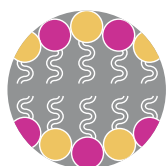
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Areas of expertise

The Facility has expertise in all aspects of mass spectrometric analysis of biological molecules, particularly proteins, but also DNA/RNA, carbohydrates and small molecules. Much of our work is directed towards understanding the functions of specific proteins and epigenetic DNA modifications. We are also able to meet a wide range of analytical challenges, for example:

- Accurate mass measurement of an intact protein (<10ppm) or small molecule (<1ppm)
- Peptide mapping by LC-MS/MS
- Protein identification (and relative quantification) in:
 - » Purified samples (e.g. gel band)
 - » Moderately complex samples (e.g. immunoprecipitated protein complex)
 - » Highly complex samples (e.g. subcellular fraction or total cell lysate)
- Identification and localisation of protein post-translational modifications
- Development of quantitative LC-MS/MS assays for the analysis of specific proteins/small molecules in complex matrices
- Quantification of modified bases (e.g. 5-methylcytosine and 5-hydroxymethylcytosine) in DNA

Equipment

The Facility is equipped with three state-of-the-art high resolution tandem mass spectrometers all with nano-electrospray ion-sources, as well as a high-resolution MALDI-TOF mass spectrometer. We have nanoLC systems which can be used with any of the tandem mass spectrometers for on-line LC-MS analyses.

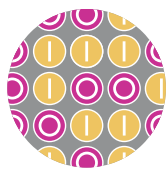
- Thermo Scientific Orbitrap Velos Pro hybrid ion trap-Orbitrap mass spectrometer
- Thermo Scientific Q Exactive Plus hybrid quadrupole-Orbitrap mass spectrometer
- Thermo Scientific Q Exactive hybrid quadrupole-Orbitrap mass spectrometer
- AB Sciex Voyager DE-Pro MALDI mass spectrometer
- Dionex UltiMate™ 3000 RSLCnano Systems
- Proxeon nanoLC systems

Pricing

Prices for use of the Facility's services are available on request.



Scientific facilities available at the Babraham Institute



Bioinformatics

The Bioinformatics group have a wide range of experience covering virtually all aspects of modern bioinformatics and statistics in both academic and commercial settings.



Biological Chemistry

The Biological Chemistry Facility provides a research capability to solve biological problems through the use of chemical knowledge and synthetic chemistry skills.



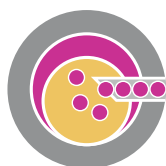
Biological Support Unit

The Biological Support Unit (BSU) provides housing and care for rodents at a highly defined health status, offering the highest standards of welfare, excellence in husbandry and procedural technique to support both academic scientific research programmes and private companies.



Flow Cytometry

The Flow Cytometry Facility offers high quality service and state-of-the-art instrumentation to members of the Babraham Institute and external companies, including those based on the Babraham Research Campus.



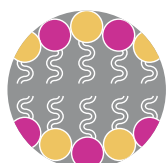
Gene Targeting

The Babraham Gene Targeting Facility provides a complete service to generate novel genetically altered mouse strains for biopharmaceutical companies and academic institutes.



Imaging

The Imaging Facility provides supported access to state-of-the-art fluorescence imaging technologies and offers expertise in live and fixed cell imaging.



Lipidomics

The Babraham Lipidomics Facility has established a series of LC-MS/MS, GC-MS/MS and HR/AM direct infusion mass spectrometric methods to analyse 37 classes of neutral lipids, phospholipids and sphingolipids from various biomedical samples.



Mass Spectrometry

The Mass Spectrometry Facility is equipped with a range of high resolution systems, which can be used for the identification, characterisation and quantitation of almost any type of biomolecule.



Sequencing

The Next Generation Sequencing Facility provides library quality control and sequencing services for the Babraham Institute and external companies, offering a variety of sequencing solutions for different project sizes and a broad range of applications.



Scientific facilities available at the Babraham Institute



Next Generation Sequencing

The Babraham Institute provides unique research facilities of national importance. These have been developed with significant investment from the BBSRC. Next Generation Sequencing technology has revolutionised post-genomics studies of gene expression, genetic regulation and nuclear dynamics. Its flexibility allows almost any genetic material to be studied on a genome-wide scale. The Facility provides library quality control and sequencing services for the Babraham Institute and external companies, offering a variety of sequencing solutions for different project sizes and a broad range of applications.

The Technology

The Facility has state-of-the-art Illumina sequencers, utilising the most widely-adopted NGS technology to produce highly accurate sequencing results in a time- and cost-effective manner.

HiSeq 2500: The HiSeq 2500 instrument maximises throughput and data yield. As many as 16 samples or sample pools may be run at the same time.

NextSeq: The NextSeq enables researchers to obtain results faster, from a limited number of samples, without reducing the depth of sequencing.

MiSeq: The MiSeq personal sequencer provides maximum flexibility with a wide range of read lengths and short turnover times.

Pricing

Prices for use of the Facility's services are available on request.

Services

Researchers can select the sequencing platform and run type that provides the sequencing depth, read length and turnaround time that best suits their project. All run types are available in both paired-end and single-read analysis formats.

High Output Runs

- maximum data output ; ideal for larger projects requiring high sample throughput
- read lengths up to 125 bp

NextSeq Runs

- ideal for projects with small sample numbers requiring a high read yield
- flexible read lengths up to 150 bp

MiSeq Runs

- suitable for validation studies, small genome and amplicon sequencing
- fast turnaround times
- read lengths up to 300 bp

Quality Control

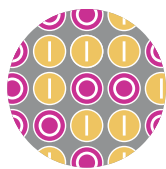
The Next Generation Sequencing Facility also offers a library quality control service, based on the Agilent 2100 Bioanalyzer system.

Coming soon!

Sample preparation services for DNA-seq and RNA-seq libraries to be offered in early 2017. Please contact the Facility for details.



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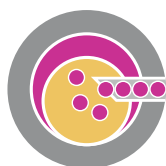
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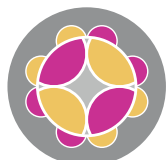
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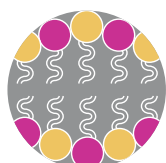
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