NATIONAL PATHOLOGY WEEK

DR LASANTHA RATNAYAKE and Dr Ben Parcell, Speciality trainees in Microbiology at Ninewells Hospital, Dundee, ran a microbiology stall in the hospital's main concourse on 2nd and 3rd November 2010 to promote microbiology as part of National Pathology Week, organized by the Royal College of Pathologists, London.

Microbiologists in hospitals play a vital 'behind the scenes' role in diagnosis, treatment and prevention of infections. At this event, the public had the opportunity to view posters and educational material on a number of important and interesting areas, such as hand hygiene, superbugs, swine flu, tuberculosis, norovirus and HIV/AIDS.

The stand also displayed photographs of different micro-organisms which drew curiosity from visitors. We were available to answer their questions and let them take away leaflets for further reading. Visitors and staff shared their experiences, such as being ill with various infections, and a nurse described her experience of the widespread use of penicillin to treat infections when it was first introduced. In addition, there was information on different career choices in microbiology, which was very well received by parents whose children were interested in science.

We would like to thank SGM for providing us with promotional material to make this event a success.

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Drs Ben Parcell (left) and Lasantha Rathayake (right) manning the stand. *Tracey Adams*

Bacteria busters. *The Manchester Beacon*

THE BACTERIA PARTY

ONE OF THE KEY PROBLEMS in healthcare today is that of increased resistance of bacteria to antibiotics. Almost everyone is aware of deaths associated with MRSA (meticillin-resistant *Staphylococcus aureus*) and *Clostridium difficile*. Resistance can, in part, be attributed to the misuse of antibiotics. To help educate and empower the public (especially secondary school students) about the appropriate use of antibiotics, a team of enthusiastic final-year pharmacy students from the University of Manchester have developed *The Bacteria Party*. Through a partnership with the Manchester Science Festival (MSF) and the Manchester Beacon, this event was selected by young people to be part of the MSF in October 2010 at the Zion Arts Centre in Hulme. *The Bacteria Party* consisted of five interactive stations where participants learnt about bacterial infections, their treatment and prevention.

STATION 1 – The good, the bad and the ugly. Students and their families discover that bacteria can be both useful and detrimental to health, illustrated by, for example, a yogurt drink and a picture of gangrene infection, respectively. In the hope of inspiring future microbiologists, participants have the opportunity to use microscopes to view bacteria, including *E. coli* and *C. difficile*, as well as to be amused by the million-fold magnified fluffy versions from giantmicrobes.com!

The good, the bad and the ugly. *The Manchester Beacon*

Take 'em all to kill 'em all. *The Manchester Beacon*

STATION 2 – Bacteria busters. Here the participants are introduced to antibiotics. Using Molymod molecular models, the students build the structures of the antibiotics penicillin V, amoxicillin, chloramphenicol, sulfadiazine and ethambutol. They also watch a 3D movie of these antibiotics using 3D glasses. Further information is provided using the popular game of *Top Trumps* where several antibiotics are categorized by date introduced, size, 'power' and resistance.

STATION 3 – Take 'em all to kill 'em all. Students are advised of the importance of completing a course of antibiotics to reduce the likelihood of resistance. This is illustrated in a fun and messy interactive activity in which polystyrene packaging chips are used to demonstrate bacterial growth using a specified doubling time. This allows students to understand how rapidly bacteria can grow. Whole sacks full of chips were used for this activity! In addition, a game of skittles demonstrates resistance; where the most resistant bacteria are the hardest to knock down!

STATION 4 – Infection: stop it before it starts. Here the students learn that prevention is better than cure. They are taught the correct hand washing technique through a hand washing rap, and then use 'Glo Germ' to demonstrate just how well they have washed their hands.

STATION 5 – Antibiotics: do you really need them? A graphically appealing Go/Stop poster lists common bacterial and viral infections for which antibiotics would be useful or ineffective, respectively. Students chose their favourite antibiotic scientist (from Fleming, Hodgkin, Ehrlich and others) to be their marker for a snakes 'n' ladders style board game. Progress in the game was made by answering questions on antibiotics and their correct usage and a spotty Mona Lisa adorned the playing cards.

The bacteria party! *The Manchester Beacon*

The Bacteria Party, culminating in cake and certificates for the students who completed the Bacterial Passport to Immunity by answering questions at each station, was popular with children and parents alike. The event illustrated just how important it is to educate the public on the use of antibiotics – many participants were surprised to discover that antibiotics cannot be used for the common cold! Following positive feedback from the MSF event, *The Bacteria Party* (now called *The Bacteria Roadshow*) has been modified and delivered to a Greater Manchester primary school (Year 6) and at a secondary school careers event (Year 9) with enthusiastic support from students and teachers alike. As well as raising awareness about antibiotics, the events have introduced students to elements of microbiology, chemistry and pharmacy.

ACKNOWLEDGEMENTS

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SURVIVAL OF THE FITTEST

Visitors at the Forum in Norwich. *L. & R. Bowater*

THE RECENT CELEBRATIONS of anniversaries associated with Charles Darwin led many scientists to explore new ways to discuss the importance of evolution. Scientists from the University of East Anglia (UEA) and Norwich Research Park designed a wide range of events that engaged with the local community. Realizing that microbes provide some of the best evidence for Darwin's seminal theory, we developed a series of events to show how microbes can quickly respond to changes in their surroundings. These events were designed to illustrate the fundamental principles behind evolution, such as 'survival of the fittest' – the microbes that adapt the most quickly and the most successfully are the ones that survive and thrive. This ability of microbes to evolve has relevance to our everyday life, for example in the development of antibiotic resistance, bioremediation and the potential for simple organisms to inhabit environments that are extremely hostile.

Children at an event held in laboratories at the UEA. *L. & R. Bowater*

With funding provided by an SGM Public Engagement in Microbiology Award, we designed and developed a series of interactive exhibits that we were able to mix and match to engage with schoolchildren, science enthusiasts and the wider public. The activities that the interactive exhibits supported also provided opportunities for academic lecturers, researchers and UEA students with an interest in public engagement to participate and develop their skills in this area. Part of the project was a suite of 5 posters designed by students enrolled on UEA's BSc in Microbiology. Other staff and students helped to create and present the hands-on elements, which included microscopes and agar plates that showed the wonderfully different morphologies, colours and smells that have evolved within the microbial world. Children were encouraged to 'evolve a microbe' using modelling clay and to 'grow their own bugs' from handprints. We also designed a computer presentation to show how simple mutations can lead to dynamic bacterial populations that can quickly adapt to changes in the environment.

Students that took part in the events commented that '*it was an enjoyable and valuable learning experience*' and '*it was a positive surprise to see how much I learnt from other people both as a science communicator, and just on an everyday level*'.

The plan was to take the interactive exhibits to three different events throughout Norwich. However, the success and flexibility of the exhibits have meant that we have also continued to develop and deliver them at other events.

The first exhibition was held at UEA as part of a

CII staff at the York Festival. *M. van der Woude*

THE YORK FESTIVAL of Science and Technology is a week-long event aiming to *Bring Science to Life* for all ages. The Centre for Immunology and Infection (CII), a joint venture between the Hull York Medical School and the Department of Biology at the University of York, has again promoted public understanding of microbiology at one of the Festival's showcase events, *Science Discovery Days*. Held at the famous National Railway Museum, this event allows children and adults to get hands-on experience of contemporary issues in science. This is the second year that the CII participated, and we were eager to build upon the previous year's success to demonstrate key aspects of our research in a light-hearted but educational format.

The location of our stand, right in front of one of the main entrances, boded well for a large number of potential visitors. Also working in our favour was a team of enthusiastic CII scientists to guide guests of all ages through the wide selection of original activities.

For many of the youngest visitors, the chance to dress up as a scientist and use the plethora of crayons to colour-in pictures of microbes proved irresistible. No doubt many family photo albums are now enriched with pictures of future Nobel Prize winners, and fridges are decorated with colourful bacteria and parasites.

Another popular attraction for our younger visitors was the 'White blood cell fishing game', where players used immune cells (magnetic fishing rods) to fish out metallic germs from the body, which consisted of a tank filled with red and white ping-pong balls. Eventually, this leisurely fishing game turned into a race against the clock, with children pitted against friends, siblings and even the occasional self-confessed competitive dad!

In addition to posters and a slide show showing off some of the imaging work done by members of the CII, we set up a couple of microscopes. A high-powered bright-field microscope connected to a computer monitor was used to look at slides of a variety of tissue sections. We also had blood smear slides from animals such as frogs, birds and fish to compare to a human blood smear, showing differences that surprised everyone, even some of our researchers!

Making a return this year was our popular 'Good guy/bad guy' game. Players are given cards with images of various bacteria, viruses, parasites and human cells and are invited to guess whether they are good or bad for us. A refreshing view on 'good and bad' was provided by one youngster who claimed a neuron had to be good for allowing him to talk, but bad when it made him feel pain! Many parents satisfied their curiosity as well, learning for example that '*C. diff*' is a bacterium. We used a physically more active variant of the game for Friday's *Discovery Day* exclusively for groups of primary school pupils. The students were asked to cast their vote by running to scientists Dr Good or Dr Bad, while listening to a lively presentation on properties of the cell in question. This game illustrates that not all 'germs' are harmful, but if we do come across bad guys, our immune system is very effective at fighting them off.

Key to the success of both days was our CII team of scientists, spanning all career stages from PhD students to senior lecturers, who were on hand to demonstrate the activities. A lot of preparation went into the development of the materials and activities, so it was rewarding for everyone to see them being enjoyed. We were delighted with the success of this year's *Discovery Days*, and intend to return next year.

TRAINS, GAMES, MICROBES AND MICROSCOPES – A WINNING RECIPE FOR A GREAT DAY!

Saturday of September. By locating this free event in Norwich's award-winning Forum centre, it has developed a group of loyal visitors who look forward to attending it, but the location also ensures that it catches the passing trade of families, pensioners, teenagers and visitors to the city. *Cells Alive* attracted more than 600 visitors over the course of the day and a huge variety of novel microbes (newly evolved in modelling clay!) made their way out of the Forum.

As a result of this project, we have produced several interactive exhibits that continue to be used at a wide variety of public engagement events delivered by Norwich scientists. The contemporary and flexible nature of the exhibits has allowed us to plan on using them again at events in the near future that will highlight the significance and fascination of research involving microbiology.

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Youngsters enjoying activities devised by CII staff. *M. van der Woude*

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