

Babraham Institute



Life Sciences  
Research  
for Lifelong Health



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# Welcome



*Professor Michael Wakelam*

## **I am very pleased to welcome you to the Babraham Institute – a centre of research excellence in the biosciences, promoting lifelong health.**

As a publically funded Institute, our excellent research is central to the goals of our strategic funding body, the Biotechnology and Biological Sciences Research Council (BBSRC). In particular our research is driving advances to help maintain lifelong health.

In the following pages, you will learn more about the Babraham Institute, its beautiful setting in south Cambridge and the importance of its role (and that of its subsidiary companies) in the expanding and developing Babraham Research Campus. The campus environment and shared facilities together with its proximity to the University of Cambridge make the Babraham Institute the ideal place for collaboration and innovation.

Our science activities are outlined briefly to introduce our four key research programmes and core facilities. We also highlight our excellent training and education activities that allow us to continue to attract and retain the best PhD students, post-doctoral scientists and staff across all parts of the Institute.

I am proud to say that our research excellence is reflected not solely in the standing of our scientists in the International research community, but also through our commitment

and contribution to public engagement (page 10). Our exhibitions, site visits and public debates help to inform wider groups about the research of the institute and also enthuse audiences about science and science-based careers. Perhaps more importantly, these activities provide opportunities for researchers to be reflective about issues raised by their research.

Our scientists are making major advances in understanding how our cells, organs and bodies are maintained throughout life and how this declines with age and in some age-related diseases. As lifespan continues to extend and the population increases, our research is needed more than ever to help understand ageing. In addition, we work to translate basic research through collaborations with clinicians and industry to help in developing new medicines. Our Knowledge Exchange and Commercialisation programme facilitates this process (page 12) and in doing so, highlights the many opportunities and benefits that comes from continued support of our bioscience research. Moving forward I am certain that the Babraham Institute will continue to play a pivotal role in major discoveries that promote lifelong health.

A handwritten signature in black ink that reads "Michael Wakelam". The signature is written in a cursive style and is positioned above a horizontal line.

**Professor Michael Wakelam**  
Institute Director

**Babraham has over 65 years history as a scientific institute. It was founded in 1948 as the Institute of Animal Physiology. Whilst the role, remit and focus of the Institute may have changed over the years, the pursuit of excellence in scientific research and training has remained a major priority.**



# About Babraham Institute

**As a world-leading research centre in bioscience, the Babraham Institute's defining purpose is to carry out pioneering research at the cellular and molecular level to understand the biological processes underpinning lifelong health and wellbeing.**

Our research focuses on signal transduction and genome regulation (particularly the interplay between the two), how they maintain health and how, over lifetime, their failure or abnormality may contribute to ageing and age-related conditions.

## Location

The Babraham Institute is situated within the Babraham Research Campus (see image opposite). The campus is unique in the co-location of the Institute, 50 bioscience companies and access to outstanding scientific facilities. Also noteworthy, is its ideal geographical location at the core of the Cambridge science cluster, which

allows the Institute and its scientists to have close links with industry, academia and medical charities.

Also on the Campus are the Institute's two subsidiary companies: Babraham Institute Enterprise Ltd (BIE) (wholly owned); and Babraham Bioscience Technologies Ltd (75% shareholding).

Purpose-built accommodation is available for visitors and staff on the campus; amenities include a nursery and sports and social club.

Babraham Institute Enterprise manages the Institute's trading and commercialisation activities. Babraham Bioscience Technologies (BBT) is the company that manages and develops the Babraham Research Campus, supporting and promoting the regional and UK bioscience ecosystem. It has responsibility for the administration and commercial development of the site for the benefit of all the tenants including the Babraham Institute.

## Funding

The Babraham Institute is an independent charitable life sciences organisation (charity registration number 1053902)

Our work is recognised as world-leading and is supported by strategic funding from the Biotechnology and Biological Sciences Research Council (BBSRC) who fund our four areas of research, also referred to as Institute Strategic Programmes (ISPs).

The Institute receives additional funding from other bodies including the Medical Research Council, Wellcome Trust, and the European Union. Funding is also awarded through research collaborations with industry and medical charities.



Babraham Institute: Aerial view

## People

Our science is carried out by internationally renowned scientists who lead research groups of Senior Research Associates, Postdoctoral Research Scientists, support staff, PhD students and visiting researchers.

There are over 300 employees at the Babraham Institute and perhaps surprisingly, not all are scientists. Although the majority of staff work in research laboratories, careers also range from technical and engineering

focused roles to opportunities to work in corporate, administrative and support service positions.

Babraham Institute offers a dynamic and diverse place of employment and provides opportunities for training and career development to attract, develop and retain the very best scientists, Research Fellows and staff.

**The development of monoclonal antibodies to which Babraham made a major contribution through early stage research, has improved the treatment of cancer, inflammatory and autoimmune disease.**

# Research Excellence

**The Institute has a tradition of sustained excellence and innovation in the biosciences. Our research aims to understand the biological mechanisms that control normal development and maintain health through to old age.**

Two overarching themes are central to our research: cell signalling – how our cells respond to cues from their external environment; and epigenetics – how the information encoded within our genome is accessed through changes in the chemical modification of our DNA or through chromatin structure and modifications. These themes are central to the healthy lifespan of every organism from conception through to old age as they coordinate how our cells and organs respond to developmental cues and environmental change.

**Our four key research areas are:**

- **Signalling.** We carry out research on the biochemical signals generated inside cells in response to environmental cues; how they are regulated and how they control cell behavior. Past Signalling work at the Institute discovered liposomes, now routinely saving the lives of premature babies and forming the basis of many drug delivery systems. Current work is revealing why our brains deteriorate with age and investigates the '5 plus 2' diet to identify strategies that may help us live longer and healthier lives.
- **Lymphocyte Signalling and Development.** We investigate how cells of the immune system develop and function, allowing us to fight infections and disease throughout our life. In the past our experience of monoclonal antibody development has led to new tools for academic research and underpinned the development of new drugs for the treatment of arthritis and cancer. Current work includes seeking to understand why the function of our immune system declines with age.

Over the last 20 years our research has led to major advances in our knowledge. These have included understanding the role and regulation of the PI-3-Kinase signalling pathway and unraveling role, nature and mechanism of epigenetic gene control. These, and other advances, have generated many leading research papers but have also paved the way for translation and commercial development of our research (page 12).





- **Epigenetics.** We seek to understand the basic mechanisms of epigenetic gene control - how reversible chemical modifications of our DNA can control access to the information stored within our genomes. These chemical modifications or epigenetic marks help to define the different types of cells in our bodies and can be influenced by environmental or nutritional factors, particularly those encountered early in life. Epigenetic information in our bodies degrades during the ageing process together with declining function of organ systems.

- **Nuclear Dynamics.** Our aim is to create an integrated understanding of the mechanisms that control our genomes including genetic, epigenetic, biochemical and structural factors that together regulate genome function. We focus our studies on embryonic and adult stem cell systems that interface and interact with the environment to promote and maintain health throughout the lifespan.

Much of this work employs genetically-modified rodents (mice and rats) which allow us to build a more sophisticated understanding of how specific genes control cell and organ function to maintain the health of the whole organism.

Excellence is also demonstrated in the world-class scientific facilities and services of the Babraham Research Campus. These include:

- Bioinformatics
- New Generation Sequencing
- Flow Cytometry
- Imaging
- Lipidomics
- Mass Spectrometry
- Small animal facilities

More details about our science and our facilities can be found in our scientific booklet entitled 'Commercialising the Science of the Babraham Institute'.

# Training and Education

**The Babraham Institute has the status of a recognised postgraduate institution within the University of Cambridge; all our students are registered within the Faculty of Biology for their PhD degrees and our Group Leaders are fully recognised University supervisors.**

The excellence of our scientists and facility staff is critical for the overall success of the Institute and for future research discoveries. We therefore ensure that our research environment and opportunities for training and career development serve to attract, develop and retain the very best staff, students and scientists.

**Opportunities include:**

- Continued Professional Development for all staff including public engagement and communication training in addition to training in new emerging techniques
- Scientists are encouraged to regularly present their research at national and international conferences
- A first-class Graduate Training Programme that provides career advice and develops transferable skills
- Each PhD student has a 'personal committee' which supports them through their studies

- Mentoring and support at all levels for individuals in making career choices including applications for personal fellowships
- All Senior Research Associates contribute to the Institute's in-house Advanced Research Training Scheme

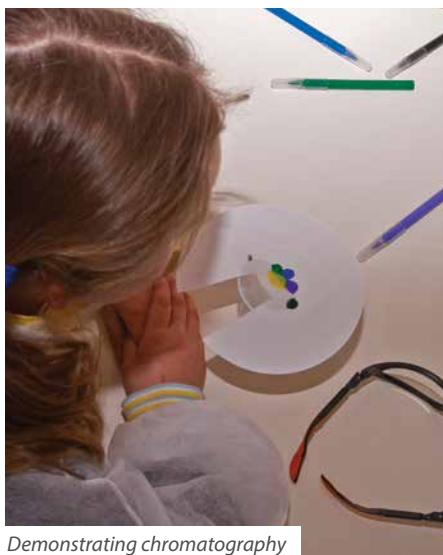
**“I work at the Babraham Institute carrying out research on the epigenetic changes that occur in the ageing heart. Since joining the Institute, I have developed lots of transferable skills as well as been involved in cutting edge research. In addition, I have attended numerous conferences and symposia across the UK, where I have been selected to give poster presentations and given the opportunity to discuss my research with experts in the field from all over the world.”**

**Emma Louise Robinson (Babraham Institute PhD student)**



# Science and Society

**Embedded within research, our Public Engagement programme brings scientists closer to society both to demonstrate the relevance of their work and to allow them to listen, understand and value the societal context of their research and anticipate its social implications.**



*Demonstrating chromatography*

We aim to engage the public in dialogue about science to create a better understanding and appreciation of the research carried out at the Institute. Our scientists and staff are involved in schools and public engagement activities throughout the year. They bring research to life by talking about their experiences, demonstrating experiments and explaining often complex science in understandable ways. Activities include:

- Science and career talks and outreach activities
- Annual schools day and open campus event
- Listening to public views through public debates
- Use of social media and on-line engagement tools
- Exhibitions and festivals to demonstrate scientific concepts
- Media and press activity

**Our Annual Schools Day has been running since 1994. This event aims to enthuse young people about bioscience and inspire them to pursue scientific careers. In addition to the 20 different lab-based projects on offer, we also aim to stimulate discussion around some of the ethical issues confronting scientists doing bioscience research.**



Cambridge Science Festival



Conference on Ageing



'Ethics in research' workshop



Babraham networking event



Babraham Institute Schools' Day



Epigenetics debate

# Knowledge Exchange and Commercialisation

## **The Babraham Institute's Knowledge Exchange and Commercialisation (KEC) programme aims to maximise the impact and translation of knowledge generated by and held within the Institute.**

Our KEC programme is designed to facilitate two-way flow of knowledge between Babraham Institute scientists and external partners and stakeholders. It is our aim to engage with individuals, businesses, public and other sector bodies through a variety of channels to maximise the societal and economic impact of our science.

In addition we aim to use our expertise to inform policy direction and understanding of science by policy makers, industrialists and clinicians at home and abroad.

### **Activities include:**

- Knowledge Exchange events - two-way dialogue between external partners and stakeholders individuals, businesses, public organisations and other sector bodies created through workshops, seminars and networking
- Consultancy and scientific research activities
- Collaboration – projects with the Biotechnology and Pharmaceutical sectors as well as with clinicians at both Addenbrookes and Papworth hospitals.
- Training - in central support services (listed previously) is available to Campus Bioincubator tenant companies and the external research community

**Crescendo Biologics Ltd was spun-out of the Babraham Institute in 2008. The company is focused on developing fragments of antibodies as potential therapeutics. In December 2013 Crescendo raised £17.5M in investment funding. The company is based on the Babraham Research Campus, and continues to collaborate with Babraham Institute scientists.**



# Find out more

## Research Excellence

More details about our science can be found in 'Commercialising the Science of the Babraham Institute' booklet

## Training & Education

Please see our website ([www.babraham.ac.uk](http://www.babraham.ac.uk)) and the BBSRC website for latest vacancies and further details

## Science and Society

Please email [linden.smith@babraham.ac.uk](mailto:linden.smith@babraham.ac.uk) if you would like to find out more about our public engagement activities

## Knowledge Exchange and Commercialisation

For further information on working with the Babraham Institute please contact:

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