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The University of Manchester

Faculty of Life Sciences Newsletter

Issue 17, June 2010

NEW PIECE IN BURGEONING BIOPHARM JIGSAW

Winning applicants Prof David Clarke, Prof Alan Dickson and Dr Simon Merrywest

The University of Manchester is now host to the Centre of Excellence in Biopharmaceuticals (COEBP), completing the North West of England's leading biotech research cluster, engaging the world-wide revolution in pharmaceutical innovation through to translation into medicines in one of Europe's largest clinical academic centres.

Funded by the European Regional Development Fund (ERDF) and the Northwest Regional Development Agency (NWDA) with £4.6 million of capital and business engagement infrastructure, the COEBP was created to respond to understanding of the molecular basis of difficult to manage human diseases through technology advances stemming from the Human Genome Project, which has opened up development of new categories of biological medicines.

The production and development of biological medicines is vastly different to the processes used to generate small molecular weight chemically-based medicines, which led the basis of medicines in the last century, and whose decline has led to a seismic shift in focus for the pharmaceuticals industry.

Biological medicines act by replacement of the function of abnormal cells (eg insulin in diabetes patients) and by their exquisite specificity to diseased biology to provide treatments hitherto unseen.

However, while promising disease targeting with much higher success rates, the production and development of biopharmaceuticals is significantly more expensive of time and finance than small molecular weight pharmaceuticals, which must be overcome to realise the much greater commercial reward. In terms of market sales biopharmaceuticals occupy about 20 of the top 200 places for all pharmaceuticals (commercial "blockbusters") and encompass 25-40% of all pharmaceuticals in development.

The academic faculties of the COEBP in Manchester – from Life Sciences, Medical and Human Sciences, and Engineering and Physical Sciences – have the expertise, know-how and technology to guide and partner with the North West pharmabio cluster to become the international "go-to" loci in the UK for biological medicines emerging throughout the next decade and beyond.

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New Piece In Burgeoning Biopharm Jigsaw continued...

With expertise ranging from gene engineering to purification of biopharmaceuticals to formulation and delivery of biopharmaceuticals as new investigational medicines for patients, underpinned by major existing research centres, such as the Manchester Centre for Integrative Systems Biology, the Centre for Drug Safety Science with Liverpool and Manchester Academic Health Sciences Centre, the COEBP will provide an integration of activity across the North West and link our activities to those of the UK and internationally.

A major element of this project is the establishment of a unique robotics facility (located within the Michael Smith Building in the Faculty of Life Sciences) for the biopharmaceutical development process, to decrease risk of clinical failure by permitting the production of large numbers of samples for product quality characterisation under multiple conditions for screening their on and off-target biological activities. This platform will be available to industrial collaborators for specific product development and translation, whilst also offering the ability to undertake research that will enable a step change in understanding of processes that define a good or bad process event early in development.

Director Professor Alan Dickson explains: "The COEBP is the final piece of the biopharmaceutical jigsaw within the region, complementing existing commercial translational activities at the National Biomanufacturing Centre and other major biologics manufacturing facilities at Speke, while providing a hub for the interface between academia and industrial and SME sector.

"This integration of the NW sector provides a powerful lever for inward investment both from industry and public and charitable funding bodies, which will be used to directly develop and enhance the capabilities of the COEBP with industrial partners."

See **www.coebp.ls.manchester.ac.uk**

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Manchester Joins Green Dream Team

The Carbon Trust has invited three Manchester academics to join its "dream team" which will take on the world in the global race to develop a sustainable, cost-effective biofuel from algae.

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Dr Jon Pittman, at the Faculty of Life Sciences and Professor Peter Fielden, Dr Jeremy Hawkes and Professor Roy Goodacre, at the Faculty of Engineering and Physical Sciences, will lead two teams working alongside ten other leading UK institutions to find a winning formula for cultivating 70 billion litres of algae biofuel a year by 2030. This will be the equivalent to 6% of road transport diesel and a saving of over 160 million tonnes of CO_2 every year. The eleven institutions were selected from over 80 initial proposals following an extensive competition and detailed assessment process.

The Carbon Trust is investing £8 million over 3 years into the projects using funding from the Department for Transport and the Department for Energy and Climate Change (DECC).

Good Times For Top Toxicologist

Ian Kimber, Professor of Toxicology at the Faculty of Life Sciences, is enjoying interesting times.

He has been awarded the 2010 Bo Holmstedt Memorial Fund Lecture. This is awarded annually to an outstanding European toxicologist.

To mark the occasion he will present a lecture, Chemical and Protein Allergy: Progress, Opportunities and Challenges, at the International Congress of Toxicology in Barcelona in July.

Ian has also recently been elected Vice President and President-elect of the British Toxicology Society and will assume the Presidency in 2012.

Manchester Researcher Swats Fruit Fly Credibility

Fruit flies have a long and illustrious history in the lab. Used in research for more than a century, they provide cheap and plentiful case studies with a genome that matches to 75% of human disease genes.

However new research shows they are not the perfect model we would believe. Instead, step forward the humble and little known Keelworm.

Dr Tokiharu Takahashi, an Anatomy researcher at the Faculty of Life Sciences, explains: "Many people are using fruit flies or roundworms for their research as model invertebrates. They are useful as experimental 'tools' but they are not completely ideal 'models' – they are rather weird and derived species, not representing typical invertebrates in many respects.

"Our finding shows that the genome of fruit flies and roundworms have undergone substantial change in the form of extensive gene loss."

Dr Takahashi and Dr David Ferrier, University of St Andrews, whose findings were published in BMC Evolutionary Biology, analysed over 2,000 gene sequences from small segmented Keelworms. These are widespread annelids living in tubes commonly found on seashore rocks and belonging to a group distinct from both vertebrates and traditional model invertebrates such as flies and roundworms. They compared this gene set of Keelworms with those of model animals and found that Keelworms share more genes with vertebrates than do flies or roundworms.

Dr Takahashi adds: "It's not bad news for researchers though. Fruit flies have been, and will remain an important model system for life sciences in general. But our paper shows that using only fruit flies is not enough to get a whole picture of invertebrate biology and animal evolution."

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

Leading Light To Deliver Prestigious Lecture

Professor Dame Nancy Rothwell has been appointed President and Vice-Chancellor of The University of Manchester.

Dame Nancy was selected following an international search which produced an impressive shortlist of candidates. A distinguished Life Scientist, Dame Nancy has been a member of staff at the University since 1987 and Deputy President and Deputy Vice-Chancellor since 2007. She will take-up her post on 1 July 2010 succeeding Professor Alan Gilbert, who is retiring after six years.

Dame Nancy becomes the first woman to lead The University of Manchester or either of its two predecessor institutions.

Commenting on her appointment, Dame Nancy said: "I am honoured and delighted to be invited to lead the University at this exciting time.

"I am determined to maintain the strategic focus that we have developed over the past six years and to work closely with colleagues to identify new priorities and opportunities for the University in the very challenging external environment that we will face over the next few years."

Dame Nancy is also set to deliver The Physiological Society's annual public lecture at the University on June 30, the day before she takes up her new role.

Founded in 1876, The Physiological Society is a learned society with over 2,900 Members drawn from over 60 countries. The Society seeks to promote and support the study of physiology: the science of how humans and other animals function. Each year at 'Physiology' - its main meeting – it holds a public lecture designed to illustrate the importance of physiology and further its understanding by the general public and in schools.

Dame Nancy will speak about her well-regarded neuroscience research in a lecture entitled 'Tracking down killers in the brain'.

For more information visit **www.physoc.org**

A Blossoming Career

Faculty undergraduate Lin Taylor has won first prize for best poster at the Student Conference on Conservation Science (SCCS).

Lin, 21, in her placement year of Biology with Industrial/Professional Experience, was up against 100 students and won with a poster discussing the potential pitfalls of using herbarium specimens in plant conservation. Her project used Madagascan orchids as a case study.

Currently on placement in the orchid herbarium section of the Royal Botanic Gardens at Kew, she was speaking from experience. The orchid conservation projects she is working on include one looking at the use of herbarium specimens in IUCN Red List Assessments and another monitoring orchids being sold on the internet for CITES infringements.

Lin said: "I was very surprised and happy to win, especially as I feel that plant conservation often does not get the attention it deserves."

Senior Advisor Dr Liz Sheffield said: "Lin has continued her outstanding academic performance at Kew. When I visited her there, her supervisor was treating her like a second year PhD student and was full of praise, so I was unsurprised when I learnt of this prize, but completely delighted. Lin has blossomed into a confident and competent researcher and will I'm sure continue to do herself and our Faculty great credit."

The annual SCCS helps young conservation scientists gain experience, learn new ideas and make contacts that will be valuable for their future careers. Over the past 11 years, they have hosted more than 1,750 delegates from 108 countries worldwide.

See **www.sccs-cam.org**

Dr Kirby Shares The Airwaves With Dr Who

Our own Dr David Kirby shared the airwaves with Dr Who – former star of the show Colin Baker – thanks to his new role as the spokesperson for the Department for Business, Innovation and Skills' science campaign.

David explained how the sci-fi gadgets on film and TV could be closer than you think to listeners from Scotland to Cornwall when he and Colin launched "Science: So what? So everything" with a day of radio interviews.

David, an expert and author on the realities of cinematic and TV sci-fi technology from the Faculty of Life Sciences, said: "In the UK, many of us don't value science as much as we should, but it lives beneath the surface of everything we touch and taste. It's the key to our prosperity, one of the driving forces of our economy, and it creates thousands of jobs that keep Britain at the leading edge.

"This campaign aims to help people look again at science with a range of interesting science stories alongside opportunities to participate in science, through events, career advice or by doing their own science experiments."

See **http://sciencesowhat.direct.gov.uk**

RESEARCH PROFILE

Professor Kathryn Else

Kathryn, made a Professor of Immunology last year, has enjoyed a productive career in a field of research with a huge impact on our health and particularly that of people in the developing world.

Her interests centre on immunity to parasitic infection, most notably infection with gut dwelling helminths. Helminths are parasitic worms which date back to the time of the dinosaurs and have colonised humans for thousands of years. Currently one-third of humans carry worms which can result in anaemia, tiredness and general morbidity as well as colitis and rectal prolapse.

Her major contributions have been in three areas:

1. Defining the importance of T helper cell subset polarisation during parasitic infection.
2. Exploring the mechanisms of leukocyte recruitment to the gut post infection.
3. Defining the importance of innate cells in the regulation of the immune and inflammatory responses to gut dwelling parasites.

Her team is particularly interested in understanding how local stimulation of the immune system to precipitate worm expulsion is integrated with anti-inflammatory signals to avoid host damaging pathology, with a focus on the roles played by macrophages and nuclear hormone receptors. In the absence of effective vaccines against human helminth infections these studies may support the principle of delivering nuclear hormone receptor ligands, such as simple vitamin A metabolites, to control morbidity alongside de-worming programmes and has recently attracted a £500,000 grant from the Wellcome Trust. Through common scientific interests revolving around inflammation, Kathryn also works closely with Professors Andrew Loudon and David Ray, in a partnership between The University of Manchester, the NIHR Manchester Biomedical Research Centre and GlaxoSmithKline (GSK), investigating how our biological clock controls inflammation in lung diseases.

Kathryn began her career at the University of Nottingham, obtaining a first class honours degree in Zoology in 1985, a Post Graduate Certificate in Education in 1986 and completing her PhD in 1989, focusing on aspects of immunity to intestinal nematode parasites. She continued to pursue this interest at Manchester, first as an MRC post-doctoral training fellow (1989) with Professor Richard Grencis, then a Wellcome Trust Fellow (1992), a Wellcome Trust Senior Research Fellow in Basic Biomedical Science (1995) and a Senior Lecturer (2007).

For key publications and other information see:

www.ls.manchester.ac.uk/research/researchgroups/immunologyandmolecularmicrobiology

Early Bird Was No High Flier

The evolution of flight took longer than previously thought with the ancestors of modern birds "rubbish" at flying, if they flew at all, according to a Manchester scientist.

Archaeopteryx, the theropod dinosaur believed to be the earliest bird, was discovered 150 years ago but debates about how flight evolved still persist. The two theories are that flight evolved in running bipeds through a series of short jumps or that Archaeopteryx leapt from tree to tree using its wings as a balancing mechanism.

Dr Robert Nudds at The University of Manchester's Faculty of Life Sciences is carrying out a series of biomechanical investigations to shed light on the subject with his colleague Dr Gareth Dyke at University College Dublin.

For their latest paper Dr Nudds and Dr Dyke applied a novel biomechanical analysis to the flight feathers of the early birds Archaeopteryx and Confuciusornis to find out if they were strong enough to allow flight.

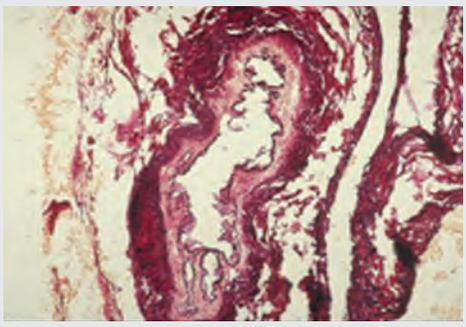
They found that the dinosaur feathers' much thinner central stem (rachis) must have been solid or they would have broken under the lift forces generated during flight or by gusts of wind. This solid structure is very different to modern birds, whose rachises are broader, hollow straws. If the dinosaurs' feathers had had hollow rachises, they would not have been able to fly at all.

"These are surprising results," says Dr Nudds, whose controversial findings were published in Science.

"I thought the feathers would be strong enough with a hollow rachis to fly but they weren't. Even with a solid rachis, they were not very good. These dinosaurs were rubbish at flying.

"This pushes the origin of flapping flight to after Archaeopteryx and Confuciusornis. It must have come much later."

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



Food Of The Gods Is A Killer

The splendid banquets offered to ancient Egyptian gods may have been delicious and bountiful but they were also a killer, blocking the arteries of the high priests who made the offerings in the temples then took them home to their families.

A team of scientists at the Faculties of Life Sciences and Medical and Human Sciences have for the first time combined a new translation of hieroglyphic inscriptions on Egyptian temple walls that give details of the food offered daily to the gods with computed tomography of the mummified remains of priests to assess their atherosclerosis.

They have found that the priests would offer the gods sumptuous meals of beef, wild fowl, bread, fruit, vegetables, cake, wine and beer at the temple three times a day, then take them back home to their families. They also found their mummified remains showed high levels of atheromatous plaques and vascular calcification; that is, blocked arteries.

Author Professor Rosalie David, of the KNH Centre for Biomedical Egyptology in the Faculty of Life Sciences, said: "There couldn't be a more evocative message: live like a God and you will pay with your health.

"It also shows that blocked arteries caused by rich diets are not just a modern malaise – the problem goes back to ancient civilisations."

Co-author Professor Tony Heagerty, of the Cardiovascular Research Group, added: "There is unequivocal evidence to show that atherosclerosis is a disease of ancient times, induced by diet, and that the epidemic of atherosclerosis which began in the 20th century is nothing more than history revisiting us."

Fittingly, Professors David and Heagerty started working on the study – published in The Lancet – after sitting next to each other at a Professorial dinner and talking about diet and health through the ages.

See **www.knhcentre.manchester.ac.uk**

Scientists Clock On To Patterns Of Behaviour…And Disease

Studies on the body clocks of two very different animals – Arctic reindeer and Soay sheep – have given important insights into the health of humans and patterns in disease.

The body clock, or circadian clock, is the internal mechanism that drives hormone rhythms – and thus a host other functions – in a rhythmic 24-hour fashion.

Professor Andrew Loudon at the Faculty of Life Sciences said: "A lot of our behaviour is controlled by seasons. This research sheds new light on how animals adapt to seasonal change, which impacts on factors including hibernation, fat deposition and reproduction as well as the ability to fight off diseases."

Professor Loudon and his colleagues at the University of Tromso, in Norway, found that Arctic reindeer have 'switched off' their body clocks in order to survive the extreme Arctic seasons of polar day, when the sun stays up all day, and polar night, when the sun does not rise above the horizon at all.

In another study, Professor Loudon and colleagues at Edinburgh University discovered two body clock genes that reveal how seasonal changes in hormones are controlled and could ultimately help find treatments for seasonal affective disorder.

The team studied Soay sheep, a breed which dates back to the Bronze Age and is considered to be one of the most primitive with seasonal body clocks unaffected by cross breeding throughout the centuries.

They also found that one of the genes (EYA3) has a similar role in both birds and mammals, showing a common link that has been conserved for more than 300 million years.

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

Flag Has Ladies All Of A Flutter

Scientists have revealed how the male common snipe 'flies the flag' to get the girl.

A new study – using high speed video and feathers bought on ebay – shows that when the male snipe sticks out his outer tail feathers, they flutter like flags in the wind, producing a highly seductive drumming sound. The winged Lothario also dives to increase the speed and therefore raise the pitch of the call in a bid to impress the female of the species.

The acoustic communication of birds has been widely researched as it is clear that it plays vital roles in key behaviours. Most of this work has been on vocal sound production. However there have been several attempts to demonstrate the aerodynamic mechanisms responsible for the distinctive drumming produced by the snipe.

This latest study, by Drs Roland Ennos and Jonathan Codd and their team at The University of Manchester's Faculty of Life Sciences, is the first to observe deformations of the feathers as they produce the actual sound, and the first to describe feathers that are specially designed to flutter like flags in the wind.

The team, whose findings were published in the Journal of Experimental Biology, compared how fast the vane actually fluttered with predictions of how fast ideal hinged plates would do so, and found excellent agreement between prediction and experiment.

To see film footage of the feather in the wind tunnel, visit **www.manchester.ac.uk/aboutus/news/display/?id=5678**

New Study To Show How Our Body Clock Controls Disease

New treatments for inflammatory lung diseases and a host of other conditions could be developed following a Faculty study into the impact of circadian rhythms, or "body clock".

In a partnership between the University of Manchester, the NIHR Manchester Biomedical Research Centre and GlaxoSmithKline (GSK), a team of scientists will investigate how our biological clock controls inflammation in lung diseases such Chronic Obstructive Pulmonary Disease (COPD). It is hoped that this project, worth more than £500,000, will lead to the development of new drugs which will target how the internal body clock regulates the severity of inflammation. The Manchester team is headed by Professors Andrew Loudon, David Ray and Kath Else, and they will work closely with colleagues in the Discovery Biology group at GSK.

Inflammatory diseases of the lung are a major cause of mortality world-wide. In the case of COPD, the progression of this inflammatory disease is irreversible once commenced. In the UK 27,478 people died as a result of COPD in 2004. Other diseases with an inflammatory aspect include asthma, which is a predisposition to chronic inflammation of the lungs in which the airways are reversibly narrowed. This disease affects 300 million people worldwide.

In order to develop the drugs, the team will first study the mechanisms whereby the circadian clock controls the magnitude of the local inflammatory response; that is, the genes and pathways that connect the clock to the cells responsible for the immune response in the lungs.

Professor Loudon, of the Faculty of Life Sciences, explains: "We are working with GSK not only to develop new drugs to alleviate symptoms but also reveal optimal timing of therapy, known as chronotherapy. This is a new and exciting area of research. It is being taken very seriously in France, for example, where researchers have for some time been studying the importance of timing of chemotherapy in cancer."

Faculty Members And Sir David Launch New Society Of Biology

Two of the Faculty's academics shared the stage with renowned naturalist Sir David Attenborough when they attended the launch of the Society of Biology.

Professor Dame Nancy Rothwell and Dr Ceri Harrop spoke at the launch, along with Sir David and Nobel-prize winning biologist Sir Paul Nurse.

The Society of Biology has been founded as a single unified voice for biology: advising Government and influencing policy; advancing education and professional development; supporting our members, and engaging and encouraging public interest in the life sciences. Created by the unification of the Biosciences Federation and the Institute of Biology, it has a diverse membership of over 80,000 - including, students, practising scientists and interested non-professionals - as individuals, or through the 68 Member Organisations.

Dr Harrop, who was asked to speak after winning the Society's Science Communication Award (New Researcher), said: "Having agreed to talk at the Society of Biology launch, I was overwhelmed when the other confirmed speakers were Sir Paul Nurse and none other than Sir David Attenborough...what an honour! From his tales of collecting butterflies as a child to travelling the globe, Sir David's fascination, knowledge and passion for the natural world are infectious, and to join in conversation with one of my lifelong heroes was a real joy."

Professor Rothwell, who is President of the Society, said: "The creation of the Society of Biology was driven by the need for a single voice to represent the UK's broad interest and expertise in biological sciences. The output of biology-based research has a huge impact on the UK's economy, and it is essential that the government continues to support bioscientists at all stages of their careers, from the classroom to the laboratory and including the many 'amateur biologists'."

Dr Ceri Harrop (centre) with Sir Paul Nurse and Sir David Attenborough

Science With A (Big) Bang!

Faculty staff and students took an inspiring message – that science is exciting and fun – to more than 22,000 children and teachers at the Big Bang Fair.

The postgraduate students and their mentors received excellent feedback on the success of their workshops at the three-day event.

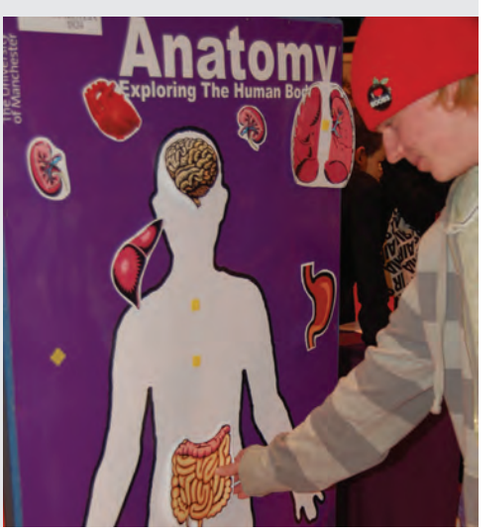
They included the session Plants that Bite Back. Senior Teaching Fellow Amanda Bamford and colleagues put on a magnificent display of carnivorous plants from the Faculty's Botanical Gardens including Venus fly traps, Sundews, Sarracenia and Nepenthes pitcher plants. The activities highlighted the evolution of carnivorous plants, as well as how plants move and catch their prey. Visitors used a high- tech digital microscope to examine in detail the trigger hairs of Venus Fly traps and take close-up photos. They also used the microscope to identify the contents of a pitcher trap (beetle legs, fly heads etc…!) The question of how sticky is a Sundew sticky trap was also explored. All ages said how much they enjoyed the display especially the Venus Fly Trap feeding times!

Another session, CSI Manchester, saw PhD students and Greater Manchester Police show youngsters the work of Forensic Laboratory Officers, Fingerprint Officers and Crime Scene Investigators. The children were shown how to set the crime scene, discuss evidence, dust for fingerprints and extract DNA. Ellen Forty, currently a third year PhD student working in Nick Ashton's lab, ran this workshop as part of her Widening Participation Award from the University.

The anatomy stall – Exploring the Human Body – proved extremely popular, thanks to the enthusiasm and stamina of Anatomy Teaching Fellow Bip Choudhury and his team, as well as the striking activities. Most visitors managed to pin the organ in the correct position on a life-sized body outline and budding Da Vinci's – an anatomist amongst other things – astutely noticed the lack of the spleen and pancreas which was left out to provide a talking point. The free white t-shirts on which to draw on the thoracic and abdominal organs went down well. But the showstopper was undoubtedly the real sheep hearts. Small gloved hands closed around the hearts as the children enthusiastically felt, squashed, poked and weighed them. They learned about the consistency of the hearts and put their fingers through the vessels and chambers. Their comments ranged from "Are those real?" to "Can I feel it?" to "I'm not touching that. I'm a vegetarian!"

The Worm Wagon showed the school children how our bodies deal with parasitic infection with the close-up horror of how worms manage to stay in the gut despite the flow of food and waste. Using specimens provided by the University of Salford, video, animation and hands on activity, the children were also taught about the constant wriggling of whipworm in the gut epithelium, against the natural cell renewal process (just like running down an up escalator). They particularly enjoyed pulling worms out of a bucket of 'mucus' to demonstrate the importance of mucins in gut defence, which was based on recent publications from the Grencis and Thornton research groups.

See **www.thebigbangfair.co.uk/home.cfm**



Sugar-Coated Science

Faculty academics showed the sweet side of science at Manchester Museum's hugely popular Chocolate Day.

Amanda Bamford and Alexa Jeanes helped children experiment with chocolate and colourings at their stall entitled "Chocolates: using colours from Nature".

Visitors investigated whether colours were natural or artificial and which colour came from which plant by examining the pigments in Smarties and M&M's. They also measured and compared the absorption spectra of the sweets' pigments in order to compare the spectra of natural and artificial colours.

Dr Bamford said: "Did you know that blue Smarties are coloured using a photosynthetic pigment called phycocyanin, derived from the cyanobacteria Spirulina? Chocolate lovers of all ages enjoyed the activities and as there were 2,200 visitors that day, we were very busy…although that might have been the chocolate fountain next door!"

News in Brief

Important New Step In Protein Production

Scientists have identified an extra step in protein production, a major activity of all cells, which they believe impacts particularly on how our cells respond to stresses such as starvation and virus attack.

Drs Graham Pavitt and Martin Jennings, at the Faculty of Life Sciences, have found a new function for a protein, called eIF5, which is critical for appropriate and normal control of the protein production process.

Protein production (or synthesis) takes place within ribosomes - complex structures made of RNA and proteins - and is facilitated by a number of accessory factors that enhance its rate and tightly control the whole process, which is central to all cell activities. Changes that alter protein synthesis control can lead to obesity, diabetes and even altered memory functions within the brain. In addition viruses use our protein synthesis pathways to produce more viruses. The infected cells try to shut down protein synthesis and prevent production of new infectious virus.

The new findings, whose findings were published in Nature, show that the protein synthesis factor eIF5 not only promotes protein synthesis by activating a second factor (called eIF2), it also has a second function which locks eIF2 in a 'switched-off' state; that is, it regulates the overall process as well as activating it.

See **www.ls.manchester.ac.uk/research/researchgroups/rnaandproteincontrolsystems**

'Wonder Gene' Found To Affect Blood Pressure

Scientists have identified an important gene that regulates the function of the muscle cells in arteries and thereby helps determine blood pressure. Dr Paolo Tammaro and his team at the Faculty of Life Sciences hope their work will help the pharmaceutical industry to design novel blood-pressure lowering drugs.

High blood pressure is the most common cause of diseases of the heart and arteries, including heart attacks and strokes. In the UK alone, high-blood pressure affects more than 16 million people.

Dr Tammaro, whose findings were published in the Journal of Physiology, explained: "Blood pressure is regulated by the diameter of the arteries via muscle cells in the wall. We knew that specialized proteins in the muscle cell membrane known as CaCC ion channels were fundamental in controlling this contraction. However, the gene coding for these proteins has been unknown. Now we have identified it as TMEM16A.

"For many years, the CaCC channels were known to be involved in a lot of different processes in the body such as controlling the secretion of fluids in the lungs and regulating how the heart beats. We now know that the gene in this system is also present and operates in human arteries."

See **www.ls.manchester.ac.uk/research/researchgroups/channelsandtransporters**

Living Window On Blood Vessel Growth Gives A Host Of New Drug Targets

See-through zebrafish have helped scientists find new drug targets to stop the growth of cancerous tumours and combat a range of other conditions including degenerative eye disease.

The team, from the Universities of Massachusetts and Manchester, used fluorescent proteins to trace blood vessel growth in the transparent zebrafish and were able to watch the process in real time in a living organism where flow was disrupted. This helped them to identify the genetic pathway by which blood flow regulates vessel growth.

Angiogenesis – where new blood vessels grow from pre-existing vessels – is a normal and vital process in growth and development, as well as in wound healing. It also creates new channels when existing ones become blocked, as in coronary artery disease), and is key to the development of many diseases such as cancer and degenerative eye disease.

The study, published in Nature, shows that blood flow activates expression of the gene Klf2a, triggering expression of a micro-RNA molecule miR126, which in turn led to the growth of new blood vessels through inhibition of Spred1. When Klf2a was knocked out in mutant zebrafish, the blood vessels did not grow. Blood vessel growth was restarted by restoring expression of MiR126 using reagents supplied by the Manchester group.

Dr Adam Hurlstone, at the Faculty of Life Sciences, said: "Manchester was very pleased to take part in the study. We had a small but essential role – our novel reagent proved how important this pathway is."

See **www.ls.manchester.ac.uk/research/researchgroups/molecularcancerstudies**

Service of Thanksgiving

The University of Manchester has paid tribute to the public-spirited people who have donated their bodies for the teaching of anatomy to its medical, dental and science students in the past academic year with a Service of Thanksgiving. It was the third such Service and the first at its new venue, on campus, the Whitworth Hall. Each year the University accepts about 40 bodies of people from the Manchester area who have indicated prior to their death that they wish to donate their bodies for this purpose. The Service is unrelated to the final committal or funeral service of any individual, but, rather, is intended as an opportunity for the public-spirited actions of the donors to be acknowledged. It is non-denominational and members of the congregation do not need to be of any particular religious affiliation or, indeed, to hold any religious belief, to attend the Service. Professor of Anatomy Alan Crossman said: "The body donors' selfless and public-spirited actions benefit the education of around 2000 students each year. The Service of Thanksgiving has become an annual event and was attended by current students, academic, administrative, postgraduate and support staff, senior University representatives, senior civic officials and clergy, as well as relatives and friends of the deceased. From the feedback we received, it is clear that the Service was greatly appreciated by those close to the donors."

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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