

The Sanger Institute is a genome research institute primarily funded by the Wellcome Trust. We use large-scale DNA sequencing and analysis, informatics and analysis of genetic variation to further our understanding of gene function in health and disease and to generate data and resources of lasting value to biomedical research.



The Wellcome Trust Sanger Institute: Research from genomics to biomedicine

A power in biology and biomedicine

Funded principally by the Wellcome Trust, the Wellcome Trust Sanger Institute is the largest genomics centre in Europe and has some of the UK's most powerful computer systems. Our leading research teams harness these strengths to understand human biology and human disease.

An established reputation

The Sanger Institute was the largest single contributor to the sequence of the human genome and led the world in making those results freely available to all.

We have built on those skills to develop new programmes in postgenomic biology – understanding the messages in genes.

A focused portfolio

The programmes developed in our strategic plan for 2006–11 will exploit the synergism between experimental and natural genetic variation to develop our biological and biomedical research and to provide new and unique resources to the research community.

A resource for today and the future

From its earliest days, the Sanger Institute has provided open access and free release of data and resources for biology. Sequence databases and tools are now enhanced by new biological resources, providing ever more valuable analysis and interpretation.

An open institution

The Institute's scientific output is published in research journals that

are freely available. All our software and databases are available for download.

Open access plays a vital role in generating new science and in providing support for biomedical discovery. Our Public Engagement programme ensures we discuss our work with a wide audience.

A unique institution

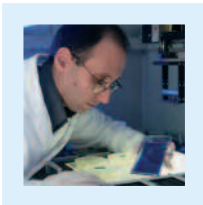
We have made unique contributions to international and national biomedical research, from the human genome sequence to biology of disease.

We will continue to develop research and collaborations that use our unique skills to provide biological and biomedical benefit.





The Wellcome Trust Sanger Institute: World-leading research in genomes, biology and biomedicine



The Wellcome Trust Sanger Institute

The Wellcome Trust Sanger Institute is a genome research centre set up in 1992 by the Wellcome Trust and the Medical Research Council in order to further our knowledge of genomes and, in particular, to play a substantial role in the sequencing and interpretation of the human genome. Genomic information will underpin research on human biology and disease for many years to come.

History

Since our founding, we have developed the resources and skills to carry out research on a scale that is possible nowhere else in the UK. This approach allows us to answer biomedical questions in unique ways and to develop understanding that cannot be achieved in most other institutions.

From the earliest days, team-based research programmes provided versatile solutions for the transition from sequencing of the genomes of simple organisms to study of human biology and disease.

The outcomes of this structure are:

- Scalable and leading-edge IT systems for sequencing and postgenomic research
- Development of high-throughput systems to handle millions of samples each week
- Deployment of team-based support to provide flexible research
- Production of resources and tools for research that are freely available to all

A culture for discovery

Our staff have driven the development and broad acceptance of the need for open access to genomic research. Together with our partners, we have made available all genome sequences and the software that allow analysis of them.

The Sanger Institute has sequenced the genomes of many dozens of organisms, the majority finished to the highest standards. It has also played a major role in programmes to understand human genetic variation and is a major collaborator

with many studies in the UK and internationally to define the genetic contribution to diseases such as diabetes, cancer and malaria.

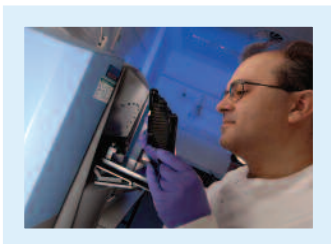
Our scientific publications are among the most cited in biological research and our new programmes demonstrate the contribution that the Institute can and will make to biomedical research.

Our hunger to make a difference to biomedicine for all remains as strong as ever.

Futures

In the next five years we aim to make a major contribution to the understanding of gene function, similar in impact to our role in genome sequencing. Through our strategy, our resources and our collaborations, embedded in our faculty programmes, we intend to establish the intellectual framework and innovation for our future science and to train the next generation of genome biologists.

The Wellcome Trust Sanger Institute: Our strategy 2006–11



Unique combinations

Our Strategic Plan for 2006–11 develops genetics as the area in which we can make the greatest – and a unique – contribution. We will concentrate on global studies of natural genetic variation in humans and pathogens, and experimental variation of genome sequence in the model organisms, mouse and zebrafish, as well as pathogens.

With results from each area stimulating research in the other, the new strategy will yield the richest set of scientific results and resources and will capitalize most effectively on the outstanding attributes of the Sanger Institute: a rich IT environment, skills in high-throughput science management, world-leading sequence and genetic analysis, strong science infrastructure, unfettered access.

A passion for discovery

A genome sequence is a springboard for discovery. At the Sanger Institute, our passion is to discover the meaning of genes; driven by sequence data, and through genetic exploration, we seek to bring biomedical advance from genome-based research.

The passion that produced the human genome sequence remains as strong today in our work to study the function of genes on a scale that matches the efforts for the Human Genome Project.

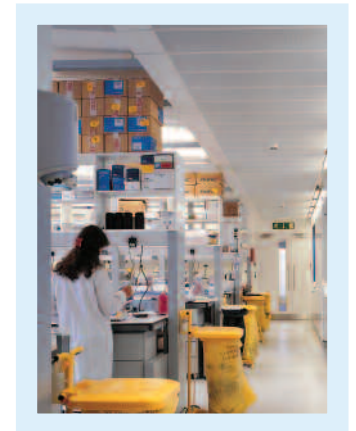
Research and resources

Since 2001, the Sanger Institute has strengthened its existing scientific leadership through recruitment of a new Faculty of researchers. These research leaders combine hypothesis-driven science that capitalizes on the skills of the Institute in high-throughput research.

Our strategy calls for a balance in the continuum between “big science” and “small science”. The balance reflects our role as information provider as well as the need to support our own research programmes. Diverse small projects will continue to add value to our research portfolio.

Major questions, vital answers

The power of modern biology can be brought to bear on questions that were intractable only a few years ago. The power of new science is, in large part, based on



analysis of massive amounts of data and is appropriately carried out through collaboration within and beyond the Institute.

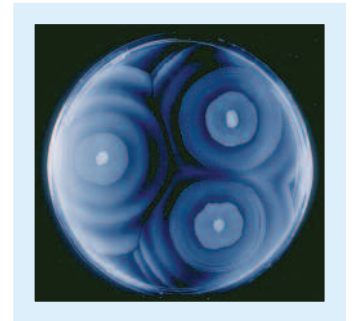
For example, our research on common alleles implicated in human disease is a large-scale collaboration between disease-centred groups, groups operating large scale technological platforms, investigators involved in statistical analyses and in model organism genetics.

Freedom to respond

Biological advance comes from research, large and small, from major programmes and from a focussed determination. The Sanger Institute recognizes the need for new programmes and new collaborations.

We retain the flexibility in our planning to capitalize on new opportunities and new developments.

The Wellcome Trust Sanger Institute: Research and resources

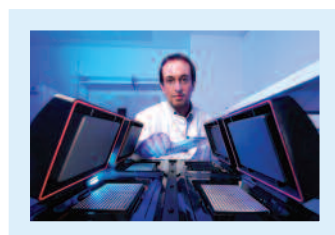


From DNA...

The Sanger Institute's contribution to the sequence of the human genome marked only a beginning of a journey of biological discovery.

Building on the achievements in research on model organisms such as yeast and nematode worm, the Institute, together with the European Bioinformatics Institute, developed the Ensembl genome browser. Ensembl brings together information about sequence, genes, variation and disease information into one freely available database.

For the new research programmes announced in the Strategic Plan for 2006–11, new IT and biological resources will be developed. We will continue to provide ready access to our biological resources.



...to Disease

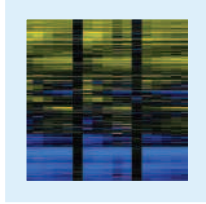
In the next five years, the Institute will continue to produce and exploit sequence information, linked to an investment in genetics that will yield the most extensive results from the Institute's expertise. Like sequencing, our genetics projects are scalable, suit the infrastructure of the Institute, are research efforts that interrelate and are in areas of research in which the Institute has global leadership.

The Faculty programmes are designed to use our unique skills to answer questions about diseases such as cancer, diabetes and malaria, both through fundamental research on biological processes and through focused research on specific disease events.

Balance

The enhanced focus on genetics will enable the Institute to deliver data and biological resources that will help scientists to tackle human disease, priming research across the globe, in the same way that the Human Genome Project is stimulating discovery of genes implicated in human disease.

Around 70% of our research spend is devoted to community projects – the biological and database resources that facilitate research by others. We will continue to serve others through the next five years.



The Wellcome Trust Sanger Institute: Working with others

Significant Collaborations 1993–2007

- Human genome: 28%
- SNP Consortium: 25%
- HapMap Project: 24%
- *S. pombe* genome: 66%
- *C. elegans* genome: 50%
- Mouse genome: 25%
- Malaria parasite genome: 40%
- Wellcome Trust Case Control Consortium
- Copy Number Variation Project
- EUCOMM
- KOMP
- ENCODE



Collaboration, large and small

Our research is embedded in the efforts of the wider community. Many of our programmes are initiated by the research interests of our own staff, but many more arise from interaction with researchers around the world.

Collaborations span the scale of our research from single-topic projects to major programmes and our aim is to increase collaborative research in the next five years. Almost 95% of our research papers are collaborations.

Working with others

The Institute's Human Genetics programme is fully integrated with, for example, the Wellcome Trust Case-Control Consortium, which seeks to uncover the genetic basis of thirteen diseases. Mouse Genetics at the Institute is part of the European EUCOMM and US KOMP mouse stem cell programmes.

All of our large-scale projects, such as large-genome sequencing, pathogen genomics, the Cancer Genome Project and variation

discovery, are collaborations with other groups. Concerted research is a mainstay of our effort.

In addition, more than 70% of our other research projects are collaborations.

Sanger contributions

The Sanger Institute has been a major contributor to many of the most significant biological efforts of the past 15 years [see box]. Our research leaders also collaborate on many smaller projects with groups from around the world.

We have delivered results through collaborations with other Institutes, agreeing milestones, deliverables and quality standards. Provision of genome-wide data and biological resources requires extraordinary effort, commitment and compromises from all partners: establishing and maintaining relationships is vital to our programmes.

Wider benefit

The Institute Strategy is designed to place our new programmes at the heart of our research effort. The outcomes of these programmes

will, in many cases, provide lasting resources of real value to biomedicine.

But we recognize the need for this national resource to play a leading part in the wider biomedical research work in the UK and abroad. We welcome the opportunity to participate with other researchers in programmes that complement our mission and Plan. We relish the challenge of new questions and of new enterprises.

Wider Engagement

The Institute's Communication and Public Engagement programme seeks to promote understanding of the nature, discoveries and wonder of science and its implications for individuals and society.

Genomic information will have an impact on all our lives. The programmes aim to stimulate interest in biomedical science, to encourage informed discussion, and to make complex biomedical research accessible to a range of audiences, including school students and teachers, and local communities.