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The University of Manchester

Faculty of Life Sciences Newsletter

Issue 16, March 2010

Faculty Enjoys Royal Visit

The Faculty of Life Sciences enjoyed a Royal visit when HRH The Countess of Wessex came to see the work of The Healing Foundation Centre, which aims to advance the understanding of wound healing and tissue regeneration.

HRH The Countess of Wessex with Professor Enrique Amaya

The Countess is the Patron of The Healing Foundation and this was her first visit to one of their research centres to see the scientists at work. It was also her first ever visit to the University.

The Healing Foundation is a national UK charity that champions the cause of people living with disfigurement and visible loss of function by funding research into pioneering scientific, surgical and psychological healing techniques. Manchester's Healing Foundation Centre represents a 25 year, £10 million commitment between The Healing Foundation and the University, its ultimate goal to identify treatments that will improve the lives of patients with disfigurements, either congenital, or following accident and disease. As a first step towards this goal, the centre is investigating the mechanisms of wound healing and tissue regeneration at the most basic cellular, molecular and genetic level, using a variety of model systems, including frogs, mice and fruit flies.

Centre Director Professor Enrique Amaya said: "The visit was a smashing success. The Countess was very engaged and enjoyed her visit.

"We have met before, when I gave a presentation at a charity event she ran for The Healing Foundation at Buckingham Palace. My presentations have lots of videos, but seeing the work in the labs, looking down the microscopes, is very different, and more exciting."

The Countess was met at the entrance of AV Hill by President and Vice Chancellor Professor Alan Gilbert, Dean of the Faculty of Life Sciences Professor Martin Humphries and other dignitaries.

She was then taken by Enrique across the tunnel into the Michael Smith Building for a tour of the labs, meeting scientists and students in the Centre studying embryonic wound healing and tissue regeneration in frogs. Frog embryos and tadpoles have remarkable capacities to heal wounds and regenerate complex tissues. She also met new FLS faculty member Tom Millard, who is researching wound healing in fruit fly embryos. Fruit flies provide a powerful model to investigate the genetic basis of wound healing, in a system with strong genetic correlation to humans.

Tom has been joined by another new faculty member in the Centre Kim Mace, who is studying chronic wound healing associated with diabetes. Figures show that the NHS spends £600 million a year on treating foot problems in people with diabetes, and £252 million of this is spent on amputations, as result of poor healing.

Professor Amaya said: "We are looking to expand the centre further. We have the capacity to house 50 people and have half of that now. The work that we are doing is in its infancy, there's lots to be done, which makes it very exciting. We are recruiting groups with common interests in tissue repair and regeneration, and have collaborations with clinicians, so we can see advances in both our basic science work and its applications."

For more information on the Centre, which was formally opened by the Healing Foundation Lead Ambassador Simon Weston OBE in 2007, **see** http://personalpages.manchester.ac.uk/staff/enrique.amaya/healing.htm.

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Spin out company secures funding to develop cleaner coatings

University of Manchester spin out company Ai2 Limited, a developer of peptide coatings for medical application, has raised £250,000 from the UPF (the UMIP Premier Fund, managed by MTI).

Ai2 is developing an innovative peptide coating technology which is able to render medical devices and implants antibacterial, thus potentially reducing the frequency of infection, a serious clinical problem.

The new investment will enable the company to progress the technology platform and seek alliances and partnerships in specific applications, including contact lenses and wound dressings.

See www.a-i-2.com
www.umip.com
www.mtifirms.com

Lord Turnberg with Professor Daniel Zajfman and Chris Cox (University Director of Development)

Scientists celebrate 30 years of prestigious prize

Former winners of the Weizmann Prize for Biochemistry were reunited at the University to celebrate the 30th anniversary of the prestigious award.

The Weizmann Prize for Biochemistry is awarded annually to the best final year undergraduate in Biochemistry at the University. It is named in honour of Dr Chaim Weizmann, a former Manchester academic known as "the father of industrial fermentation".

Dr Weizmann was a Reader in Chemistry at Manchester when he became famous for discovering how to use bacterial fermentation to produce large quantities of organic chemicals, including acetone that was used in the manufacture of cordite explosive propellants critical to the Allied war effort.

Weizmann later became the founder of the state of Israel. He was elected as its first President on 1 February 1949, and served until his death in 1952.

Chaim Weizmann also founded the Daniel Sieff Research Institute in Israel, since renamed the Weizmann Institute of Science, now one of the world's top-ranking multidisciplinary research institutions. The Weizmann Institute has 2,600 students and staff and awards MSc and PhD degrees in mathematics, computer science, physics, chemistry, biological chemistry and biology, as well as several interdisciplinary programmes and youth programmes. Its academics include Professor Ada Yonath, winner of the 2009 Nobel Prize in Chemistry.

Former Weizmann Prize winner, now Vice President and Dean of the Faculty of Life Sciences, Professor Martin Humphries said: "We were very proud to mark 30 years of such an important award. I was honoured to win the award back in 1980, and as a consequence I have always felt a direct association with Chaim Weizmann. I want to thank Weizmann UK for their continued support of our undergraduate programme.

"I am particularly pleased that the Faculty of Life Sciences has now developed a number of strong research links with scientists at the Weizmann Institute, and I hope these links will expand and flourish. The Weizmann's commitment to scientific excellence and its well-earned successes make it a valued partner."

Professor Humphries and 13 other former Weizmann Prize winners were joined by the President of the Weizmann Institute Professor Daniel Zajfman. He said: "When Dr Chaim Weizmann arrived in Manchester in the summer of 1904, he was a young scientist, not yet 30 years old. Here he embarked upon the scientific career that would lead him to important discoveries and culminate in establishing the Weizmann Institute of Science. So it is fitting that the Weizmann Prize encourages young scientists at the start of their own quest for insight and impact."

See
www.weizmann.org.uk
www.weizmann.ac.il

Fiona Coll and Professor Alison Gurney

Flying high!

The Faculty of Life Sciences has won a Silver Athena SWAN award for its hard work and achievement in providing positive support for women working in science, engineering and technology (SET) at key career transition points.

This follows University-wide success when Manchester won a Bronze Athena SWAN in 2008.

The Faculty has shown commitment to changing the culture and gender balance in decision making and was applauded by the judging panel for its work on ensuring gender balance in the recruitment and development of staff.

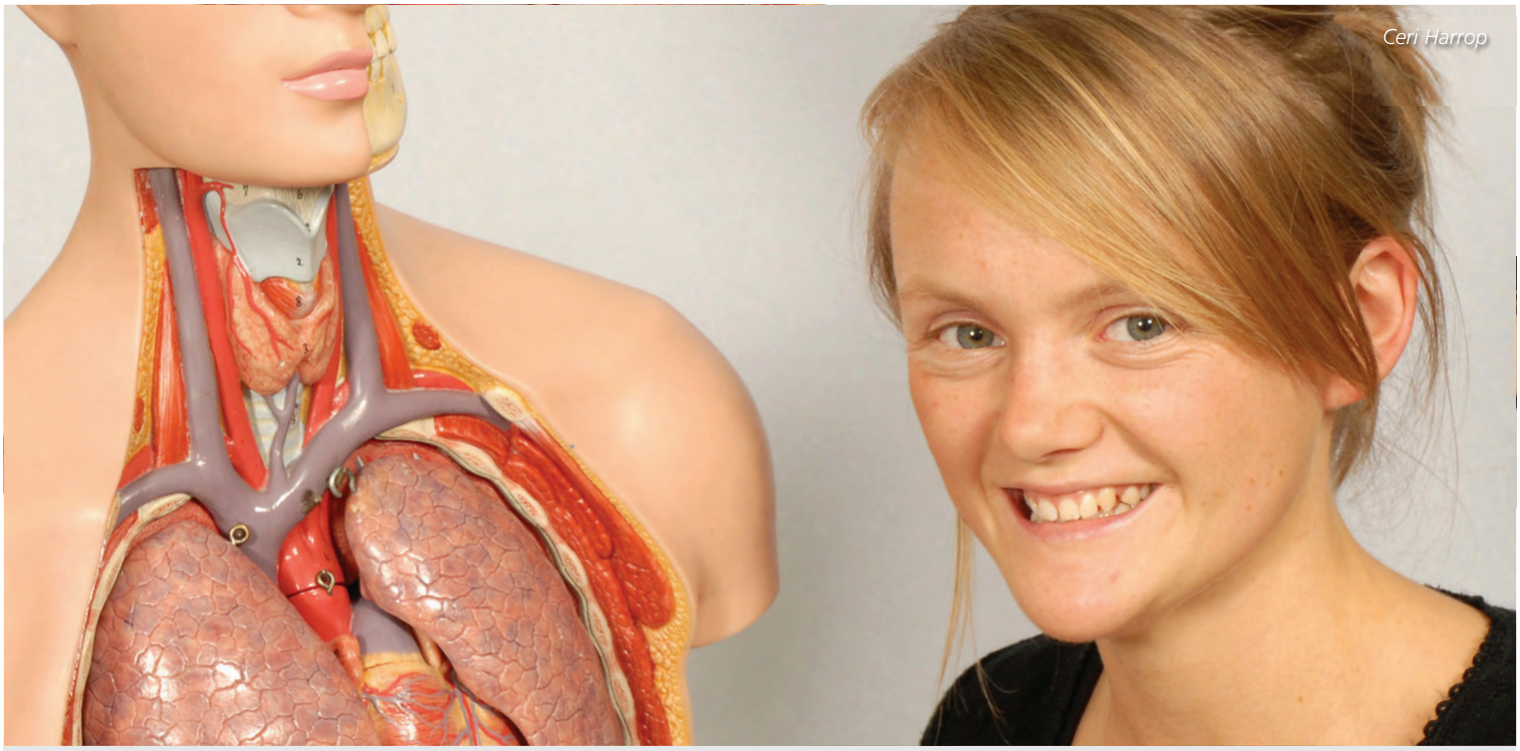
Professor Alison Gurney, representative of the Faculty on the SWAN Self-assessment panel, prepared the application after collecting, analysing and comparing key data on gender equality over the last three years. This included female staff and student numbers, the gender profile of staff at each grade and on decision-making committees, promotion applications and success, parental leave and flexible working. The group prepared an action plan to address remaining issues, such as the increasingly low proportion of female staff with increasing grade and the low numbers of women applying for promotion. The action plan will be rolled out over the next year.

Professor Gurney and the Faculty's HR Manager Fiona Coll collected the award at a ceremony at the Botanical Gardens in Birmingham.

Alongside the Athena SWAN Award, the Faculty has just launched a new website 'Women in Life Sciences – WiLS'. The Faculty is committed to developing a network and providing positive support for all female academic and research staff, administrative staff and students within Life Sciences.

It aims to encourage women throughout their career in Manchester, with the aim of increasing recruitment, retention and progression. Achieving this is part of a joint effort between the Faculty, employers, mentors and individuals.

See www.manchester.ac.uk/lifesciences/wils



Our rising star of science

A young scientist in the Faculty's Wellcome Trust Centre for Cell-Matrix Research has won a prestigious Society of Biology Science Communication Award.

Ceri Harrop's energetic efforts to bring science to the public include writing and presenting a short television series, presenting a radio show and working as an ambassador for her subject in the national EPSRC-funded New Outlooks In Science & Engineering (NOISE) campaign, as well as founding and chairing the Wellcome Trust Centre for Cell Matrix Research (WTCCMR) public engagement committee.

All this while developing a 3D in vitro model of the human airways to study how asthma and other respiratory diseases can lead to changes in the structure and function of the airways, in a study funded by the Dr Hadwen Trust, a charity that funds research to replace the use of animals in experiments.

The Society of Biology's Science Communication Awards, sponsored by Pfizer, recognise research-active bioscientists from UK universities or institutes who make an outstanding and consistent contribution to communicating science to the public.

Ceri, who won the award's New Researcher category, said: "The taxpayers, or charity donors, fund our research. It is public money and they have a right to know what we are doing with it. Plus I don't think we give people enough credit – they are interested in health, the environment and other science issues and we, as scientists, should make research accessible to the public.

"It's also both highly rewarding and enlightening to take your research to a different audience. It helps you see your work from a different perspective."

The Faculty's Vice President and Dean Professor Martin Humphries, who nominated Ceri, said: "In Manchester, we are dedicated to employing staff and producing graduates who are not only outstanding professionals but also informed, ethically aware, socially responsible citizens. The WTCCMR has responded to this challenge by elevating public engagement activity to a high priority, and over the last few years we have assembled a large network of lab staff and academics who now see PE as a core aspect of their job. Ceri has played the principal leading role in driving these developments. She is a very worthy winner of the Society of Biology Science Communication Award."

For more information see
www.wtccmr.manchester.ac.uk

Faculty plays key role in new web resource

The Faculty of Life Sciences, along with MIMAS and National Centre for Text Mining (NaCTeM), has had a key role in developing a new web interface to help researchers access and exploit over 1.7 million full-text, peer reviewed biomedical research articles and over 19 million other life science research papers.

Professor Simon Hubbard is Manchester's Academic sponsor on the project and sits on the programme board of UK Pub Med Central (UKPMC), which set up the new site, launched by Dame Sally C. Davies, Director General, Research and Development at the Department of Health. He also worked on some of its sub-projects with MIMAS.

Simon and fellow Manchester colleagues attended the showcase event at the British Library which launched a whole range of new search and data mining tools designed to unlock the scientific knowledge held by UKPMC. The speakers included Simon, Ingo Schiessl also from FLS and Manchester's Professor Doug Kell, who is also Chief Executive of the Biotechnology and Biological Sciences Research Council (BBSRC).

Developed in direct consultation with researchers, it aims to become the information resource of choice for the UK biomedical and health research community. The Open Beta version of UKPMC will enable researchers to search and link information from literature and drill down into underlying datasets in new and innovative ways, as well as link and manage their own grants and publications via an expanded Grant Reporting System.

See
www.ls.manchester.ac.uk/research/researchgroups/structuralandfunctionalsystems/
http://mimas.ac.uk/
http://ukpmc.ac.uk/

Dinosaur dressage

Dinosaurs have literally been put through their paces by a new supercomputer, allowing scientists to get closer to understanding how they once moved.

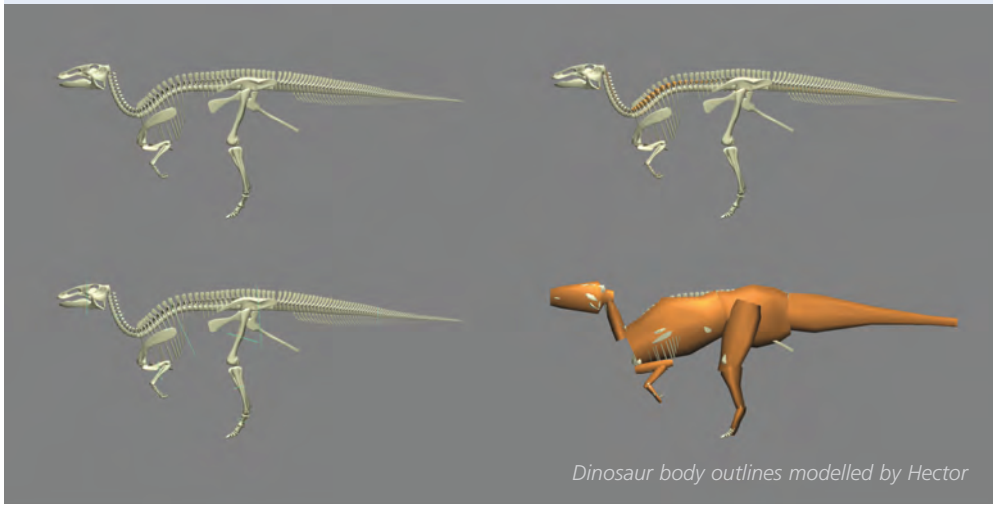
The team – from the Universities of Manchester and Oregon and Yale - set up the 'dinosaur dressage' with the help of Hector, the UK Research Council's supercomputer, currently the 20th fastest super computer in the world.

Dr Bill Sellers, at the Faculty of Life Sciences, said: "We found that hopping hadrosaurs were fastest but – for safety reasons – a two-legged running gait was most likely. In the same way that we can all muster a John Cleese 'silly walk' few can sustain it!"

The team, funded by National Geographic and The Natural Environment Research Council and whose results were published in Palaeontologica Electronica, has shown how more research can be done to find out how large and fast animals moved, both living and extinct.

In the meantime, Jurassic fanatics can simulate their very own dinosaur as the software (Windows, Mac, Linux) and models are freely available to download from www.animalsimulation.org.

Also see
www.ls.manchester.ac.uk/research/researchgroups/computationalandevolutionarybiology



Dinosaur body outlines modelled by Hector

Scientists reveal new pattern in our daily clock

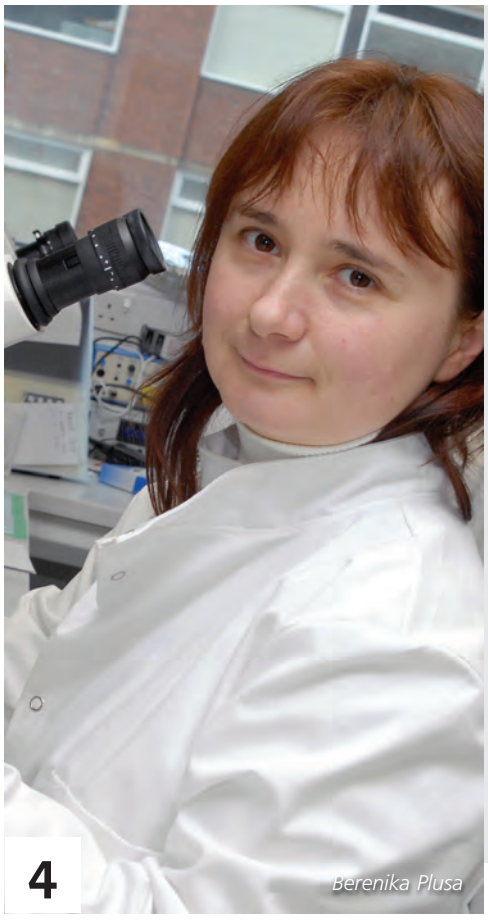
Our brain's daily clock encodes time in a complex pattern that was previously unknown, and not by simply increasing its activity as the day progresses, scientists have revealed.

The findings of their study, published in Science, turn a long-held theory on circadian rhythms on its head and mean that we may now be able to develop new drugs and approaches to tune the daily clock to treat sleep disorders and to aid recovery from long-distance flights.

The team – the Faculty of Life Sciences' Dr Hugh Piggins and Dr Mino Belle and the University of Michigan's Dr Daniel Forger and Casey Diekman– found that there were two basic types of neurons with very different electrical properties in the brain's daily clock. One type (per1) was able to survive at unusually high levels of excitability that would kill most neurons in the brain. They also showed a huge difference in their electricity level, or excitability, between day and night. The other type of cells had very different electrical properties and could not survive the levels of excitability displayed by per1 neurons.

On further examination the team found that the per1 cells appeared to be silent during the day because they had become so excited that they could not communicate in the typical way that most brain cells do. They had a lower, more easily traced excitability level in the morning and at dusk and were only truly silent at night. This flies in the face of accepted theory.

See www.ls.manchester.ac.uk/research/researchgroups/neurosciences



Berenika Plusa

Research Profile: Berenika Plusa

Berenika, currently a Manchester Fellow within the Faculty of Life Sciences, has had a productive career so far. After obtaining her PhD in Biology of Development, with a special award from the Scientific Council of the Institute of Genetics and Animal Breeding in 2000, she went on to undertake postdoctoral positions at the University of Cambridge, Department of Genetics and at the Memorial Sloan-Kettering Cancer Centre in New York.

Berenika was successful in obtaining a Manchester Fellowship in 2007, which offered five years support for salary and equipment directly funded by the Faculty. Since joining the Faculty, Berenika has had a period of maternity leave, and after returning to work, her research has continued to thrive within the laboratory despite the pressures of family life. She said: "I had excellent support from my husband and family once I came back to work, and it was great to get back into the lab again". Just before returning from maternity leave, Berenika secured a three year BBSRC grant to work on 'the roles of cell polarity and polarity proteins in cell fate decisions and epithelial development during primitive endoderm formation'.

The lab investigates various aspects of regulative abilities of early mammalian embryos using the mouse as a model organism. In particular, they are focused on understanding how the first cell fate decisions are made during preimplantation mammalian development and the role of cell-cell communication and cell plasticity in this process. Studying these early developmental decisions is vital for understanding normal development and important to shedding light on causes of early miscarriages and early pregnancy pathologies. Moreover, early embryos are sources of continually self-renewing embryonic stem cells, which can be induced to differentiate into specific cell types such as cardiac, neural or endocrine lineages in culture and thus offer enormous prospects in the field of regenerative medicine. Therefore, extending knowledge of the mechanisms underlying cell lineage specification and cellular reprogramming during normal development is not only crucial for understanding mammalian development but also for the advance of cell-based therapies of such diseases as diabetes or Parkinson's disease.

At the present Berenika's lab is concentrating on identifying the point during development when cells become irreversibly committed to the first three embryonic lineages and factors that contribute to these decisions.

See www.ls.manchester.ac.uk/research/researchgroups/developmentalbiology/

Survival of the cutest…

Domestic dogs have followed their own evolutionary path, twisting Darwin's directive 'survival of the fittest' to their own needs – and have proved him right in the process, according to a new study.

The study, published in The American Naturalist, compared the skull shapes of domestic dogs with those of different species across the order Carnivora, to which dogs belong along with cats, bears, weasels, civets and even seals and walruses.

It found that the skull shapes of domestic dogs varied as much as those of the whole order. It also showed that the extremes of diversity were farther apart in domestic dogs than in the rest of the order. This means, for instance, that a Collie has a skull shape that is more different from that of a Pekingese than the skull shape of the cat is from that of a walrus.

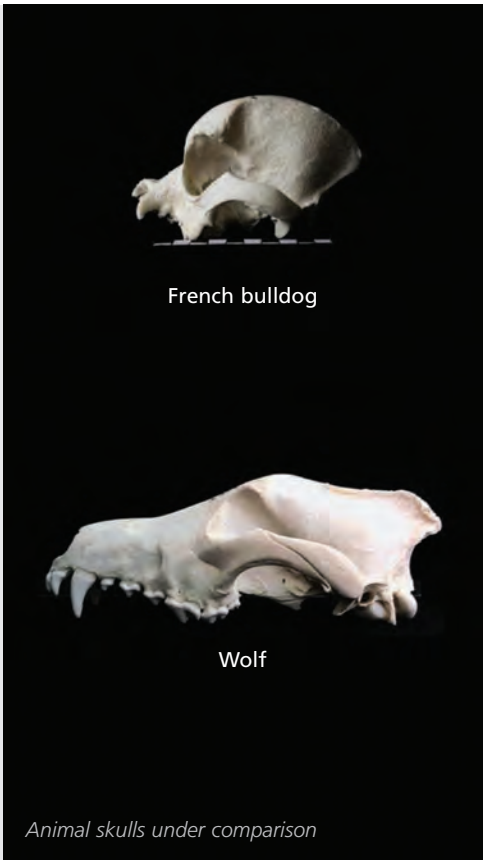
Evolution is usually a slow and gradual process, but the incredible amount of diversity in domestic dogs has originated through selective breeding, particularly after the modern purebred dog breeds were established in the last 150 years. By contrast, the order Carnivora dates back at least 60 million years. The massive diversity in the shapes of the dogs' skulls emphatically proves that selection has a powerful role to play in evolution. Much of the diversity of domestic dog skulls is outside the range of variation in the Carnivora, and thus represents skull shapes that are entirely novel.

Author Dr Chris Klingenberg, at the Faculty of Life Sciences, says: "Domestic dogs are boldly going where no self respecting carnivore ever has gone before.

"Domestic dogs don't live in the wild so they don't have to run after things and kill them – their food comes out of a tin and the toughest thing they'll ever have to chew is their owner's slippers. So they can get away with a lot of variation that would affect functions such as breathing and chewing and would therefore lead to their extinction.

"Natural selection has been relaxed and replaced with artificial selection for various shapes that breeders favour."

See
www.flywings.org.uk



Animal skulls under comparison

Enzyme that 'cleans' cancer cells

Scientists have discovered that an enzyme can rid cells of a gene believed to be responsible for a wide range of cancers.

Dr Jorg Hartkamp and Dr Stefan Roberts have found that the protease HtrA2 can "clean" cells of the oncogene WT1, which is found at high levels in many leukaemias and solid cancers such as breast and lung cancer.

Their work has given drug designers a new target which will allow them to develop treatments for all these cancers in which WT1 expression is elevated.

WT1 is a well-known factor in cancer, having been discovered 20 years ago. It suppresses the development of Wilms' tumour of the kidney, a rare cancer that affects one in 10,000 children.

However it has a cancer causing role in other forms of the disease, particularly leukemias such as acute myeloid leukaemia (AML) and chronic myeloid leukaemia (CML).

In addition high expression of WT1 is associated with a bad prognosis in AML patients, while trials using peptide vaccines against WT1 in patients with lung cancer, breast cancer and leukaemia were promising.

This latest study – published in the journal Molecular Cell and funded by the Wellcome Trust, Cancer Research UK and the Association of International Cancer Research (AICR) – is the first to identify the enzyme that can rid cells of WT1.

Dr Hartkamp, at the Faculty of Life Sciences, said: "We have filled in the black box of WT1. It is this protease that is doing the trick – it can clean cells of WT1."

Dr Roberts, who initiated the work at Manchester and is now at the University at Buffalo, added: "There are great prognostic implications in leukaemias but this protease may have even more targets. It is unlikely that a protease cleaves only one transcription factor such as WT1."

Gene discovery helps green goal

Faculty scientists have identified the genes that make plants grow fatter and plan to use their research to increase plant biomass in trees – thus helping meet the need for renewable resources.

"The US has set the ambitious goal of generating a third of all liquid fuel from renewable source by the year 2025. Estimates suggest to reach their goal they would need 1 billion tonnes of biomass, which is a lot," says Professor Simon Turner, whose BBSRC-funded study is published in Development.

"Our work has identified the two genes that make plants grow outwards. The long, thin cells growing down the length of a plant divide outwards, giving that nice radial pattern of characteristic growth rings in trees. So you get a solid ring of wood in the centre surrounded by growing cells. Now we have identified the process by which the cells know how to grow outwards, we hope to find a way of making that plants grow thicker quicker, giving us the increased wood production that could be used for biofuels or other uses.

"And there is an added benefit. There are concerns that the growing of biofuel products competes with essential food production. However, the part of the plant we have studied is the stalk – not the grain – so there will be no competition with food production."

Professor Turner and Dr Peter Etchells studied the plant Arabidopsis, particularly the growth in its vascular bundles, and found that the genes PXY and CLE41 directed the amount and direction of cell division. Furthermore, they found over-expression of CLE41 caused a greater amount of growth in a well-ordered fashion, thus increasing wood production.

The team are now growing poplar trees in the lab – to see if they fit the Arabidopsis model. They will use these results to develop a system of increasing wood production.

See www.ls.manchester.ac.uk/research/researchgroups/cellorganisationanddynamics

Major role in uk's top science festival

The Faculty played a major role in the Manchester Science Festival, the city's annual celebration of science, technology and engineering. With 100,000 delegates, it is now the UK's most popular science festival.

Its Centre for the History of Science, Technology and Medicine (CHSTM) sponsored three public talks by high-profile speakers Thomas Dixon ('Darwinism vs creationism: a very American conflict'), James Moore ('Darwin's Sacred Cause: Race, Slavery and Human Origins') and Patricia Fara ('Science: A Four Thousand Year History').

In addition CHSTM's Director Michael Worboys chaired an evening debate on the threat pandemics pose to society, how we are dealing with them and the measures in place for the future.

CHSTM researcher Kat Foxhall explained how nineteenth-century surgeons experimented with different remedies when scurvy broke out amongst prisoners, while Neil Pemberton described how leading nineteenth-century celebrity pathologist Bernard Spilsbury unravelled the mysteries of homicide.

Researchers on the CHSTM biomedical history stall included Julie Anderson, who displayed a selection of artificial limbs from different eras – and allowed younger visitors to design their own artificial limb! Vicky Long explained 1920s and 30s innovations to transform factories into healthy and pleasant working environments and allowed visitors to take vocational aptitude tests from the era. Michael Brown displayed nineteenth century surgical instruments from the Manchester Medical School Museum and discussed how anaesthesia and antisepsis made surgery safer.

At the Cornerhouse cinema, CHSTM lecturer David Kirby participated in a discussion on 'Thirst, Blood, Vampires and Science' following a screening of vampire film Thirst. CHSTM postgraduate Emily Hankin led a walking tour of the University and, in the congenial setting of the Lass O'Gowrie CHSTM lecturer James Sumner led a crowded audience through a light-headed stagger of scientific understandings of alcohol since 1600.

See
www.chstm.manchester.ac.uk

Julie Anderson (centre) shows youngsters an artificial leg


Michael Brown (left) gets into character

Revisiting a founding father…

The KNH Centre for Biomedical Egyptology has won two prestigious grants, one of which will revisit the work of anthropologist Sir Grafton Elliot Smith and set up a publicly available website on his excellent but as yet overlooked work.

The Wellcome Trust has given the team £160,000 to re-examine Smith's evidence from 20,000 bodies buried at Nubia, in research that never received the recognition it deserved. Smith, an academic at the Universities of Cairo and Manchester and UCL in the early twentieth century, started the study of disease in large populations and gathered extensive data just before Nubia was flooded by the building of the low dam of Aswan. The KNH team will work with the Natural History Museum to produce a host of new papers and set up the website.

The Leverhulme Trust has also awarded £58,000 to the KNH Centre for a study to see if health was related to status in ancient Egypt. PhD student and osteologist Iwona Kozieradzska will gather and examine evidence from extensive excavations at a cemetery at Sakkara.

Finally the KNH Centre hosted a successful day school discussing the scientific study of ancient Egyptian mummies, which included the question, was the great Pharaoh Ramesses II a true redhead?

Ramesses II - the third Egyptian pharaoh of the nineteenth dynasty - lived to the grand old age of 91 and is regarded as one of Egypt's greatest pharaohs. He became King in 1279 BC, when he was in his early 20s, and ruled for over six decades during which time his fame was extraordinary, it remained legendary throughout classical antiquity and today this remarkable pharaoh still holds an enduring fascination. As a builder he covered the land from the Delta to Nubia with buildings in a way no ruler had ever done before. He had many wives, fathered scores of children, and declared himself a god early on in his reign. On his death, he was buried in a tomb in the Valley of the Kings; his body was later moved to a royal cache where it was discovered in 1881, and is now on display in the Egyptian Museum in Cairo.

Professor Rosalie David, who lectured at the day school, said: "Even in death Ramesses II remains a fascinating figure. In 1974, Egyptologists noticed the condition of the mummy was deteriorating. They decided to fly Ramesses II's mummy to Paris for examination - and he was issued an Egyptian passport that listed his occupation as "King (deceased)".

The mummy was received at Le Bourget airport, just outside Paris, with the full military honours befitting a king. In Paris, Ramesses' mummy was diagnosed and treated for a fungal infection. During the examination, scientific analysis revealed the pharaoh's arthritis, poor circulation and appalling dental condition."

The day school also revealed how modern scientific investigations and archaeological research is helping to reveal more about the lives of other characters from ancient Egypt - Horemkenesi, high priest of Amun at Karnak; Meresamun, a temple singer; and Asetirikhetes, the Ptolemaic mummy from 305 BC.

Professor David said: "The day school was so well received last year that we decided to hold it annually. This year's agenda was just as fascinating. We are really enjoying putting the day schools together and thinking of new insights that fellow enthusiasts would want to know."

See www.knhcentre.manchester.ac.uk/

The science – and art of – forensics

The Faculty is hosting a conference on the science – and art – of Forensics.

The conference, to be held on 11 and 12 June, will feature the creators of the popular forensics dramas Silent Witness and Waking the Dead, Nigel McCreary and Barbara Machin respectively. Each responsible for attracting 6M viewers to the BBC, they will discuss screening forensics at an evening event.

The international event, sponsored by the Centre for the History of Science, Technology and Medicine (CHSTM) and the Wellcome Trust, will also feature William Haglund, the UN's chief scientific advisor at mass gravesites in Rwanda, Sierra Leone and the former Yugoslavia, while renowned US academic David Foran will cast doubt on Dr Henry Crippen's celebrated 1910 conviction for the murder of his wife.

Bookings for the conference are being taken from 1 March.

Organiser Dr Ian Burney said: "In the courtroom, in newspapers, and on our television screens, modern day forensics has never been so visible, so compelling and, in some respects, so contentious. This conference places the remarkable prominence of forensic science and medicine in contemporary culture in analytical and historical perspective."

Co-organiser Dr David Kirby added: "It brings together leading scholars from history, sociology and socio-legal studies, media and cultural studies, and practitioners working within the diverse spaces of forensic culture - from crime scenes and bio-medical laboratories to television studios. It will enable a genuinely cross-disciplinary conversation of interest to a broad audience of academics, forensic practitioners and the public."

To book a place or for more information see
www.chstm.manchester.ac.uk/newsandevents/conferences/forensics

Groundbreaking climate change research – at high school

Pupils from Manchester Academy are helping Faculty scientists in a two-year groundbreaking scientific study to accurately measure the important impact of trees in the fight against climate change.

Drs Roland Ennos and David Armson have calculated that a mere 10% increase in the amount of green space in built-up centres would reduce urban surface temperatures by as much as 4°C. This 4°C drop in temperature, which is equivalent to the average predicted rise through global warming by the 2080s, is caused by the cooling effect of water as it evaporates into the air from leaves and vegetation through a process called transpiration.

Their study will use nine i-trees plots along Oxford Road, each consisting of three 3m x 3m grids of tarmac, grass and a tree which are linked to monitoring equipment that gathers information on surface and air temperature, air quality and surface water run off.

And they have recruited three groups of pupils to be responsible for downloading the data from their plot and comparing the levels of rainwater run off and surface temperature for each of the different surface types. The pupils will also measure the level of harmful pollution that is absorbed by the trees leaves (and therefore taken out of the air).

The results will provide the data needed to demonstrate the multiple benefits of greenery to city and town environments. It is also hoped the study will be a useful tool to provide planners and developers with data to inform future developments Manchester so that enough green space is provided to help keep people living, working and visiting the City cool and comfortable as the climate changes.

Dr Ennos said: "It is generally accepted that trees and greenery help to reduce surface and air temperatures – that's why it is always cooler to stand beneath the shade of a tree, rather than a building. No one has accurately measured the size of this effect over a sustained period and against other types of surfaces. Our hope is that the results of i-trees will inform future tree planting in the city so we can start now to counter balance the increase in temperatures expected in the cities over the next 20 years caused by climate change.

"Involving the pupils from Manchester Academy in the project is really important, as they will be finding out first hand about climate change and its effects, and making a real contribution to the study and the future of Manchester."

Dr Joanne Smiles, science teacher at Manchester Academy said: "i-trees presents our students with a valuable opportunity to contribute to real scientific research. Furthermore, it is crucial that we involve young people in processes to combat climate change, as it is they who will pick up the baton and continue to find solutions".

See
www.ls.manchester.ac.uk/research/researchgroups/computationalandevolutionarybiology

Dr Roland Ennos (top left), David Armson (top right) with pupils, Tshepo Gaditswalelwe (left) and Mubariz Mujtaba (right)

Michael Brown (left) gets into character

News in Brief

New light on chlorophyll

Faculty scientists have discovered exactly how plants obtain energy from sunlight through chlorophyll production in a study that helps to explain the design and activity of all enzymes.

Professor Nigel Scrutton and his team have not only gained a more detailed understanding of the production of the most abundant and life sustaining chemical on Earth, they also expect to apply their findings to all enzymes thus allowing the design of novel clinical and industrial processes.

The study, published in the Journal of Biological Chemistry (JBC), also takes in quantum tunnelling, a newly discovered enzyme mechanism where they use energy to blast through rather than climb a chemical reaction.

See www.ls.manchester.ac.uk/research/researchgroups/structuralandfunctionalsystems/

Wonder weeds

Plants that cope better with changes in the environment – giving greater crop yields in the face of global warming – could be developed following a study into the weeds in the cracks in pavements.

Dr Giles Johnson and his team at the Faculty of Life Sciences have identified a protein that helps plants 'track' the environment and increase their capacity to photosynthesise (capturing light energy through the leaves which enables them to grow). This protein is produced according to the expression of a particular gene.

Some plants, including important crops, are less able to track their environment and are thus unable to cope with environmental changes. But if the team is able to help plants to respond to changes in their environment by traditionally breeding or genetically modifying them, crop yields could be increased, especially in vulnerable land.

Dr Johnson – whose study used thale cress, a common weed that is in the same family as cabbage and oil seed rape and was published in Plant Physiology – said: "Over the last 200 years, industrial society has transformed the atmosphere of our planet, increasing CO2 concentration by 50%. Climates are becoming warmer but, crucially, more unstable with increasing frequencies of extreme weather events such as droughts and heat waves – it is this variability of climate that poses most threat to agriculture. Even short periods of extreme weather can trigger crop failure.

"If we wish to secure food production, we urgently need to breed plants with an increased ability to tolerate change in their environment."

See www.ls.manchester.ac.uk/research/researchgroups/structuralandfunctionalsystems

Anne-Marie with her daughter Caity

Anne-Marie enthuses schoolchildren

Obituary: Dr Anne-Marie Buckle

Dr Anne-Marie Buckle sadly and unexpectedly lost her battle with cancer over the New Year.

Anne-Marie came to UMIST in 1995 having been head-hunted from SyStemix Inc., Palo Alto, to join the newly established Leukemia Research Fund Cellular Development Unit led by Tony Whetton. While working in California under the leadership of the world famous stem cell biologist Irv Weissman, she was a member of the original team that first isolated and characterised human haematopoietic stem cells. Following this ground-breaking work, the move to UMIST allowed her to develop her interests in understanding development of the human haematopoietic stem cell lineage.

While working in UMIST and subsequently The University of Manchester, she developed methods to establish haematopoietic stem cell lines from cord blood and study their differentiation in vitro. She explored the behaviour of developmentally important signalling pathways, in particular the Notch pathways, in the control of stem cell differentiation and lineage commitment. This led Anne-Marie to forge a number of exciting multi-disciplinary collaborations within the Manchester Interdisciplinary Biocentre (MIB). Working with Peter Fielden and Nick Goddard, her work established an experimental strategy for understanding the steps in stem cell development by mimicking the micro-niche in which stem cell maturation occurs in situ.

Anne-Marie's approach to science was always one of hard work, mixed with refreshing modesty and openness. But perhaps more than anything, it was her commitment and enthusiasm that made working with her such a joy. These aspects of her personality also defined her affection for disseminating knowledge to students of all ages. With Drs Jaleel Miyan and Elaine Spooncer, she won a curriculum innovation award from the Manchester Enterprise in Higher Education Centre for the introduction of new problem-based teaching methods in the UMIST molecular cell biology (or 'Biological Science') degree programme. She was exceptionally popular with students and knew how to connect with them, excite them, and propel them along the learning path.

These same skills made her a highly regarded, respected and valued research group leader, advisor, mentor and colleague. Anne-Marie was a full participant in the MIB ethos and was also well-known across campus, organising the very popular Stem Cell seminar series and many Women Into Science, Engineering and Construction (WISE) events. She was also involved in many events to engage school children with a range of science activities, such as a Royal Society funded week of science in Hayfield.

To commemorate Anne-Marie's commitment and enthusiasm for both teaching and research the Faculty of Life Sciences has established the 'Anne-Marie Buckle Memorial Prize' that will be awarded for the best final year student project in the general area of Cell and Molecular Biology.

The University sends its sincere condolences to her two children, Chris and Caity, and husband Andy.

New therapy hope

Scientists have revealed how a mutant gene that causes a connective tissue disease resulting in dwarfism does so by significantly affecting the inside of cells – opening up new therapy strategies that involve drugs already under development.

In disorders such as many forms of dwarfisms or brittle bone disease, mutations in genes for extracellular matrix proteins were thought to exert their pathogenic effects because of resulting defects in extracellular matrix. But Dr Mike Briggs, Professor Ray Boot-Handford and their team in the Wellcome Trust Centre for Cell-Matrix Research have shown in a series of recent papers that they also have significant effects inside the cell.

See www.ls.manchester.ac.uk/research/researchgroups/cellmatrixresearch

Editor's Note

If you have any comments or contributions for future editions of the Newsletter, please contact the Faculty of Life Sciences:

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