

Before the fear factor sets in

TY programmes in Trinity's science labs are laying ground for future of economy

By Luke Maishman
Science Editor

FOR MANY of us 'Science' is a world of young, spotty men in white coats or greying and unintelligible decrepit geniuses. An illusion unfortunately reiterated by the popular media and hardly helped by our unimaginative science teaching at primary and secondary level. But, whether we like it or not, science is becoming an ever more important part of industry. This is why we need to address our fears and build the "world class research base" envisaged by some of our politicians.

An inspired effort in this area is the Transition Year programmes which run in many of our science departments in College. Secondary school pupils, who are about to chose their Leaving Certificate subjects - choices that will affect their career decisions for the rest of their lives, get a chance to see real life science research in some of the top academic labs in the country.

During the two-week break after Hilary Term I met two pupils who have

"a fantastic opportunity to make more and better scientists"

been taking advantage of this little-known opportunity. Ruth Murphy spent two weeks getting an idea of what research science is like in the School of Biochemistry and Immunology, while her friend Anna Mealy learnt about animal behaviour and parasites in the Department of Zoology.

Ruth spent two weeks in the Comparative Immunology lab headed up by Professor O'Farrelly. She is particularly grateful for the efforts of the lab team, including Fernando Narciciandi, who demonstrated simple but interesting experiments for her. These included extracting DNA from a cheek-swab and watching the growth of bacteria on agar plates over a few days. As Ruth notes "just simple experiments, but they still kind of gave me a feel for what it might be like working in Science." She was glad to have done the placement, going so far as to say that she would do another one next year in a different area of science, if only she had the opportunity!

Anna was also very positive about her

placement in the zoology lab. She has enjoyed a diverse range of activities, from attending lectures on animal behaviour to visiting Dublin Zoo. She tells me that her opinion of zoology in particular has been affected by the placement and declares that she is now enthusiastic about going on to study science: "I'd say I will, especially after this week, it's just been brilliant!" Positive results indeed, considering Anna spent only two weeks in Trinity and prior to her placement "wasn't too keen on [zoology]".

How can we make these programmes more influential? Andrew Lloyd, a post-doctoral researcher who has taken an interest in the programmes, thinks that the best investment that can be made in this system is a government grant scheme for the applicants. He notes that the level of science and maths in the secondary school curriculum has slipped over the last fifty years, and exclaims "transition years have not even a 'Time Magazine' level of understanding of [science]". Andrew describes the transition year programme as "a fantastic opportunity to make more and better scientists to drive forward Ireland's aspirational knowledge economy."

Meanwhile, school and faculty heads are recognising the worth of these programmes. Professor Mills, head of the school of Biochemistry and Immunology, describes this school's programme as "a very useful means of enthusing second level students about science" He goes on to state that, "career prospects in Science are still very good in Ireland".

Professor Williams, Dean of the Faculty of Engineering, Mathematics and Science, notes "these interactions are invaluable to allow second-level students to become exposed to Science, Engineering and Technology ... [on] which this country is becoming more and more dependent in the 21st century." Apparently a funding scheme is being started within the faculty to support such initiatives.

But can we say that this is enough? In the current economic downturn the government is cutting back everywhere. But efforts such as this could be made much more effective very cheaply through a small grant scheme. This kind of cost-effective, 'intelligent thinking' solution is exactly what's needed when cash runs short, to ensure that we have an economy worth looking forward to when the rebound starts.



Ruth Murphy and Anna Mealy in the lab where Ruth spent her placement.

Immune attack

By Ruth Murphy
Special Contributor

IMMUNE ATTACK is an educational, slightly addictive computer game based on the immune system of the human body. You are the commander of a small metal pod, which travels around the blood vessels inside the body. The object of the game is to help find and destroy the deadly bacteria pseudomonas, which is rapidly making copies of itself. As you float in the blood vessel, white blood cells such as neutrophils, T-cells and B-cells; and red blood cells drift past you. To get more information on the cells' functions and features, all you have to do is click on them as they go by.

Your first task is to collect a drone data pack, which is located in a blood vessel in the ear. This pack helps you to complete your mission. Your second task is to navigate to the site of the infection. When you get there you must mark the selectins and the ICAMs, which attract

and guide the white blood cell monocytes and help them to pass from the blood vessel into the tissue, where they change into bacteria-eating macrophages. This is called transmigration. As the game continues, you get closer and closer to destroying the bacteria until, (if you're skilled!), you succeed.

I definitely learned a lot about the immune system through playing this game, without even realising it. Even as the game is loading before it actually starts, interesting facts about white blood cells and infections appear on the screen. Steering the ship is quite difficult, it requires practise! The sound effects are good, but sometimes they are too loud and it's hard to hear your instructions. Overall I think 'Immune Attack' is really fun, and you learn about your immune system while playing it.

Ruth Murphy visited Trinity at the end of Hilary term on the Transition Year programme of the School of Biochemistry and Immunology.

IN BRIEF

LUKE MAISHMAN

TCD

ENGINEERS UP EARLY FOR FIRST EVER EMS DAY



THE FIRST EMS day (Engineering, Mathematics and Science day) was held last Wednesday (15 April). Similar in principle to Med day, this event aimed to raise money for charity. Such was the enthusiasm and dedication to the event amongst the student body that volunteers were out collecting as early as 8am, despite the downpour that morning.

ECO FRIENDLY

ELECTRIC CARS FOR BRITISH DESPITE RECESSION

THE BRITISH Government has announced plans to subsidise the purchase of electric cars in the UK. Motorists will be offered £5,000 against the cost of an electric or plug-in car, which can be as cheap as £8,000 in total. The £250 million plan to promote low-carbon transport over the next five years also includes provisions for the installation of charging points, and further investment in infrastructure.



INTERNET

WEB FILESHARING PIRATES PUNISHED IN REAL LIFE



FOUR MEN have been sentenced to a year in jail and ordered to pay £2.5 million in damages for their involvement in Pirate Bay, a free online filesharing site. The men were found guilty of breaching copyright law in Sweden on 17 April 2009. The site is used by 25 million people world-wide. The accused are planning to appeal, and stated that The Pirate Bay would continue to operate despite this verdict, using computers in other parts of the world if necessary.

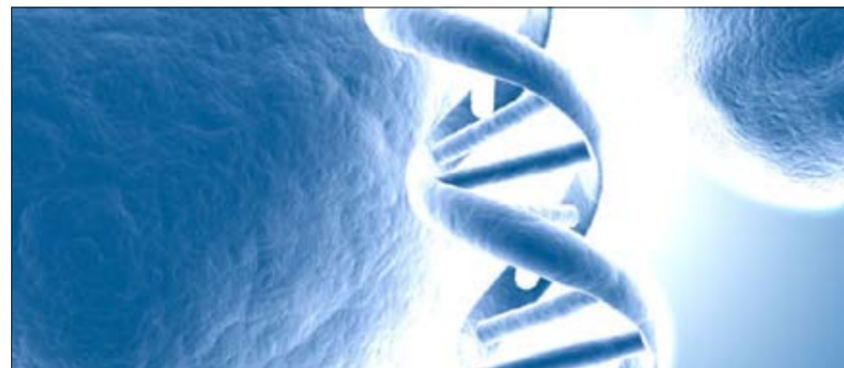
TCD research to help hospitalised

By Ronan Lyne
Deputy Science Editor

TRINITY'S BIOSCIENCES Open Demonstration, which ran last month in the Science Gallery, showcased exciting new research and innovation in medical technologies by researchers working across college. One of the key themes was the use of genetic technology in future medical therapies.

One team of Trinity scientists have developed a means of temporarily unlocking the blood-brain barrier using siRNA, to safely deliver drugs to the brain and retina. The blood-brain barrier usually protects the brain from infections by keeping most molecules out of the brain, but in doing this, it limits treatment of neurological and optical diseases, because drugs are also unable to cross. This technology makes it possible to temporarily open the tight junctions between cells to deliver medicine to the brain, or to reduce swelling after injury or stroke.

A highly interesting development was in the field of genomic medicine - predicting a patient's predisposition and responses to illnesses, based on their genetic makeup. A team of scientists in the Institute for Molecular Medicine have developed a means of accurately predicting a patient's response to hospital-acquired infection. By analysing



Genomic medicine aims to predict a patient's response to illness

the patterns of gene expression in different groups of patients, the researchers devised a method to predict whether or not a patient would succumb to sepsis, which is a life-threatening inflammatory response. This raises the possibility of screening all hospital patients and tailoring their aftercare accordingly.

Genomic medicine is not a new idea. In the post-genome years, whole-genome scans have become within the reach of the average person, and many companies offer the service, which can be completed by spitting into a container or sending off some swabs of cheek cells in the post. A few weeks later, the results are returned, and one's likelihood of developing Alzheimer's disease, cancer,

and multiple sclerosis, amongst others, can be explained. Other, more complex traits are beginning to show up on such analyses, including personality traits and risk factors for mental illnesses or learning disabilities, for those interested in learning more about their children's future. Many startup biotech companies such as 23andMe and Navigenics now offer other services in addition to this personal DNA analysis. Many offer genetic counselling, some tell you about your ancestry, and some even offer social networking features on their websites, so you can discuss your 20% chance of restless leg syndrome with people from around the world.

Predicting a patient's response to illness and drug treatment, however, is

a burgeoning field of research. Genetic pharmacokinetics research predicts how a patient will react to a drug, and can thus be used to determine the most effective course of treatment. But using this information routinely in a hospital setting has not yet become feasible. As for PreSepsis, the process is currently lengthy and quite expensive. However, Dr Ryan, the head of the Presepsis team, was adamant that the setup cost was not much more than the cost of intensive care for a patient with serious sepsis, and it would become more attractive in the future as the technology improves.

There are further issues with financing genomic medical approaches. Public health systems are unlikely to pay up until the cost/benefit ratios are in their favour, and many insurance companies already refuse to compensate for routine genetic tests, so financing pretreatment is currently on a personal basis. A more worrying prospect is the growing number of insurance companies who will pay for genetic tests - but insist on a copy of the results. Legislation to prevent, or at least limit genetic discrimination has been enacted in the US and the UK, and even Ireland has followed suit (albeit weak-handedly), as part of the Disability Act, but the legislation is inevitably one step behind the fast-growing field of genetic testing.

Search for Ithaca

By Ailbhe Goodbody
Science Staff Writer

SCIENCE PERVADES all areas, and can be used in unexpected ways to solve mysteries that have been unexplained for centuries. One such example is the application of science to ancient texts to solve classical enigmas. The location of Homer's Ithaca, described in his epic *The Odyssey* as the homeland of the hero Odysseus, has puzzled scholars

Underhill investigated whether Odysseus' homeland Ithaca is now part of the Greek island Icaithi.



for more than 2,500 years. An island called Ithaki exists today off the west coast of mainland Greece; however, with its mountainous coastline and its location on the eastern extremity of a group of islands, it contradicts Homer's description of Ithaca, which he says "lies low, furthest to sea towards dusk" (towards the west).

A possible solution was suggested by Robert Bittlestone in 2003 - he proposed that at the time of the Trojan War over three thousand years ago, the western peninsula of the island of Kefalonia could have been a separate island. This would fit with Homer's description, but a

problem was explaining the appearance of a land bridge 180m high between the two parts of the island. Geological changes can occur in a short time, especially in tectonically active regions such as Greece, so Bittlestone contacted Professor Underhill of the University of Edinburgh to investigate the low-lying isthmus connecting the two peninsulas.

Various geological techniques were used to investigate the hypothesis. Firstly, there could have been a dramatic uplift of the island. Evidence of uplift was found, however the maximum possible effect of this is about six metres - nothing near the 180m or so that has to be explained. Uplift is a factor, but is certainly not the primary factor.

Professor Underhill next examined the geology of the isthmus itself, and found that much of it was composed of rubble. Landslides are common on the island due to the frequent earthquakes: a landslide in November 2007 destroyed several houses in the area. His team drilled a borehole in the valley and were surprised to discover that the rubble extends a long way underground.

The results imply that a significant valley could have once existed there, which was filled in gradually by a succession of landslides. There is still much work to be done, but undoubtedly both geoscientists and classical scholars will be awaiting results with interest.

TCD creates global online ethical database

By Shane Heffernan
Science Correspondent

EVER WONDERED whether your coffee was grown under shaded trees like in the good ol' days? Or maybe it was grown in the sunshine where the taste isn't so good but the profits sure as hell are! No? Me neither. While I'm sure many of us would be concerned if something we buy was being produced in a manner that causes serious ecological damage or breaches of human and animal welfare, the fact is that so much of what we buy is imported. As a result, being well up on how it got from

the earth to you becomes a full time occupation.

Enter the Wikichains project. Using the same technological framework as Wikipedia, a group led by TCD's Dr. Mark Graham have launched a project aimed at providing the more socially and morally conscious consumer with a database for commodities. The goal is "to encourage a different type of globalization: a globalization of knowledge that will harness the power of the Internet in order to allow consumers to learn more about the commodities that they buy."

The project was conceived by Dr

Graham following his own research into the Thai silk industry. Being struck by the globalization of the silk industry and how at the same time "knowledge about that same product is surprisingly un-globalized", he decided to put his expertise as a cyber-geographer to use in forming a "Some sort of site that would allow people to upload text, pictures, sounds and videos of any node of any commodity chain that they could think of". After considerable time researching commodities, he feels "Firms can hide their bad practices behind veils of distance. Other than what they are telling us, how can we know how much

they pay their workers? What their environmental/ethical track record is?" Such a database would not be restricted to exposing the production lines of global companies in the poorer regions of the world. Information from all steps of the commodity chain is the idea here: Graham wants people to volunteer anything "as simple as a photograph they have of a microchip factory in Dublin, or knowledge about an hourly cashier wage in a Dublin Tesco."

Clearly, such a project requires a huge effort from many people in order to work. Alongside this comes a need for funding of which, as of yet, the project

does not appear to have. All costs related to Wikichains are being covered by Dr. Graham himself, although Wikichains does hope to secure funding in the future. One obvious avenue is funding from parts of the private sector that may feel their own track record is exemplary and would therefore benefit from such unbiased media exposure. Going down this road does, however, represent a danger for Graham and the project. "I would never accept sponsorship from any individual or group trying to use money to alter the mission of the project. So, taking money from companies wanting to better promote their record probably

would not be a good idea". The goal is for Wikichains to be self sustaining rather than temporary and so a major push for volunteers is planned from this summer onwards.

So is it worth getting excited about? Certainly! That is, if you eat pork, drink Starbucks or wear cotton. While at present the website only contains a small handful of articles and some links to other feature articles, what's there does make for good reading for those of you who, like me, feel passively conscious about their consumption. With luck, by the end of the year, less of us will be buying our rashers from Holland!