The largest ever study of genetics of common diseases has been launched with £30 million funding from the Wellcome Trust.

The study, a follow-up to the Wellcome Trust Case Control Consortium, will analyse DNA samples from 120 000 people. This is a far bigger sample than the work done so far has had, and so will yield greater sensitivity to subtle yet medically important genetic variations. This will allow researchers to search for genetic influences on 25 diseases, and to study the genetics of learning in children and individuals’ responses to statins.

This new series of genome-wide association studies will be one of the most ambitious initiatives ever undertaken, bringing together leading research groups from at least 60 institutions internationally (including more than 20 from the UK).

Over the next two years, working in collaboration with the Case Control Consortium or independently, the research teams are expected to analyse as many as 120bn pieces of genetic data in search of the genes underlying conditions such as multiple sclerosis, schizophrenia and asthma.

Researchers will examine between 500 000 and 1m variants (SNPs) per sample as well as a comprehensive set of copy number variations (CNVs).

The research has been made possible by advances in understanding of human genome variants, pioneered by the Wellcome Trust Sanger Institute at Hinxton, Cambridge. The Institute will devote a large part of its high-throughput genotyping pipeline, headed by Dr Panos Deloukas, to testing many of the DNA samples. Most of the data analysis will be undertaken at the Wellcome Trust Centre for Human Genetics, University of Oxford.

The £9m Case Control Consortium is one of the UK’s largest and most successful academic collaborations to date. It examined DNA samples from 17 000 people across the country, bringing together 50 leading research groups and 200 scientists in the field of human genetics from dozens of UK institutions. The results – published in the journal Nature on 6 June 2007 – identified a number of genes and regions of the human genome that increase people’s susceptibility to or protect them from common diseases such as diabetes, rheumatoid arthritis and coronary heart disease.

An ophthalmological diagnostic test. A number of major new Wellcome Trust awards will support training for talented medical researchers, as well as research capacity building, in Kenya, South Africa, Uganda and elsewhere in Africa (see page 5).
Wellcome Collection is one year old

When we opened Wellcome Collection in June 2007, we hoped that the mix of exhibitions and events dedicated to ‘medicine, life, art’ would attract 100 000 visitors in its first 12 months. To our delight, the venue – in the Wellcome Building on Euston Road in London – has exceeded our expectations: more than 300 000 people have come through our doors over the past year.

Why has Wellcome Collection been so successful? In part, it is because the UK public is increasingly interested in science and medicine. But Wellcome Collection also offers something new and, I think, unique: the chance to explore different cultural fields inspired by science, and the opportunity to debate and discuss the issues that science raises for society.

The exhibition series has included: The Heart, which followed the development of our anatomical knowledge of the heart and considered its far-reaching cultural and symbolic significance; Sleeping & Dreaming, which brought together works from artists, scientists, film-makers and historians; and Life Before Death, a series of 24 sets of photographs taken of terminally ill people before and after their deaths. The latter was reviewed in the Guardian newspaper’s G2 magazine and led to the greatest ever number of hits on their website in 24 hours. The current exhibition, From Atoms to Patterns, displays designs from the 1951 Festival of Britain that were inspired by the structures from X-ray crystallography and runs until 10 August 2008.

In addition, lively and well-attended public events have included the UK’s first interactive broadcasts of live open-heart surgery, debates on topics such as organ donation and medical blogs, walks examining the medical history of London, and a ‘science, ethics and faith’ debate about the Human Fertilisation and Embryology Bill, broadcast on Radio 4. Online versions of the exhibitions, and videos from a selection of events, can be found on the Wellcome Collection website at www.wellcomecollection.org.

Of course, Wellcome Collection is just one way in which we hope to inspire people to engage with science. The projects we fund range from major exhibitions – such as Inside DNA, produced by the At-Bristol science centre, which explores human molecular genetics and genomics research – to smaller initiatives such as Junior Café Scientifique, which is developing a debate network for schools.

Next year will see exciting activities inspired by the 200th anniversary of Charles Darwin’s birth and the 150th anniversary of the publication of On The Origin of Species. We are funding several films and an animation, and a series of Darwin-inspired experiments that will be made available to every UK schoolchild. We hope that these will raise awareness of Charles Darwin’s work, and by example inspire future generations to observe and think about their environment.

Mark Walport
Director of the Wellcome Trust

The Wellcome Trust has announced a new £30 million partnership between the private, public and charitable sectors to offer training to science teachers.

The initiative, entitled Project ENTHUSE, will receive a £10m investment from the UK Government over the next five years, with a further £10m from the Trust and up to £10m from business partners including AstraZeneca, AstraZeneca Science Teaching Trust, BAE Systems, BP, General Electric, GlaxoSmithKline and Rolls-Royce.

Through Project ENTHUSE, bursaries will become available for teachers to attend courses at the National Science Learning Centre. Over 4000 science teachers across the UK have already taken advantage of the teaching and training resources at the Centre; this new injection of funding will extend the experience to state schools throughout the country.

Two awards funded through the Wellcome Trust’s Neuroscience and Mental Health Stream will be exploring stress and depression.

Professor Anke Ehlers (Institute of Psychiatry, King’s College London) and colleagues have been awarded funding to build on their earlier work on post-traumatic stress disorder and social phobia. Previously, the researchers developed treatments to help people with these disorders to overcome psychological processes that can prevent recovery. They will now modify these treatments (for example, by developing self-study programmes) and explore the mechanisms through which they work. The group’s work is also focused on the prevention of disorders – researchers will follow people newly recruited to the emergency services to identify ways to predict who will develop post-traumatic stress disorder.

Professor Glyn Lewis (University of Bristol) has been awarded a project grant to study the issues early in life that can increase the chance of becoming depressed as a teenager. Among other factors, researchers will explore the effect of substance abuse and maternal depression on developing depression at the age of 17, using the Avon Longitudinal Study of Parents and Children (ALSPAC) birth cohort.
One year since its launch, UK Biobank recruits its 100 000th participant.

This landmark figure means that the UK-wide medical initiative established to improve the prevention, diagnosis and treatment of a wide range of serious illnesses is well on the way to reaching its target of 500 000 participants by the end of 2010.

As part of the multimillion-pound collaborative project, researchers have collected health and lifestyle information, body measurements, and blood and urine samples from thousands of people aged between 40 and 69. The information will be added to a national database and updated as the participants’ health is tracked for up to 30 years.

Recruitment for UK Biobank began in Manchester in 2007. Since then, over 1.5 million samples of blood have been stored as part of the project; seven additional recruitment centres across the UK have opened (in Oxford, Cardiff, Glasgow, Edinburgh, Stoke-on-Trent, Newcastle-upon-Tyne and Leeds), and two more are on the way, for Reading and Bristol.

Funding awarded through the Wellcome Trust’s Physiological Sciences stream will explore the biological functions of a peptide and a family of lipids in the hope of developing treatments for atherosclerosis.

A programme grant has been awarded to Adrian Hobbs (University College London) and colleagues. They will investigate the biological roles of C-type natriuretic peptide, one of a family of naturally occurring substances, some of which are used to treat heart disease. It is hoped this work could help to find new ways to treat cardiovascular diseases such as stroke and atherosclerosis (the build-up of fatty plaques within arteries).

Finding possible future treatments for atherosclerosis is one aim of a collaborative project grant awarded to Homero Rubbo (University of Uruguay) and Valerie O’Donnell (Cardiff University). The researchers will make novel nitrated lipids – a type of fatty compound with anti-inflammatory actions – and investigate their ability to prevent atherosclerosis in an animal model.

The Wellcome Trust and the Wellcome Trust are part of a major new collaboration designed to identify the key genetic mutations involved in up to 50 types of cancer.

Cancer is caused by DNA mutations that disrupt the normal biological pathways of cells, leading to uncontrolled growth. The Sanger Institute’s Cancer Genome Project has led the way in genome-wide approaches to discovering these mutations, by systematically comparing the DNA in cancer cells with the reference sequence produced by the Human Genome Project.

The new International Cancer Genome Consortium, which currently includes ten institutions from four continents, will study approximately 50 cancer types and subtypes, aiming to produce comprehensive catalogues of the genetic mutations involved. Each project will require cancer specimens from 500 patients and have an estimated cost of US$20 million (£10m).

Because these mutations are often specific to a particular type or stage of cancer, the research will provide the foundation for the identification of new therapies, diagnostics and preventative strategies.

www.icgc.org

New HIV health services are being rolled out in Zimbabwe, and Wellcome Trust-funded researchers will be assessing their effectiveness.

The Trust has awarded over £2.6 million to Simon Gregson from Imperial College School of Medicine to help measure the effectiveness of a major HIV prevention and treatment initiative in Zimbabwe.

In 2006, Dr Gregson and colleagues found that HIV prevalence appeared to be in decline in Zimbabwe, largely driven by the adoption of safer behaviours such as condom use. However, it has not been clear whether successful smaller-scale initiatives to prevent and treat HIV/AIDS will still work when scaled up across entire countries.

To study the effects of the initiatives – which include strategies to change people’s behaviour and the roll-out of antiretroviral therapy across the country – the team will measure new HIV infections and deaths (from AIDS and other causes) in a sample of 12 000 people whom they had worked with before the new services were available. Mathematical models will allow the team to assess the contribution of individual interventions. They will also explore how much people make use of the newly available services and will find ways to potentially increase the uptake of these lifesaving resources.
UPDATE

Animal research guidelines

Five of the UK’s major funders of animal research have published common guidelines for using animals in research. Compliance with the guidelines will be a condition of funding for new grants involving the use of animals.

One requirement is that when collaborating with laboratories outside the UK, researchers and their local ethics committees must check that welfare standards are consistent with the principles in UK legislation and the new guidelines. Any significant deviations will need prior approval from the funding body.

This is the first time that the Medical Research Council, the Biotechnology and Biological Sciences Research Council, the Natural Environment Research Council, the Wellcome Trust and the National Centre for the Replacement, Refinement and Reduction of Animals in Research have collaborated to produce a common set of principles for animal use and applying replacement, refinement and reduction (the ‘3Rs’).

www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD040129.htm

UPDATE

HFE debate

The Wellcome Trust has been briefing MPs on the Human Fertilisation and Embryology Bill as it passes through Parliament.

In particular, the Trust was concerned that restrictions would be placed on the use of human admixed embryos in research, thereby limiting scientists’ ability to investigate new stem cell therapies.

A spotlight area of the Trust website includes background documents, an animation, and a video of a debate between scientists and religious leaders.

www.wellcome.ac.uk/hfe

UPDATE

Key Stage 2 science

The Effects of National Testing in Science at KS2 in England and Wales was published in April, commissioned by the Wellcome Trust and the Association for Science Education.

The report – the result of a survey of around 1000 teachers in England and Wales – compares assessment of Key Stage 2 (KS2) pupils’ achievement in science in the two countries.

In England, preparation for compulsory national testing in science reduced the time pupils could spend on practical investigations. Instead, the focus of teaching was on equipping pupils with enough factual knowledge and scientific terminology to answer written questions on science test papers. Concentration on aspects of science likely to be tested resulted in a narrow curriculum for science. Test preparation therefore contributed little to pupils’ understanding in science.

In Wales, by contrast, compulsory testing in science at KS2 was abolished in 2004, and replaced by teacher assessment. Teachers said this freed them to concentrate on developing pupils’ knowledge, engaging them in practical science activities, and to begin to use a broader range of teaching strategies.

Teachers in both England and Wales generally believed that abolishing national testing was therefore beneficial to pupils. They also felt that teacher assessment could provide more accurate information about pupils’ levels of attainment at KS2 than national test scores. However, this did depend on having rigorous assessment criteria and guidelines to ensure consistency in the interpretation of levels of achievement within and across schools.

The report, plus a number of others focusing on different aspects of science education, can be found on the Trust’s website.

www.wellcome.ac.uk/About-us/Publications/Books/Education/

UPDATE

Big Picture

The latest issue in the Big Picture series – a resource for teachers and post-16 students with up-to-date information on research findings in biomedicine, and the social and ethical implications – came out in June.

Big Picture on How We Look explores physical appearance, looking at the remarkable interplay between the biology that sculpts our form and the culture that interprets, embellishes and adapts this form. It asks what we mean by normal, what beauty is and how such concepts influence the way we live. It looks at why we take the form we do, and why we do so much to change what nature has given us. It also considers what we might look like in the future – due to biology or to our own powers to reinvent ourselves.

www.wellcome.ac.uk/bigpicture/howwelook/wn55

UPDATE

 Witnesses to MRSA

The latest seminar transcript in the ‘Wellcome Witnesses to Twentieth Century Medicine’ series has been published by the Wellcome Trust Centre for the History of Medicine at UCL.

Superbugs and Superdrugs: A history of MRSA covers problems encountered by the spread of methicillin-resistant Staphylococcus aureus and attempts to overcome them.

www.ucl.ac.uk/histmed/publications/wellcome_witnesses_c20th_med

Above: Superbugs and Superdrugs.

Above: Big Picture on How We Look.

Above: ‘Responsibility in the use of animals in bioscience research’ guidelines.
FUNDING
Boost for African medical research and training

Strategic Awards totalling £20 million have been made to four research programmes across sub-Saharan Africa. This investment will ensure that talented researchers in some of the world’s poorest countries can access the training and experience needed to conduct research at a world-class level.

The KEMRI–Wellcome Trust Research Programme in Kenya, one of the Trust’s Major Overseas Programmes, has received almost £9m to train researchers, including increasing capacity in the specific areas of translational research, social science research and clinical trials.

Professor Brian Greenwood from the London School of Hygiene and Tropical Medicine (LSHTM) has been awarded over £7m to support training for African scientists to undertake high-quality malaria research in African universities.

Also receiving funding are two of the Wellcome Trust’s Senior Research Fellows. Professor Robert Wilkinson at the University of Cape Town, South Africa, has received £3m to establish a Centre for Clinical Infectious Disease Research at the University, which will focus on HIV and TB, of particular importance to the region. Alison Elliott, from the LSHTM and based at the the Uganda Virus Research Institute, has received £1m to develop infection and immunity research and training within Uganda.

RESEARCH
Paranoid thoughts

A virtual reality Underground ride has been used to reveal that suspicious or paranoid thoughts are much more common in the general population than was previously thought.

Paranoid thoughts – exaggerated fears about threats from others – are often triggered by ambiguous events such as people looking in one’s direction or hearing laughter in a room. Daniel Freeman at the Institute of Psychiatry, King’s College London, and colleagues have now used a virtual reality simulation to study how people misinterpret others’ actions.

Wearing virtual reality headsets, 200 volunteers walked around a virtual London Underground carriage (above). The carriage contained neutral computer people (avatars) that breathed, looked around and sometimes met the gaze of the participants. One avatar read a newspaper, while another would occasionally smile if looked at. The most common reaction from the volunteers was to find the virtual reality characters friendly or neutral, but almost 40 per cent of the participants experienced at least one paranoid thought. Those who were anxious, worried, focused on the worst-case scenarios and had low self-esteem were the most likely to have such thoughts.

In the past, only those with a severe mental illness were thought to experience paranoid thoughts, but this research indicates that about one-third of the general population regularly experiences persecutory thoughts. Paranoia is increasingly being treated using cognitive behavioural therapy (CBT), and Dr Freeman believes that in the future virtual reality could be used as a tool in clinical assessment and be incorporated into CBT interventions for paranoia, allowing patients to test out their fears in virtual worlds.

Visit www.wellcome.ac.uk/news to watch a video interview with Dr Freeman and to see footage of the virtual Tube ride.

**RESEARCH**

**New clues to diabetes genetics**

Six new genes that play a role in the development of type 2 diabetes have been identified, extending the total number of genes implicated in common forms of the disease to 16.

Ninety researchers from over 40 centres in Europe and the USA analysed genetic data gathered from over 70,000 people in search of genetic differences that make some people more susceptible than others to type 2 diabetes. Previous work from these groups and others had identified ten genes contributing to risk; the new findings add a further six new genes.

The research backs up previous studies suggesting that a key process in the development of type 2 diabetes is the failure to regulate the number of insulin-producing cells in the pancreas. In addition, the researchers have identified a surprising association between type 2 diabetes and the gene known as JAZF1, which has recently been shown to play a role in prostate cancer.


**Diagnosing autism**

The rise in the number of cases of autism may be related to changes in how it is diagnosed.

Many children diagnosed with severe language disorders in the 1980s and 1990s would today be diagnosed as having autism, according to research by Professor Dorothy Bishop, a Wellcome Trust Principal Research Fellow at the University of Oxford.

In recent years, the criteria for diagnosing developmental language disorders and autism have changed. This has coincided with a marked rise in the rates of autism diagnosis. The figure until the 1990s was widely accepted as being about five people per 10,000; even using the narrowest definition of autism, this rose to almost 40 in 10,000 by 2006.

Professor Bishop and colleagues revisited 38 individuals, aged 15–31, who had been diagnosed as children with having developmental language disorders rather than being autistic. However, when reassessed using current diagnostic criteria, around a quarter were identified as having autistic spectrum disorder.

The findings support the theory that changes in diagnosis may contribute towards the rise in autism, although the small size of the study leads Professor Bishop to caution against using the results to suggest that the prevalence of autism is not genuinely rising.


**A tall story**

The team that identified the first common version of a gene influencing height has now identified a further 20 regions of the genome, which together can make a height difference of up to 6 cm.

Unlike a number of other body size characteristics such as obesity, which is caused by a mix of genetic and environmental factors, 90 per cent of normal variation in human height is due to genetic factors rather than, for example, diet. In 2007, a team of researchers including Tim Frayling from the Peninsula Medical School, Exeter, and Professor Mark McCarthy from the University of Oxford identified the first common gene variant to affect height, though it made a difference of only 0.5 cm.

Now, using DNA samples from over 30,000 people, the researchers have identified 20 new loci that can influence adult height. The number and variety of genetic regions involved show that height is not just caused by a few genes operating in the long bones: some of the genes regulate basic cell division, some are implicated in cell-to-cell signalling, and some are transcription factors that switch other genes on or off.

One locus in particular is also implicated in osteoarthritis, the most common form of arthritis, involving the effects of wear and tear on the body’s structures. This locus reinforces a similar link identified by a previous study, and may be involved in the growth of cartilage.

However, of the 20 loci identified by Dr Frayling and colleagues, half contain genes about which little or nothing is known, and the researchers suggest that there may be more than 100 genes overall that affect human height.

RESEARCH

Crusaders’ Lebanese legacy

Some Lebanese Christian men carry genetic signatures usually found in Europe, which suggests that the legacy of invading Crusaders included Y chromosomes as well as castles (such as that in Byblos, Lebanon, above).

The Genographic Project is using DNA samples from people around the world to map historical patterns of human migration and answer other anthropological questions. As part of this research, a team that included Chris Tyler-Smith of the Wellcome Trust Sanger Institute analysed the Y chromosomes of over 900 Lebanese men.

When they compared Y chromosomes from the Christian, Muslim and Druze communities, subtle but distinct genetic differences between the groups emerged. For example, a genetic signature called WES1 was present in 2 per cent of Lebanese Christian men but was completely absent from Lebanese Muslim men (and all the surrounding countries). This signature is otherwise found only in Western European populations, and its presence in Lebanese men is thought to be a consequence of the Crusades, which began almost 1000 years ago.

Meanwhile, Lebanese Muslim men were more likely than Lebanese Christian men to carry a genetic signature that is typical of the population involved in the Muslim expansion of the seventh and eighth centuries.


RESEARCH

Gene therapy for blindness

The vision of a young man with Leber's congenital amaurosis has been improved by a new gene therapy treatment.

Leber’s congenital amaurosis is a rare inherited eye disease caused by an abnormality in the RPE65 gene. The condition appears at birth or in the first few months of life and causes progressive deterioration of the retina and loss of vision. There are currently no effective treatments available.

In a clinical trial led by researchers at the UCL Institute of Ophthalmology and Moorfields Eye Hospital, healthy copies of RPE65 were inserted into the retinal cells of three patients. This involved an operation to deliver a harmless virus or ‘vector’ to the retina, which then carried the gene into the cells (above: blood vessels in the retina).

Following the treatment, the three all achieved levels of vision at least equivalent to before the operation, but one showed significantly improved night vision. The researchers believe the operation’s success for this particular individual could be because his disease had not progressed to the same extent as the others’.

The other two patients may also still benefit from the new treatment, but it will be some time before this becomes apparent. The team has already begun to trial the technique in younger patients, where they hope to achieve even better results.


UPDATE

Genome Campus influence

The impact of research reports from the Wellcome Trust Sanger Institute and the EMBL–European Bioinformatics Institute makes them the top two most influential research institutions in the UK, according to results published in Science Watch.

In addition, nine of the top 25 most influential UK researchers work at the Wellcome Trust Genome Campus near Cambridge, home to the two institutes.

http://sciencewatch.com/ana/fea/08mayjunFea/

UPDATE

Porter plaque

Lewisham has honoured the eminent historian Roy Porter by affixing a plaque to his childhood home.

Professor Porter, who died in 2002 at the early age of 56, came to the (then) Wellcome Institute for the History of Medicine in 1979 and was Director of the history of medicine unit in 2001 when it passed to UCL. Sir Steve Bullock, the Mayor of Lewisham, unveiled the plaque at 13 Camplin Street, New Cross Gate, on 5 June 2008.
The work of osteologists at the Museum of London is shedding light on what life in London was like hundreds of years ago.

The Centre for Human Bioarchaeology at the Museum of London is everything you’d hope it would be: a maze of corridors leading to a large office crammed full of journals and papers, dusty bone fragments laid out for examination, and a skeleton on wheels.

Inconspicuous cardboard boxes line row after row of shelving, their labels giving little indication of their contents – some 17,000 skeletons examined and archived by the Centre over the last 30 years. These remains cover over 2,000 years of London’s history, and have provided a glimpse into how Londoners used to live.

The majority of the skeletons stored are from the medieval period, but there are about 1,000 skeletons from London’s four Roman cemeteries, and 80 Saxons. Bill White, Curator at the Centre, explains: “We haven’t got representative numbers of Anglo-Saxons because, after the Romans left, London was largely abandoned. People moved back much later on, so there are a few hundred years where there’s not really any archaeology.”

Thanks to Wellcome Trust funding, detailed data on 11,000 skeletons are now available on the Wellcome Osteological Research Database (WORD). This has transformed the way people use information from the Museum, allowing researchers to do ‘virtual studies’ from their own desks. The database is also important as a conservation tool: it reduces the amount of specimen-handling and provides a record of what’s been done before, preventing the duplication of sampling.

Medics, dentists and other researchers can use the data for many purposes – to try to find when a particular disease arose, what sort of factors were involved and what medical interventions were made.

Perhaps unsurprisingly, an individual’s sex is one of the more straightforward features to ascertain from skeletal remains. “In general we’re looking at the morphology, or shape,” says Jelena Bekvalac, a Research Osteologist at the Centre. The shape of the pelvis is obviously a key indicator, as is the shape of particular areas on the skull. “Males and females have similar characteristics, and a person could show both male and female features, so we use a scoring system for key areas.”

Pinpointing age is much harder. In younger individuals, developmental changes that happen at certain points can give an indication of age. For example, the eruption of teeth or fusion of certain parts of the skeleton are linked to particular age ranges.

“Ageing adults is harder as it’s all based on degeneration,” says Ms Bekvalac. “We all degenerate at different rates, and you might also get different ages for different parts of the same skeleton.” With this in mind, osteoarchaeologists fit individuals into age bands, rather than giving them a single, precise age.

Digging up diseases

The osteologists’ aim is not necessarily to determine the cause of death, but to examine evidence from the remains and the site at which they were found to understand more about a person’s life. How much can be inferred depends on the type of pathology present. “If you have something fast-acting or acute, you
wouldn’t see it on the skeleton,” says Ms Bekvalac. “We need something chronic really – we do need people to have suffered, to a certain extent!”

Some diseases have key indicators. For example, a diet high in rich foods can lead to a characteristic ‘candlewax’-like overgrowth of bone, particularly in the spine, known as diffuse idiopathic skeletal hyperostosis (DISH). Osteoarthritis can be indicated by a shiny bone surface, caused by bone rubbing on bone, while smallpox seems to attack the elbow joint. On one skeleton the team found complete disruption of this joint by smallpox on one side. “Once you see an indicator like this, it doesn’t matter if it’s a whole skeleton or just part, you can tell that a person suffered from that disease,” says Ms Bekvalac.

The skeletons also tell of some horrible injuries, including a particularly grim case from a site in Farrington. The femur head (the part of the leg bone that fits into the hip joint) had become separated from the main part of the bone and fragmented. The researchers found a small piece of bone that was shiny, a sign it had broken off and been loose in the joint. It appeared that the person continued to use their leg, even though it could have been incredibly painful.

One of the most remarkable discoveries of the team was a skeleton from the Royal Mint – the Black Death catastrophe cemetery of East Smithfield, dated to 1348–50 – found with an arrowhead lodged in the vertebra. The healing around the arrow suggests that, despite having been shot in the back, the person continued living. “They must have just snapped off the shaft of the arrow and carried on,” says Ms Bekvalac.

Working so closely with the skeletons means that the osteologists feel like they get to know the people they’re studying. This is strengthened if the individuals can be identified – such as at the Chelsea Old Church excavations, where the skeletal remains were found with coffin plates – and be linked to wills or parish records.

One Chelsea resident, William Wood, is a particular favourite of the osteologists. His details make it easy to picture how he might have looked and lived. Records reveal that he was the beadle (a parish church official) and butcher in Chelsea – then a wealthy rural area – who died in 1842 aged 84. Osteological studies showed he died toothless and with the ‘candlewax’-like spinal growth, indicative of DISH. “We know now that people with this condition tend to be overweight and suffering from type 2 diabetes,” says Bill White. “But there’s very low pain, if any, and he probably had a good life.”

Rewriting history

Osteological research can also help to correct some misconceptions about people and the way they lived in the past: everything from the austere lifestyle of monks to the random heaping of bodies in plague pits. Clues from the clergy reveal that some may have not lived as modestly as thought. Some higher clergy were taller than the normal monks, and showed evidence of tooth decay, both of which are associated with a better diet than many medieval people enjoyed.

As well as from monasteries, many of the medieval remains studied come from so-called ‘catastrophe cemeteries’, associated with events that killed many people quickly. One such cemetery in East Smithfield was created during the Black Death. “They started to bury people individually but that quickly became unfeasible,” says Mr White. “They dug large trenches but carefully laid the bodies out side by side, with children’s bodies placed between them to make use of the space.” Poignantly, parts of the trenches remain empty, marking when the plague ended.

The comparison of skeletons from the Roman, medieval and postmedieval periods has uncovered surprising findings about the population’s average height. “People assume that the increase in average height seen today came about gradually, but that’s not what we see,” says Mr White. According to the team’s measurements, the Romans were slightly smaller than the average height today, the Saxons were much taller, and people from the early medieval people were shorter again.

“They are a marvellous resource to do research on. You can look at so much – the patterns of a disease over time, such as TB or osteoarthritis, a disease of antiquity commonly observed in skeletons, and even diseases that people might think of as restricted to modern times, like osteoporosis.” says Ms Bekvalac. “It’s not just about learning about the past, it has implications for now and potentially for the future too.”

Centre for Human Bioarchaeology (including the Wellcome Osteological Research Database):

www.museumoflondon.org.uk/chb

• Get up close to some of the Museum of London’s most interesting human skeletal remains at the Skeletons exhibition at Wellcome Collection, which runs from 23 July to 28 September 2008.
In August 2007, Professor Malcolm Molyneux came to the end of his directorship of the Wellcome Trust's Major Overseas Programme in Malawi. He continues to work in the Malawi–Liverpool–Wellcome Trust Clinical Research Programme (MLW), and he reflects here on the achievements of the research unit in Blantyre, and the challenges that remain in Malawi.

“Two things that strike you immediately when you first arrive in Malawi are the cordiality of the people and the beauty of the country,” says Prof. Molyneux. “Very soon you realise how big the challenges are that communities face every day, and how resilient people are in making use of very limited resources.” His affection for the country began when he and his wife Elizabeth spent a decade from the mid-1970s to mid-1980s working as doctors in the south of the country, first in a mission hospital and then in the national hospital in Blantyre.

In 1995, after 11 years in Liverpool, he returned to Malawi to set up a research programme in Blantyre – to function as the principal overseas focus for the newly formed Wellcome Trust Centre for Research in Clinical Tropical Medicine at the University of Liverpool (which he established with his colleague Professor Peter Winstanley). “We wanted the programme to contribute to the livelihood of Malawi’s newly formed medical school, the College of Medicine (University of Malawi),” he says. “Patients at the hospital suffer from a huge burden of diseases that need improved understanding and improved care – both of which research can help to provide. Having an integrated research unit that is closely involved in the wards of the hospital allows the research to respond to local priorities. It contributes to good clinical practice as scientists and clinicians work together to find what can be done to improve people’s health.”

Training local doctors and graduates, Prof. Molyneux says, is key. “It’s a privilege to be involved in the nurturing of a strong cadre of locally trained experts. These are the people who will become the country’s health leaders in both medicine and research.” Some graduates have already begun research careers in clinical, laboratory or field disciplines, and many combine clinical specialisation with some research interest.

“For all, a major challenge is that they are pioneers – Malawians have not preceded them on this journey, and there are no well-trodden career pathways to follow.”

Tackling health issues
As in many other countries in Africa, malaria is a major challenge to Malawi’s healthcare system. It is responsible for 30 per cent of deaths in children under five, and 30 per cent of all hospital admissions. “We’ve been helping to tackle malaria in a number of different ways,” says Prof. Molyneux. “Working with the Ministry of Health’s national Malaria Control Programme, we have carried out a series of trials of existing and new antimalarial therapies – testing new artemisinin combination therapies for the treatment of malaria [these have now replaced previous therapies that were failing], assessing suppository treatment for severe malaria [of potential value at village level], and evaluating new possibilities for the control of both parasites and mosquitoes.” The team has now been awarded a Gates Foundation grant to look at the effects of rolling out artemisinin combination therapies on a broad scale in the population.

In addition to malaria, scientists in the Programme have been studying HIV, which affects 14 per cent of Malawi’s population (over 70 per cent of adults in the medical wards are infected). The research has concentrated on bacterial infections to which HIV-infected people are prone, especially Streptococcus pneumoniae, non-typhoidal salmonellae and tuberculosis. In all of these areas, the prospects for existing or possible vaccines have been high on the research agenda.

When their formal employments come to an end on New Year’s Day 2009, Prof. Molyneux and his wife hope to continue to work in Malawi, with the usual mixture of research, clinical practice and teaching. But they will also have more time off to visit grandchildren in Kenya and Britain and to enjoy music and mountains in Malawi and elsewhere.
Technology Transfer at the Wellcome Trust, a committed funder of translational research, is currently inviting preliminary applications for its Translation Awards funding scheme.

Translation Awards are open to projects from researchers at both academic institutions and companies. Projects must address an unmet need in healthcare or applied medical research, offer a potential new solution and have a realistic expectation that the innovation will be developed further by the market.

Funding areas include: diagnostics, enabling technology, regenerative medicine, therapeutics, vaccines and medical devices.

Upcoming deadlines for preliminary applications:

T: +44 (0)20 7611 8202
E: techtransfer@wellcome.ac.uk
www.wellcome.ac.uk/techtransfer/wn
Henry and Silas

It has long been thought that no photograph survived that includes both Wellcome and Burroughs. This picture – discovered through the cataloguing of the Wellcome Foundation Archives – proves that assumption wrong.

The image is of an outing made by the staff of Burroughs Wellcome & Co. (the pharmaceutical company the two men co-founded in 1880) to the Crystal Palace, Sydenham, on 14 July 1888. Wellcome is pictured standing in the row behind those seated, clearly identifiable by his luxurious moustache. Two places to the left of Wellcome is Burroughs, in a white peaked cap.

Burroughs Wellcome & Co. prided themselves on the care and attention they afforded their staff. Summer staff outings were a regular occurrence and the company would later open a Club and Institute for the benefit of employees when the company’s factory moved to Dartford in the 1890s.

Evidence suggests that during the formative years of the company, Burroughs was more directly involved in staff welfare and social activities than Wellcome. The Crystal Palace outing bears this out, as a programme of events for the day (which also survives in the Library archives) states that Burroughs was due to take part in the 100 yards dash for older staff – even offering the other competitors a six-yard start. (Wellcome’s name does not appear in the list of participants for any of the sporting events for the outing.)

Even though they had entered into partnership only eight years previously, by 1888 and the date of this picture, Burroughs and Wellcome’s business relationship had broken down. While the company continued to thrive, by the time of Burroughs’s untimely death in February 1895, he and Wellcome were said to no longer be on speaking terms.

The Wellcome Trust is the largest charity in the UK. It funds innovative biomedical research, in the UK and internationally, spending around £650 million each year to support the brightest scientists with the best ideas. The Wellcome Trust supports public debate about biomedical research and its impact on health and wellbeing.

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The Wellcome Trust’s mission is to foster and promote research with the aim of improving human and animal health. During 2005–2010, our aims are:

Advancing knowledge: To support research to increase understanding of health and disease, and its societal context
Using knowledge: To support the development and use of knowledge to create health benefit
Engaging society: To engage with society to foster an informed climate within which biomedical research can flourish
Developing people: To foster a research community and individual researchers who can contribute to the advancement and use of knowledge
Facilitating research: To promote the best conditions for research and the use of knowledge
Developing our organisation: To use our resources efficiently and effectively.

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