# Microbiologist

The magazine of the Society for Applied Microbiology ■ December 2009 ■ Vol 10 No 4 ISSN 1479-2699

# STIs
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**December 2009** ■ Vol 10 No 4 ■ ISSN 1479-2699

Microbiologist the magazine of the Society for Applied Microbiology

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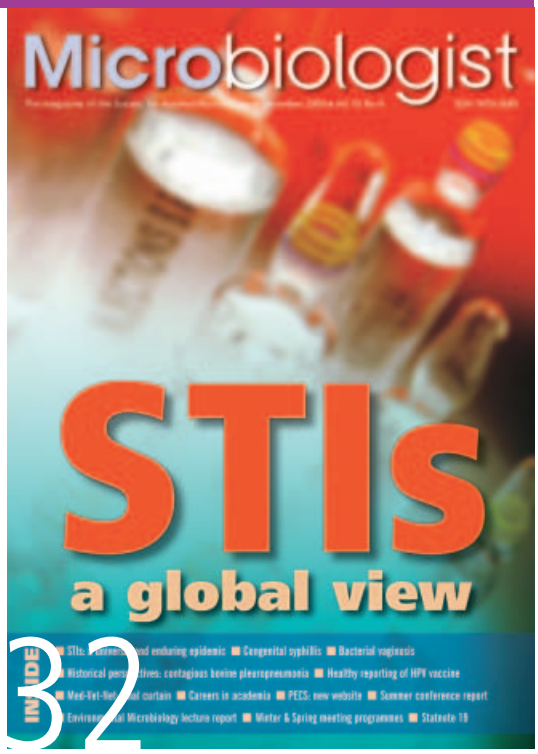


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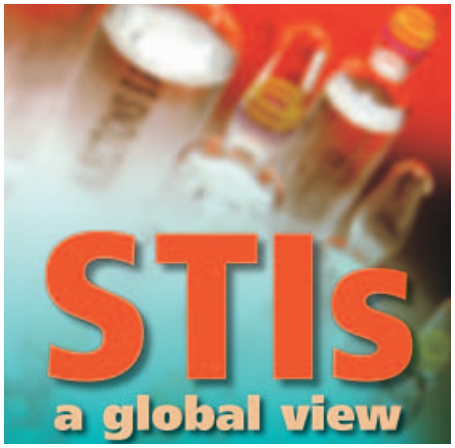
# editorial

**Lucy Harper** talks about this issues feature articles on STIs




This issue of *Microbiologist* is dedicated to one area of applied microbiology which is often publicised at this time of year — sexually transmitted infections (STIs). We're all familiar with the advertising campaigns targeting certain demographics to warn of the dangers of alcohol-induced irresponsibility. However, as I write this Editorial I am delighted to discover that, according to figures released by the Office of National Statistics (http://www.statistics.gov.uk/pdfdir/csh1009.pdf), one in four women favour condom use as their normal choice of contraceptive — the same proportion as favour the contraceptive pill. The added advantage of the condom is as a barrier method of contraceptive, so it's also effective in reducing the transmission of STIs including HIV.

Last month* there was some debate about the results of a trial of vaccine protection against HIV. Scientists trialled a combination of vaccines in Thailand and found a 31% difference in the contraction of HIV in those who had received the vaccine compared with those who hadn't. However, there was some debate about whether the study results were statistically significant or robust enough to be meaningful from a public health perspective.

As more results were published, the statistical significance of this outcome was still not clear. Of around 16000 people, 8,000 were given the vaccine combination and the remaining 8,000 were not. Of the 8,000 that were, 51 contracted HIV during the trial period whereas 74 of those who weren't administered the vaccine contracted HIV. The power of this study has been brought into question and what the results mean in 'real' terms is at present not certain. I expect many of you will have read about this at the time. Do you have any particular views on this story? Do you think it was wrong that the results were publicised when their true meaning isn't certain? Perhaps you're encouraged to see this story generating conversation about research methodology and statistics among non-scientists? Whatever your perspective we'd like to hear your views.

In this issue of *Microbiologist* we look at STIs from a number of perspectives. There's a general overview of the clinical situation in the UK — how are STis diagnosed and treated? Find out on page 32. Next, we look at congential Syphilis — a problem which isn't just restricted to the developing world. What can be done to eliminate this important problem? What role does screening play? Turn to page 36 to find out. Finally, we look at a fascinating condition — Bacterial Vaginosis. Whether this is infact a STI is a matter of some debate, but I'll be asking Dr Phillip Hay of St. Georges Hospital, London about his work in the area and why this work lead him to spend his wedding anniversary in a brothel in Equador (page 39).

We also have a fascinating article on the history of bovine pleuropneumonia (page 41) and for those of you who are considering a career in academia, turn to page 46 to find out more about life as a lecturer.

That's all from me for 2009 other than to wish you all a Merry Christmas and a Happy New Year

Lucy Harper

*This was correct at time of going to press

## contribute

We are always looking for enthusiastic writers who wish to contribute articles to the magazine on their chosen microbiological subject.

For further information please email the editor, Lucy Harper at: **lucy@sfam.org.uk**

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**Advertising:** Information about advertising in *Microbiologist* and how to submit advertisements can be found on the Society website.

**Website:** our website **(www.sfam.org.uk)** is a timely source of up-to-date information on all Society matters and maintains a comprehensive archive of articles and reports on a variety of microbiological topics.

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# benefits

The Society for Applied Microbiology is the voice of applied microbiology within the UK and was founded in 1931. Society members play a leading role in shaping the future of applied microbiology, and enjoy many benefits, including:

- The opportunity to apply for one of our many grants or funds
- Eligibility to win any of our awards or nominate a candidate for the SfAM Communications Award
- Access to our five peer-reviewed Journals: *Journal of Applied Microbiology*, *Letters in Applied Microbiology*, *Environmental Microbiology*, *Environmental Microbiology Reports* and *Microbial Biotechnology*
- Free access to the entire collection of digitised back files for *JAM* and *LAM* dating back to 1938
- A topical quarterly magazine, *Microbiologist*
- Substantially reduced rates for attendance at SfAM meetings and conferences
- Networking with worldwide professionals in over 80 countries
- Access to private members area of the SfAM website
- Monthly email bulletins with the latest news from SfAM
- Invitation to the annual *Environmental Microbiology* lecture
- Fostering cross disciplinary research
- A 25% discount on the extensive Wiley-Blackwell collection of titles

Detailed information about all these benefits and more can be found on the Society website at: www.sfam.org.uk

**GRANTS & AWARDS:** Many grants, awards and prizes are available to members including the W H Pierce Memorial Prize and prizes for student oral presentations and posters at the Summer conference. In addition to these substantial awards, the Society has funds to assist members in their careers as microbiologists. These include the President's Fund, Conference Studentships, Sponsored Lecture Grants and the popular Students into Work Scheme.

Full details of all the Society's grants and awards can be found on the website together with PDF downloadable application forms.

**JOURNALS:** The Society publishes two monthly journals: *Journal of Applied Microbiology* and *Letters in Applied Microbiology*. We also produce this quarterly colour magazine, *Microbiologist*, which contains features, topical news stories and full details of our meetings. The Society is also a partner with Wiley-Blackwell in the monthly journals *Environmental Microbiology*, *Environmental Microbiology Reports* and *Microbial Biotechnology*.

All Full and Student members receive free access to the online versions of the Society's journals, and can also submit papers to our journals via an online submission service.

**MEETINGS:** We hold three annual meetings; the winter meeting is a one-day meeting with parallel sessions on topical subjects. The spring meeting is a one-day meeting tailored for personnel in clinical microbiology. The summer conference is held every July and comprises a main symposium, a poster session, the AGM and a lively social programme. All members are invited to our prestigious annual lecture held to commemorate the success of our *Environmental Microbiology* journal. We also hold joint ventures with other organisations on topics of mutual interest.

**WEBSITE:** The website is the best source of detailed information on the Society and its many activities. It has fully interactive membership areas where you can find archive issues of *Microbiologist*, exclusive SfAM documentation and much more.

# membership options

■ **Full ordinary membership** gives access to our many grants and awards, online access to the *Journal of Applied Microbiology*, *Letters in Applied Microbiology*, *Environmental Microbiology*, *Environmental Microbiology Reports* and *Microbial Biotechnology*, copies of *Microbiologist*, preferential registration rates at Society meetings and access to the members areas of the website.

■ **Full student membership** confers the same benefits as Full membership at a specially reduced rate for full time students not in receipt of a taxable salary.

■ **Associate membership** is only open to those with an interest in applied microbiology without it being a prime aspect of their job. For example, school teachers and those taking a career break; on maternity leave, or working temporarily in other areas. It does not provide access to any journals or Society grants and awards.

■ **Honorary membership** of the Society is by election only and this honour is conferred on persons of distinction in the field of applied microbiology. Honorary members have access to our online journals.

■ **Retirement membership** is available to Full members once they have retired from their employment. Retired members are entitled to all the benefits of Full membership except grants and access to the Society's journals.

■ **Corporate membership** is open to all companies with an interest in microbiology. Corporate members benefits include:

- Quarter page advertisement in each issue of *Microbiologist* (which can be upgraded to a larger size at discounted rates)
- the opportunity to publish press releases, company news, etc., in each issue of *Microbiologist*
- FREE banner advert on the Society Website with a direct link to your company site.
- Up to three members of company staff attending Society meetings at members' rate (this means a 50% discount on non member registration rate).

## JOIN US!

You can apply for membership on, or offline. To apply offline, please contact the Membership Co-ordinator, Julie Wright on **+44 (0)1234 326846**, or email **julie@sfam.org.uk.** Alternatively, write to her at:

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# microbreak

The answers to the crossword competition in the September 2009 issue of *Microbiologist* are shown on the right. Congratulations to **Michael Bell** who successfully completed the crossword and won a £30 Amazon voucher.

The competition for this issue is **microbiology rebuses**. Look at the images below and see if you can work out what microbiology-related phrase or word is represented by each image. Enter your answers in the boxes provided and you could win an **Amazon voucher**. Get your entries to the Society Office by Friday 15 January 2010 to be in with a chance of winning!


Crossword compiled by Louise Hill-King



An Amazon voucher is waiting for the person whose entry is picked first from the Editor's in-tray! The closing date for entries is **Friday 15 January 2010**. The answers will appear in the March 2010 issue of *Microbiologist*.

Name: _____

Address: _____

_____

Simply photocopy this page and send it to: 'Microbreak rebuses', Society for Applied Microbiology, Bedford Heights, Brickhill Drive, Bedford MK41 7PH, UK.

# president's column

**Geoff Hanlon** reviews the Society's many grants and prizes

You might think that in a recession it would be very easy to give money away. However, bizarre though it might sound, the Society has always had difficulty spending all the money budgeted for its grants*. In 2008 the total amount of grant money awarded was £149,441 and while this was an increase over the amount awarded in 2007 it still represented a significant under spend on that allocated in the budget. This has been a mystery for a number of years and despite much publicity on the availability of grants, the situation does not change markedly year-on-year. One conclusion to be drawn from this is that the nature of the grants available does not meet the needs of our members and we should possibly be offering other types of awards. It is certainly the case that some categories of awards are very popular but others remain much less so. I have given below a summary of the grants currently available and an indication of their uptake last year. Although the amounts given here are in pounds sterling equivalent local currency rates are available for international applicants. In the vast majority of cases all those who applied for grants were successful however, in a few cases applicants were found to be ineligible for one reason or another. For full details of these grants and the terms and conditions relating to eligibility please consult the S*f*AM website (www.sfam.org.uk/grants.php).

**Sponsored lecturer grant**. This is an award of up to £500 to allow groups, clubs and societies with an interest in microbiology to invite eminent speakers to give guest lectures. It clearly sits well with our desire to be the *voice of applied microbiology* and to provide benefits to members and public alike. However, in 2008 only two applications were received and only £593 was spent.

**Regional meeting grant**. In a similar vein to the award above this is designed to allow groups to organise a meeting on a microbiological topic of interest and a sum of up to £2,000 is available for support. In 2008 no applications were received.

**New lecturer research grant.** This grant was established in 2008 and is designed to provide research pump-priming for newly appointed lecturers in their first academic post in a Higher Education Institute. Funding of up to £10,000 is available to the successful applicant and normally a single award would be made annually. In 2008 we decided to make two awards and the budget was fully spent.

**S*f*AM laboratory fellowship.** This fund is available to members working in private, academic or government laboratories who wish to train in a new technique. The society will pay a maximum of £1,000 per week for up to a four-week visit to a host laboratory. This includes staff travel and laboratory consumables. Only one application was received in 2008 and an award made of £435.

**President's fund.** This has always been a popular grant and is available to assist members in attending scientific meetings or workshops related to their area of expertise. The amount budgeted for this fund was increased last year to allow for demand and 45 awards were made totalling £38,176.

**Hardship fund.** This grant is for S*f*AM members who are studying for a MPhil/PhD in applied microbiology under the direction of a supervisor who is also a member. The funds are used to contribute towards university fees and the applicant can apply for up to £3,000 per year for three years maximum. In 2008 only one application was received and the sum of £3,000 was awarded.

**Research development fund.** This fund is available to provide consumables or a small piece of equipment required to allow a student to complete their post-graduate studies in the area of applied microbiology. Normally the amount awarded would be up to £2,500. This fund was well supported in 2008 with three applications; all were funded and the sum allocated was £7,500.

**Conference studentships.** S*f*AM offers funding to facilitate student members attending Society meetings. The grants cover registration, accommodation, meals and reasonable travel expenses. Preference is given to those who will contribute to the meeting by offering a paper or poster or who are involved in organisation of the meeting. Nine awards were made in 2008.

**Students into work grant.** This is another highly popular grant which allows members the opportunity to provide current students or recent graduates who are studying microbiology as part of their degree, work experience for up to 10 weeks. The fund provides a student allowance of £160 per week and £500 towards the cost of consumables. In 2008, 29 awards were made and a total of £53,615 was allocated.

**Overseas development award.** For those who read my column in the last edition of the *Microbiologist* you will be aware that this is an area which we would like to expand in order to enhance our international capacity building agenda. This award aims to support members who wish to visit laboratories overseas to provide training or alternatively to allow overseas members to visit the UK for training purposes. However, in 2008 only one application was received and £3,000 awarded.

**Endangered culture collection fund.** This highly focussed fund also meets our objectives of international capacity building and is generally well subscribed and in fact this was the one grant category which was overspent.

**Innovative project/public engagement grant.** This grant provides pump-priming funds to develop an innovative piece of work associated with applied microbiology which has public engagement as its main focus. The maximum award is £2,000 and in 2008 only one application was received.

In total there were 96 awards made in 2008 with a success rate for applications approaching 100%. However, this number is very small considering the number of members we have and many of the successful recipients send in applications every year. I would like to see the total number of applications increase and embrace a wider pool of members particularly those from overseas who are generally underrepresented. This year we carried out an extensive survey of member's views on a range of issues and the full

scope of the responses is still being evaluated. Given the issues outlined above, committee are in the process of undertaking a review of our grant structure and we will utilise the results of the member's survey in those deliberations. This should result in a series of grants better suited to member's needs by consolidating some awards, eliminating others and creating new categories of funding. We will keep you informed of progress and as always I would value any contributions you may wish to make to the discussion process.

May I take this opportunity to wish you a joyful and peaceful Christmas and a very happy New Year.

*to be eligible to apply, most grants require that membership has been held for at least two subscription payments

**Professor Geoff Hanlon**
President of the Society

# ceo's column

**Philip Wheat** reports on the latest developments within the Society

As I mentioned in my previous column we are very pleased that so many of you took the time to complete the members' questionnaire which was distributed during May and June 2009. As you would expect, the resulting feedback is proving invaluable in helping to shape the services we provide to members. In particular, we have taken on board many of the comments made in relation to Society meetings and we are in the process of implementing some of your suggestions. Look out for further details which will follow early next year. Much of the feedback we received from the questionnaire has resulted in changes which will already be visible to members. For instance, a significant number of members requested the meeting topics: biofilms, bacteriophages and listeria. These three areas are comprehensively covered in the programme for the 2010 summer conference (see preview on page 31). This should be a vibrant meeting which will be held at The Grand Hotel, Brighton — a prestigious sea front hotel in a thriving south coast resort. With these programme topics and location, the meeting is likely to be popular so I would strongly advise early booking if you would like to attend as places are limited. In addition, I would also like to encourage student members to submit an abstract for the meeting to be in with a chance of winning one of the prizes for either best poster or oral presentation. Student members (UK and overseas) can also apply for a studentship grant, which covers all costs of attendance (including travel) at any Society summer conference. However, there are a limited number of awards available so once again I strongly recommend applying early.

Details of the winter and spring 2010 meetings can be found on pages 27 to 30. As I mentioned in my last column we have a change of venue for the Spring 2010 meeting which will be held in the historic town of Stratford upon Avon at the Stratford Q Hotel.

Following the President's column in the last issue of the *Microbiologist* we have been investigating how the Society can focus more of its attention on the issue of international capacity building for scientists from developing countries. This has resulted in several new initiatives being proposed and discussed so I expect to be able to announce several exciting new initiatives in this area in 2010.

Planning is already underway for the Society to attend and exhibit at a variety of meetings in the United States. I can confirm that once again we will be exhibiting at the following meetings: American Society for Microbiology (23 – 27 May 2010, San Diego), International Food Technology (17 – 21 July, Chicago) and finally the International Association of Food Protection (1 – 4 August, Anaheim).

Now all that is left for me to do is to wish you all a restful and prosperous time over the Christmas and New Year period. I hope to meet you at one of the many Society events taking place in 2010.

**Philip Wheat**
Chief Executive Officer

# W H Pierce Prize

*Katie Hopkins receiving the W H Pierce Prize from Professor Geoff Hanlon, James Mcdonald and Ali Ball of Oxoid*

**membership** matters

Following graduation from Imperial College London with a 1st class honours degree in Microbiology in 1997, I started a PhD at the University of Birmingham under the supervision of Dr Anthony Hilton and Professor Charles Penn. My project focussed on random amplification of polymorphic DNA (RAPD) PCR analysis to determine its suitability as a rapid method for subtyping of *Escherichia coli* O157.

Following completion of my PhD in 2000 I returned to London to work at the Health Protection Agency Centre for Infections. During this time I was able to further develop my interests in molecular subtyping methods and began to work on mechanisms of antimicrobial resistance in *Salmonella enterica* and other enteric pathogens. This was a very productive period and resulted in 24 peer-reviewed publications, and in collaboration with the Veterinary Laboratories Agency (VLA), Weybridge in the development of a miniaturised microarray for the rapid identification of antimicrobial resistance genes in Gram-negative bacteria, which is now commercially available.

Currently I am working as a Clinical Scientist focussing on primary diagnosis of *Helicobacter pylori* infections and performing antimicrobial susceptibility testing to aid patient management. I also have a role in service development, with an international patent pending on a real-time PCR-based assay for identification of the major *Salmonella* subspecies, and I continue to work on antimicrobial resistance in enterobacteria. I have been an Editor for the *Journal of Antimicrobial Chemotherapy* since 2008, and a member of the Microbial Drug Resistance editorial board since early 2009.

Antimicrobials are rarely used to treat gastroenteritis caused by non-typhoidal salmonellae, but can be crucial in treating salmonellosis in vulnerable patient groups and potentially life-threatening invasive infections. Since the 1960s there has been not only a global increase in multidrug resistant salmonellae, but also emergence of resistance to antimicrobials classed as 'critically important for human medicine' by the World Health Organisation. Among these are the third-generation cephalosporins, quinolones and aminoglycosides.

Third-generation cephalosporins such as ceftriaxone are used to treat salmonellosis in vulnerable patient groups, particularly children. The first CTX-M extended-spectrum ß-lactamases (ESßLs) and AmpC beta-lactamases in UK

*S. enterica* were identified during a joint HPA-VLA project, and linked to foreign travel and domestically-acquired cases of infection (Batchelor *et al.*, 2005a; Batchelor *et al.*, 2005b; Liebana *et al.*, 2004). Such organisms are of clinical importance because delayed recognition of ESßLs can result in increased morbidity and mortality; AmpC enzymes are of major clinical concern because they confer resistance to all ß-lactams except cefepime, cefpirome and the carbapenems.

Strains harbouring ß-lactamases are frequently resistant to other antimicrobials such as quinolones and aminoglycosides. Such resistance genes are often located on the same plasmid and are co-transferred, thereby reducing treatment options and leading to co-selection of resistance by use of other antimicrobial agents. In this respect the identification in the UK of *S. enterica* harbouring both ß-lactamase and plasmid-mediated quinolone resistance (*qnr*) genes is of concern (Hopkins *et al.*, 2007; Hopkins *et al.*, 2008). In many instances these plasmid-mediated quinolone resistance genes were associated with travel to, or food imported from, the Far East. Rather worryingly the basal level of quinolone resistance encoded by these *qnr* genes is sufficiently low (<1mg/L) that strains appear susceptible according to BSAC and CLSI guidelines, yet treatment failures have been reported in patients infected with non-typhoidal salmonellae with MICs in this range.

Of further concern has been the identification of *S.* Oranienburg from a hospital outbreak in Poland in 2002 possessing a plasmid carrying a 16S rRNA methyltransferase encoding high-level resistance to aminoglycosides together with the ESßL CTX-M-3 (Hopkins *et al.*, 2007). Similarly, clinical and food isolates of *S.* Virchow harbouring the 16S rRNA methyltransferase *rmtC* and the *qnrB2* gene have been recently identified in UK salmonellae, implying food as a possible route of transmission of these resistance determinants (Hopkins *et al.*, 2009). Many patients had reported recent travel to India; this association is therefore being investigated further. The 16S rRNA methyltransferases are clinically important as they confer high levels (MICs >512mg/L) of resistance to all clinically important aminoglycosides except streptomycin.

For many of the genes described above their dissemination has been aided by their association with mobile genetic elements such as plasmids, transposons and insertion elements, which allow for horizontal as well as vertical transmission of the resistance mechanisms. In particular, the association of particular ß-lactamase genes with specific transferable plasmid backbones has indicated widespread diffusion of particular plasmids within in the UK and in bacterial populations from other continents (Hopkins *et al.*, 2006). At present the occurrence of resistance to these critical antimicrobials is still low in the UK, but continued surveillance is essential to minimise risks to future treatment that widespread dissemination of these resistance mechanisms would create.

I would like to thank my colleagues in the HPA Laboratory of Gastrointestinal Pathogens and the staff of the Department of Food and Environmental Safety at VLA Weybridge for all their help and advice over the years. It is a great honour to be awarded the 2009 W H Pierce Prize and I thank the Society for Applied Microbiology and Oxoid for their recognition of my work.

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**Katie Hopkins**
Health Protection Agency

# Membership Changes

## NEW MEMBERS

**We would like to warmly welcome the following new members and hope that you will participate fully in the activities of the Society.**

### Argentina

F. Mozz

### Australia

N. Fegan; C. Saint

### Austria

P. Mester

### Canada

G. LaPointe

### Croatia

B. Seol

### Cyprus

G. Botsaris

### Czech Republic

I. Manga

### Denmark

T. Nielson

### France

C. Gilbert

### Hungary

B. Mraz

### Ireland

C. Gahan; S. Fanning; R. Ryan

### Mexico

C. Vazquez-Cruz

### Nigeria

S. Adeyemo; T. Adias; M. Agbaje; C. Anyakorah; F. Ojo; A. Onilude; A. Onwuka; F. Onwuka

### Slovakia

T. Kuchta

### South Africa

C. Barrow

### Spain

A. Bosch; S. Delgado; B. Mayo

### UK

V. Abidogun; I. Barber; A. Bhat; L. Birse; R. Boden; M. Carter; J. Chung; R. Cutler; J. Donaghy; C. Elwell; E. Emo; C. Fontinelle; D. Fraser-Pitt; S. Giles; J. Glassey; C. Godwin; N. Goonawardane; A. Henein; R. Hogg; N. Holden; C. Hughes; F. Jorgensen; E. Medu; B. Meyer; P. Mistry; E. Mohd Esah; D. Mugampoza; B. Nagamani; L. O'Connor; M. Owen; T. Pham; N. Rajarajan; G. Ramage; H. Rollett; S. Routledge; N. Sayers; P. Shortland; E. Sim; N. Smith; S. Terrington; L. Tyzack; C. Walker; J. Walker

### USA

A. Glenn; P. Jesudhasan; A. Mohagheghi; D. Prince; R. Zdor

### Corporate members

TCS Biosciences Ltd

# Sense About Science preliminary findings of peer review survey

Should peer review detect fraud and misconduct? What does it do for science and what does the scientific community want it to do? Will it illuminate good ideas or shut them down? Should reviewers remain anonymous? On 8 September 2009 the preliminary findings of one of the largest ever international surveys of authors and reviewers, the Peer Review Survey 2009, were released. The findings were presented in the session "Science fact or science fiction: should peer review stop plagiarism, bias or fraud?" at the British Science

# 2009 SfAM AGM

**The 78th Annual General Meeting of the Society for Applied Microbiology was held on Wednesday 8 July 2009 at 4.30pm at Manchester Metropolitan University**

### Present:

Basil Jarvis, Don Whitley, David Post, Sally Cutler, Christine Dodd, A. O. Olabode, Steve Davies, Arthur Gilmour, Jane Beal, Robert Madden, Janet Corry, Helen Donoghue, Andrew McBain, Andrew Sails, Martin Adams, Joanna Verran, Louise Fielding, Mark Fielder, Geoff Hanlon (Chair).

### 1. Apologies for absence

Apologies were received from Mark Reed.

### 2. 77th Annual General Meeting

The minutes of the 77th Annual General Meeting held in Belfast in 2008 were published in the September 2008 issue of *Microbiologist*. They were approved and accepted by those present.
Proposed: Andrew Sails. Seconded: Martin Adams

### 3. Matters arising

There were no matters arising.

### 4. Report of the Trustees of the Society 2008

Copies of the report of the Society for 2008 were distributed previously. This report was accepted.

### 5. Adoption of the Annual Report 2008

Geoff Hanlon asked for the report of the Trustees to be officially adopted by those present. All present were in agreement.
Proposed: Arthur Gilmour. Seconded: Robert Madden

### 6. Result of ballot and election of new committee members

Mark Fielder reported that this year there were four committee vacancies. Carol Phillips and Joanna Verran were retiring by rotation and were thanked for their contributions and hard work during their term of office.
Geoff Hanlon then stated that six nominations had been made to the committee and a subsequent ballot had resulted in four new members of committee:
Samantha Law — nominated by Peter Green and seconded by Alison Baxter
Alison Kelly – nominated by Mark Fielder and seconded by Claire Cassar
Mark Reed – nominated by Mark Fielder and seconded by Martin Adams
Sally Cutler — nominated by David Post and seconded by Max Sussman

### 7. Retirement of Honorary Treasurer and election of new Honorary Treasurer

Mark Fielder thanked Valerie Edwards-Jones and put forward Steve Davies as new Honorary Treasurer of SfAM.

### 8. Retirement of Honorary Meetings Secretary and election of new Honorary Meetings Secretary

Mark Fielder thanked Martin Adams and put forward Andrew Sails as new Honorary Meetings Secretary of SfAM. The proposals of the new Officers of SfAM were accepted.
Proposed: Arthur Gilmour. Seconded: Sally Cutler

### 9. Election of new members (including honorary members), deaths and resignations

A list of names of applicants for membership and a list of deaths has appeared in the *Microbiologist* throughout the previous year. The Society holds a summary of the resignations of members throughout the previous year for consultation if requested.

### 10. Any other business

Basil Jarvis asked if there was any information available re: the number of members of the Society. Philip Wheat answered the question stating that SfAM held approximately 1400 members. He went on to inform the meeting that the membership was rising by around 50-100 per year.
Geoff Hanlon also reported that those who leave the Society (currently around 150 – 200 per year) normally answer the exit questionnaire.
Basil Jarvis asked about the creation of a new class of membership in recognition of the current economic climate for those who are temporarily out of work. Geoff Hanlon responded by saying a degree of discretion was applied when members were faced with such a situation.
Janet Corry asked whether there was a way in which overseas members without a UK bank account could arrange payment to SfAM more easily through, for example, Western Union credit transfer. Geoff Hanlon commented that this payment method would be assessed. He then highlighted the Society's intention to build upon International Capacity Building activities.

Festival, where Tracey Brown of Sense About Science, David Adam of The *Guardian* and Peter Hayward of *Lancet Infectious Diseases* debated the challenges of publishing research.

Peer review is fundamental to integration of new research findings. It allows other researchers to analyse findings and society at large to weigh up research claims. It results in 1.3 million learned articles published every year, and it is growing rapidly with the expansion of the global research community. With that growth come new concerns — about getting the next generation of researchers to review in sufficient numbers, about maintaining the system's integrity and whether it can be truly globalised; and also new ideas — about alternative quality measures, technologies to prevent plagiarism, rewarding reviewers and training them.

To find out more about the preliminary results of this survey visit the Sense About Science website at **www.senseaboutscience.org.uk/index.php/site/project/395**

# New committee members

S*f*AM would like to welcome four new members of Committee. Here they introduce themselves

## Alison Kelly

I was originally introduced to the then Society for Bacteriology when working at the Institute of Food Research in Reading. My first degree in Biology and Food Science and Nutrition from Oxford Brookes University was achieved on a part time basis whilst working full time at IFR. I subsequently obtained my PhD in Microbiology with IFR and the University of Reading. During this time I was lucky to have worked with Dr Bernard Mackey and Professor Glenn Gibson as a Research Fellow at Reading, and Dr Rohan Kroll before that at IFR, on diverse food-related research projects. These included: predicting the thermal inactivation of bacteria in a solid matrix, population dynamics during the stationary phase of *Campylobacter jejuni*, the physiology and respiratory activity in *Listeria* spp, as well as microbial fuel cells for the rapid enumeration of bacteria and the direct epifluorescent filter technique to enumerate bacterial spores.

I am currently at Kingston University where I am a Senior Lecturer in Microbiology, lecturing to Biomedical Science, Pharmacology, Pharmacy and Nutrition undergraduates and Biomedical Science postgraduates. My current research interests include method development and analysis of the antibacterial, anti-ageing and anti-oxidant properties of plant-based products, the efficacy of disinfectants towards medically important staphylococci, and mapping weather patterns in *E. coli* O157:H7 infections. I am very happy to have this opportunity to serve on the Committee and add to my initial food safety Micropod podcast from Christmas 2008. I am also very much looking forward to my new role as Regular Content Editor for the *Microbiologist*.

## Samantha Law

After completing a degree in Applied Biology (Molecular and Microbiology) at Nottingham Trent University, I studied the 'Microbial biochemistry of slow sand filters' for my PhD at the Robert Gordon University in Aberdeen. Since then I have retained an interest in microbial communites and biofilm formation. Thus far, I have had a varied career and have been involved in the microbiological monitoring of waste water treatment plants and coastal waters, lectured in food microbiology, worked on a European Union project to improve the microbiological monitoring of sterilised milk and have monitored the quality of beer produced at Guinness.

Since 2005, I have been the Production Supervisor and Senior Culture Collection Scientist at NCIMB. This has gained me a rounded experience as one of my roles is to maintain a wide spectrum of different strains in the current bacterial culture collection and ensure that an agreed number of new bacteria are added to the collection every year. I am mainly responsible for the Gram-negative bacteria but do occasionally work with Gram-positives!

I have been a member of S*f*AM for a number of years and I am delighted by this opportunity to serve on the Committee.

**Sally J. Cutler**

My passion for Microbiology started with a BSc degree course from University College, London from which I graduated in 1981. I then worked in diagnostic bacteriology laboratories at The Royal London and Stoke Mandeville Hospitals before moving into a research role on Lyme borreliosis based at Charing Cross Hospital (now part of Imperial College London). Whilst in this post, I obtained my PhD in 1992 through part-time study. I continued my post-doctoral research on spirochaetes but switching towards those causing relapsing fever. Following these studies I was awarded the W H Pierce prize in 1994.

I subsequently moved to the Veterinary Laboratories Agency, Weybridge in 2002, where I broadened my research interests to include other bacterial zoonoses such as *Brucella*, *Leptospira*, and *Coxiella*. From this post I have moved into academia in 2007, where I currently hold a Readership in the School of Health and Bioscience at the University of East London. I additionally serve as an associate editor for Clinical Microbiology & Infection and for Ticks and Tick-borne Diseases, as a member of the Institute of Biomedical Science (IBMS) virology advisory panel, and on the IBMS London Regional panel. My research interests are still largely focussed upon spirochaetes and bacterial zoonoses, particularly those with an impact upon developing countries.

I have been a member of S*f*AM since the days when it was the Society for Applied Bacteriology. I currently serve on the meetings subcommittee and have been a regular participant at S*f*AM meetings for a number of years, both as a presenter and member of the audience. I hope that my varied background and diverse experience will help me represent a large proportion of our membership at Committee level and look forward to supporting our new and evolving society membership over the forthcoming years.

**Mark Reed**

My career began working in the microbiology laboratories at the Arrowe Park and Clatterbridge Hospitals on the Wirral whilst attending university in Liverpool. This followed a then traditional route of training towards state registration as a Medical Laboratory Scientific Officer. Having enjoyed a start to my career at the bench, I moved into the commercial world with Gibco (Life Technologies), and gained experience in the UK microbiology and tissue culture markets, before moving onto industrial bio-processing, and later into business development, and marketing management in Europe and Scandinavia.

International travel soon became a large part of the roles that I held, and realising that new challenges should never be ignored; in 1989 I joined the Pro-Lab Diagnostics Group of companies with its Head Office in Canada and was charged with the responsibility of setting up a European Division. The following 20 years were certainly challenging presenting many opportunities, and the chance to gain valuable additional business experience and qualifications. The company now employs 16 staff and is recognised internationally for the supply of numerous high quality *in vitro* diagnostic kits and reagents.

Having originally joined a membership sub-committee of S*f*AM several years ago, I am delighted to have been nominated and then approved as a full member of the S*f*AM Committee and look forward to the contributions that I feel I can make given an extensive and varied international commercial and scientific background.

# journalWatch

News about the Society's journals


***Journal of Applied Microbiology***
***The following articles published in 2009 were the most downloaded articles from Journal of Applied Microbiology between January – September 2009:***

Applications of cyanobacteria in biotechnology. R.M.M. Abed, S. Dobretsov and K. Sudesh. **Vol. 106**, No. 1, January 2009

Microbial nitrilases: versatile, spiral forming, industrial enzymes. R.N. Thuku, D. Brady, M.J. Benedik and B.T. Sewell, **Vol. 106**, No. 3, March 2009

The bacteriophages in human and animal body -associated microbial communities. A. Letarov and E. Kulikov, **Vol. 107**, No. 1, July 2009

The effect of climate change on the occurrence and prevalence of livestock diseases in Great Britain: a review. P. Gale, T. Drew, L.P. Phipps, G. David, M. Wooldridge, **Vol. 106**, No. 5, May 2009

Plant growth promotion and biological control of *Pythium aphanidermatum*, a pathogen of cucumber, by endophytic actinomycetes. K.A. El-Tarabily, A.H. Nassar, G.E.St.J. Hardy and K. Sivasithamparam, **Vol. 106**, No. 1, January 2009


***Letters in Applied Microbiology***
***The following articles published in 2009 were the most downloaded articles from Letters in Applied Microbiology between January – September 2009:***

Comparison of T-RFLP and DGGE techniques to assess denitrifier community composition in soil. K. Enwall and S. Hallin, **Vol. 48**, No. 1, January 2009

Bacterial spoilage of wine and approaches to minimize it. E.J. Bartowsky, **Vol. 48**, No. 2, February 2009

Assessment of the bacterial diversity of breast milk of healthy women by quantitative real-time PCR. M.C. Collado, S. Delgado, A. Maldonado, J.M. Rodríguez, **Vol. 48**, No. 5, May 2009

Isolation and characterization of alginate-degrading bacteria for disposal of seaweed wastes. J.-C. Tang, H. Taniguchi, H. Chu, Q. Zhou and S. Nagata, **Vol. 48**, No. 1, January 2009

The antimicrobial activity of four commercial essential oils in combination with conventional antimicrobials. S.F. van Vuuren, S. Suliman and A.M. Viljoen, **Vol. 48**, No. 4, April 2009


***Environmental Microbiology***
***The following articles published in 2009 were the most downloaded articles from Environmental Microbiology between January – September 2009:***

Quorum sensing in *Pseudomonas aeruginosa* biofilms. T.R. de Kievit, **Vol. 11**, No. 2, February 2009

Insights on *Escherichia coli* biofilm formation and inhibition from whole-transcriptome profiling. T.K. Wood, **Vol. 11**, No. 1, January 2009

Applications of the rep-PCR DNA fingerprinting technique to study microbial diversity, ecology and evolution. S. Ishii, M.J. Sadowsky, **Vol. 11**, No. 4, April 2009

Comparative day/night metatranscriptomic analysis of microbial communities in the North Pacific subtropical gyre. R.S. Poretsky, I. Hewson, S. Sun, A.E. Allen, J.P. Zehr and M.A. Moran, **Vol. 11**, No. 6, June 2009

Effect of PCR amplicon size on assessments of clone library microbial diversity and community structure. J. A. Huber, H. G. Morrison, S.M. Huse, P. R. Neal, M.L. Sogin and D.B.M Welch, **Vol. 11**, No. 5, May 2009


***Microbial Biotechnology***
***The following articles published in 2009 were the most downloaded articles from Microbial Biotechnology between January – September 2009:***

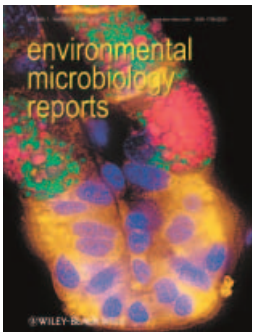
Bioremediation, a broad perspective. P. van Dillewijn, H. Nojiri, J. R. van der Meer and T.K. Wood, **Vol. 2**, No. 2, March 2009

Uracil influences quorum sensing and biofilm formation in *Pseudomonas aeruginosa* and fluorouracil is an antagonist. A. Ueda, C. Attila, M. Whiteley and T. K. Wood, **Vol. 2**, No. 1, January 2009

A broad range of themes in *Microbial Biotechnology*. C. Daniels and J-L Ramos, **Vol. 2**, No. 1, January 2009

Positively regulated bacterial expression systems. T. Brautaset, R. Lale and S. Valla, **Vol. 2**, No. 1, January 2009

Microbial biotechnology for producing high volume chemicals. L.P. Wackett, **Vol. 2**, No. 1, January 2009




***Environmental Microbiology Reports***
***The following articles published in 2009 were the most downloaded articles from Environmental Microbiology Reports between January – September 2009:***

Climate change: a catalyst for global expansion of harmful cyanobacterial blooms. H.W. Paerl and J. Huisman, **Vol. 1**, No. 1, February 2009

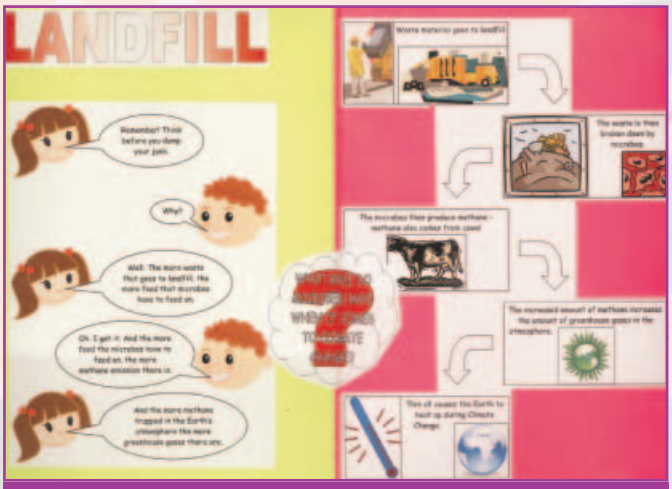
Crystal ball – 2009. **Vol. 1**, No. 1, February 2009

Bacterial diversity associated with freshwater zooplankton. H-P. Grossart, C. Dziallas and K.W. Tang, **Vol. 1**, No. 1, February 2009

Raman tweezers sorting of single microbial cells. W.E. Huang, A.D. Ward and A.S. Whiteley, **Vol. 1**, No. 1, February 2009

**Sam Holford**
Wiley-Blackwell

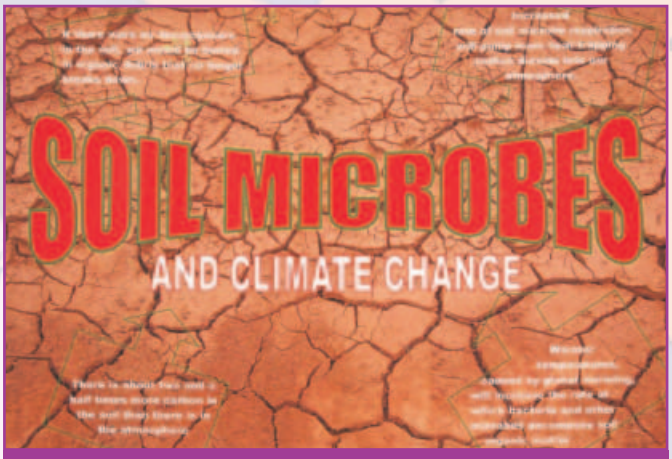
# MiSAC competition 2009: microbes and climate change




KS3 1st prize winning entry from Sophie Hill

The 21st annual Microbiology in Schools Advisory Committee (MiSAC) competition was a feature of MiSAC's 40th anniversary year. The topic for the competition was *Microbes and climate change*. The requirement was to produce an eye-catching poster to illustrate the role of microbes in climate change. The topic was chosen with the aim of developing an appreciation and understanding of the role of microbes in contributing towards climate change and their potential for providing solutions to some of the problems caused. Sponsorship for the competition was generously provided by the Society for General Microbiology (SGM).

Although the number of entries this year was by no means a record, the interest shown was particularly encouraging bearing in mind that the topic was a challenging one. It was clear from the reactions received from their teachers that many students enjoyed exploring a subject that extended their knowledge beyond the curriculum. There were some 350 entries involving almost 600 students from nearly 60 schools and colleges drawn from England, Wales, Scotland, Northern Ireland and Eire. As usual, Key Stage 3 (KS3) provided the larger entry group but it is encouraging to see a continuing increase in support from the Key Stage 4 (KS4) age group which this year provided almost half of the entries. The recent and welcome trend for some schools to send entries for both age groups, though still small in number, was maintained.




KS4 1st prize winning entry from Eadie Shaw, Rosie Stewart and Sara Spiers

The SGM Deputy Chief Executive Janet Hurst and Education Manager Dariel Burdass represented the sponsors on the judging panel which also included the Chairman and other members of MiSAC, including S*f*AM member, Martin Adams. The judges looked particularly for originality and a balanced content allied to presentation of a strong visual impact, and effectiveness in communicating sound science to a peer group. The high quality of many entries in both age groups was very impressive and the creative approach taken, particularly in the KS4 group, was most welcome.

There was strong evidence of a good grasp of the purposes and nature of a poster, perhaps aided by the guidance provided for entrants. Other good features were evidence of scientific merit, the use of entrants' own words, and not entire text taken directly from the web, and the use of attractive and relevant illustrations to reinforce the message. It was again very encouraging this year to see an excellent level of adherence to the entry rules, i.e. a poster of A3 size, illustrating *one* important aspect of the role of microbes in climate change.

Cash awards were made to the 1st, 2nd and 3rd prize winners and to their schools, and commended entries were awarded certificates. The prize winners in the KS3 age group were from Edgbaston High School, Birmingham (**Sophie Hill** — 1st), Portsmouth Grammar School (**Stephanie Tindall** — 2nd) and Orchard School, Retford (**Natalya Boswell** — 3rd), and in the KS4 age group from St Nicholas School, Fleet (**Eadie Shaw**, **Rosie Stewart** and **Sara Spiers** — 1st), The King's School, Ely (**Santiago Roldan** — 2nd) and Loughborough Grammar School[1] and The King's School, Ely[2] (**Michael Hsu**[1], **Charles Jordan**[2] — 3rd). In addition, each student entrant received a certificate and each establishment some microbiology teaching resources.

S*f*AM will be sponsoring next year's competition.

**MiSAC** is the Microbiology in Schools Advisory Committee. Its members represent a wide range of educational institutions and scientific organisations. For further information visit:
**www.microbiologyonline.org.uk/what.htm**

To see all the winning posters visit:
**www.microbiologyonline.org.uk/miswin09.html**

**John Grainger**
Chairman of MiSAC

# Healthy reporting on the HPV Vaccine

## media**watch**

microbiology and the media

If you have any views on science in the media which you think should feature in this column, please send them to the Editor at: **lucy@sfam.org.uk**

How did the media handle the death of Natalie Morton? Well, actually. With good science, an MMR-style panic was averted, writes **Tom Sheldon** of the Science Media Centre

Vaccines have been back in the news with the death of Natalie Morton, and some have rushed to criticise the media for cynically spreading rumour and misinformation. I imagine that many would expect the Science Media Centre, established to improve the quality of science reporting, to be leading the assault. But being on the front line between science and breaking news gives us a different perspective.

Yes, reports that whole vaccination programmes were being suspended were inaccurate. But that the vaccination programme was thrown 'into chaos' by the events of the time is undeniable. Local radio stations have been inundated with emails from worried parents, some questioning whether to allow their daughters the vaccine. And it was natural to wonder whether the vaccine had anything to do with Natalie's death. She had had a jab that day, and shortly afterwards she died. Who wouldn't ask questions? That is the job of journalists, and to address the possibility of a link was legitimate.

But what matters to me is that the best experts in the field are available and that journalists approach them for comment. Responsible, cautious scientists were everywhere that week, offering measured, evidence-based information. Where you didn't read or hear them, you can bet they were there in the background, informing science and health journalists about the facts of the matter.

On the flip side, campaigners got barely a sniff of the action. Anti-vaccine hysteria is easy to find, but we saw far less of it this week than during the MMR furore.

It doesn't come naturally to many scientists to step into the public arena when there is still uncertainty surrounding an issue. That's much more comfortable ground for a campaigner or a career politician. But should scientists and medical experts wait for all the facts before commenting? Absolutely not, especially where public health is concerned — the stakes are much too high.

The same goes for government officials, who at such a time should be seen and heard to be open and honest. Not to do so risks catastrophe. See an excellent editorial in Wednesday's *Times* for more on this theme.

The media we deserve, one could argue, would never respond to a breaking story; instead, it would wait patiently until all of the facts are known and verified, perhaps weeks later, and then quietly decide if it was worth reporting. Newstopia? Perhaps. But completely unrealistic.

It would be wrong to defend every piece of coverage. The anti-vaccine or anti-government editorial stance of some newspapers puts spin on the headline or the tone. Testimonies by individual citizens can mislead. But examine the articles themselves. *The Mirror* ran with *DON'T PANIC* in 3-inch-high letters, with a prominent quote from Professor Steve Field about the safety and efficacy of vaccination. *The Sun* went with "Tragic Natalie not killed by cancer vaccine". BBC Newsround published an excellent online Q&A with Dr David Elliman, where he laid out the facts about the HPV vaccine openly and honestly.

So I don't think this is, or was ever going to be, the next MMR. Why? Because we have learned too many lessons from last time. Scientists no longer hide away when a story breaks. Science and health reporters fight hard within their newsrooms for the right to cover their stories with factual accuracy. I know of one health journalist who argued vociferously on Wednesday to stop her editors splashing with *"ban this killer vaccine"*. Google this headline and you'll see who won.

One of the most frightening pieces of rhetoric I came across was in Wednesday's *Daily Mail*; not by a journalist, but by Dr Richard Halvorsen, who wrote: *"Yet the sudden death of a Coventry schoolgirl... highlights the reality that vaccination programmes are not without their risks."*

It highlights nothing of the sort. Halvorsen did not know there was a link to the vaccine (there wasn't). It was probably coincidence. By contrast, the specialist journalists, even before the coroner's statement was available, were more cautious.

We should not forget that behind all this is the loss of a human life. But more lives will be saved by scientists stepping in to defend a life-saving vaccine at a time when many teenagers and parents may be considering avoiding it. Without their involvement, and without specialist science and health journalists pulling in the right direction, things might have looked quite different.

**Tom Sheldon**
Science Media Centre

## acknowledgement

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## our policy on the media

We will:

- always do our best to provide facts, information and explanation.
- if speculation is required, explain the rationale behind that speculation.
- desist from hyping a story—whether it is the journalist or the scientist doing the hyping.

MED•VET•NET

## Europe's number one foodborne disease network draws the final curtain

Med-Vet-Net, arguably the EU's foremost Network of Excellence, has drawn the final curtain on five years of EC funding with the launch of a new report entitled, *Building a European Community to Combat Zoonoses*.

The report details Med-Vet-Net's long list of scientific achievements across the spectrum of its thematic disciplines from epidemiology and surveillance to risk research and disease control.

The Network, which concluded in October having ushered in a new era of scientific collaboration and preparedness across Europe, uniquely brought together more than 300 multi-disciplinary scientists from 10 countries to undertake research on the zoonoses and foodborne diseases that threaten public health.

Through previously inconceivable collaborations between medical and veterinary scientists, food science researchers, microbiologists, epidemiologists and risk analysts, Med-Vet-Net established a critical, interconnected mass of scientific experts who are now readily available to EU authorities in the event of an outbreak emergency, such as H1N1 ('swine flu'), Verocytotoxigenic *Escherichia coli* (VTEC), or egg-related salmonellosis.

Med-Vet-Net Project Manager, Professor John Threlfall of the UK's Health Protection Agency (HPA), said the fruits of the Network's scientific collaborations could not be overstated.

"*In the fight against disease it is critical that, as a European community, we can respond effectively, collectively and immediately*," Professor Threlfall said. "*Through Med-Vet-Net's work we now have standardised tests and tools, harmonised laboratory procedures, common strain collections and repositories of reagents, and a common language across Europe to enable us to more quickly and accurately detect and control the most serious foodborne disease threats*."

### A legacy of success

Med-Vet-Net's 25 multi-partner scientific projects yielded an unparalleled catalogue of results, many with significant and tangible benefits to the European Community, including:

- New tests for earlier and more accurate detection of *Salmonella*, VTEC, Q-fever, pig trichinellosis and foodborne virus diseases
- A real-time surveillance network of food borne infections in Europe (PulseNet Europe)
- An online atlas comprising a series of maps showing the spread and incidence of the 10 most important types of *Salmonella* in Europe ('*Salmonella* Atlas')
- A new serological test that measures antibodies in blood serum as an indicator of


### med-vet-net

**Med-Vet-Net** was initiated in September 2004 and funded for five years by the European Union (EU) 6th Framework Programme within the 'Quality and Safety of Food' Priority Area. The Network concluded on 31 October 2009. Med-Vet-Net brought together many of Europe's most prominent research groups working on the detection and control of zoonoses. By adopting multi-disciplinary and multi-national approaches, Med-Vet-Net enabled knowledge throughout the food chain to be shared across regional, national and international borders.


past infection, offering a more accurate picture of disease incidence

- The first ever food-based detection in Europe of particular genes associated with resistance to beta-lactam, aminoglycoside and flouroquinolone antibiotics
- Identification of infection rates in different countries of foodborne disease in humans
- New methods of assessing risks to consumers and the impact of control measures
- Identification of the burden of infection of foodborne disease — the costs and impact to the community

## Staying together — the Med-Vet-Net Association

Med-Vet-Net's most enduring legacy however will be its own continuing existence. Launched in early October, the newly formed and self-funded Med-Vet-Net Association, comprising all 14 of the Network's scientific partners, will build on the success of its predecessor, strengthening the existing partnerships and forging new collaborations both within Europe and around the world.

It is anticipated that the Association will continue to support ECDC and EFSA in their activities, and also develop new areas of collaboration including support in providing the scientific evidence for risk assessors, risk managers and policymakers. Like Med-Vet-Net, the new Association will also actively communicate and disseminate its research results and achievements through publications, scientific meetings, a website, news bulletins and networking.

At the helm of the Med-Vet-Net Association is newly elected President, Dr Valérie Baduel of the French Food Safety Agency (AFSSA) with Dr Roberto La Ragione of the Veterinary Laboratories Agency (VLA) as Vice-President. The Project Management team comprises Project Manager and Association Secretary, John Threlfall of the HPA, and Treasurer Arnaud Callegari, also from AFSSA.

## Joining up

The Association has kicked off offering three levels of membership: Full members, who at present are some of the existing Med-Vet-Net partner institutes; Associated members, comprising small to medium-sized research groups in the field of zoonoses; and Acceded members, who will, for the most part, be industrial organisations and companies.

The Association's priority is to bring new research groups under its wing to ensure the fight against zoonoses in Europe maintains the collaborative momentum generated by Med-Vet-Net.

Dr Baduel, Association President, said continuing Med-Vet-Net's success was the only way to ensure Europe stays in the fittest possible shape to tackle the scourge of zoonotic diseases: "*The new horizons are new diseases, which is why it is essential we maintain the momentum of Med-Vet-Net and continue to develop and remain a major focus for European activities targeting the prevention and control of zoonoses*."

**Tania Cutting**
Communications Adviser
Med-Vet-Net

## information

For more information about the Med-Vet-Net Association, or to download a copy of Med-Vet-Net's showcase report, *Building a European Community to Combat Zoonoses*, visit **www.medvetnet.org**

# Summer Conference 2009 Report

## Manchester Metropolitan University, UK, Monday 6 to Thursday 9 July 2009

This year's summer conference was held in the vibrant and bustling city of Manchester during the city's International Festival. Manchester Metropolitan University was the venue and provided an ideal mix of lecture hall and communal areas where we all gathered to peruse the posters, mingle with other delegates and chat to those at the stands at the Trade show.

The conference began on Monday evening with a fascinating lecture looking at the past, present and future of prion zoonoses. This was kindly presented by Professor John Collinge of the National Hospital for Neurology and Neurosurgery, London.

**Lucy Harper**

The conference continued on Tuesday with a session on **Arthropod borne zoonoses**. Malcolm Bennett (Liverpool University, UK) gave the first talk entitled "*What is a zoonosis?*" This fascinating talk gave an overview of zoonoses and why they are a public health concern. Malcolm began his talk with a history and background of zoonoses. Around 75% of human emerging infectious diseases are zoonotic, as are around 60% of all human infectious diseases and around 33% of zoonoses transmissible between humans. Malcolm concluded his talk with a revised definition of a zoonosis as: *"disease in a human animal owing to transmission of infection from a non-human animal"*.

Nils Chr. Stenseth (University of Oslo, Norway) continued the session by speaking on "*Plague — historical perspectives to modern infection trends*". Nils began by reminding us that whilst it may seem as though the plague is no longer a threat to human health, in Central Asia and other parts of the world, *Yersinia pestis* still sporadically infects humans. The plague bacterium, continues to circulate within the wild rodent population of these areas. Nils discussed his work in Kazakhstan studying gerbils, often the source of human plague in the country. This study found a link between climate variation and instances of plague and it is thought this climate variation is one of the limiting factors which helps control the disease. However, the plague is a re-emerging disease and we should be aware that it could once again become a threat to human health.

Following this, Sue O'Connell (Health Protection Agency, Southampton, UK) discussed "*Lyme borreliosis — facts uncertainties and myths*". Lyme borreliosis has been researched extensively for the past 30 years. Sue discussed causes and clinical presentation of this disease which varies between the USA and Europe. She concluded her presentation by discussing treatment of the disease.

Bruno Chomel (University of California, USA) gave the next presentation on "*Bartonellosis an increasingly recognised zoonosis*". Bruno presented a basic introduction to *Bartonella* species before going into more detail about the many different diseases caused by this species of bacteria. Bruno told us a little about the history of bartonellosis which was first recognised in Peru and was known as Carrion's disease. Since then *Bartonella* species have been linked to many different diseases including trench fever which is most associated with World War One but still circulates in homeless populations today via the human body louse. Bruno then discussed a "new clinical entity" Cat Scratch Disease (CSD). This is transmitted from cat to cat by fleas and in turn transmits via cat scratches to humans. In the USA, 28% of pet cats test seropositive for *Bartonella henselae* the causative agent of CSD. In atypical cases it can cause problems such as endocarditis and encephalitis. Bruno concluded by discussing research into *Bartonella bovis* which causes endocarditis in cattle, as well as *Bartonella henselae*.

Sally Cutler (University of East London) gave the penultimate lecture of the session entitled "*Relapsing fever — forgotten but not gone*". Sally began by explaining what relapsing fever is — a disease which is caused by spirochaetes and as the name suggests, causes a high fever, followed by a period of a few days of apyrexia (no fever) then a recurrence of the fever and associated symptoms (headache, muscle pain abdominal pain and joint pain). This cycle can occur up to 13 times! As this disease is spread through human lice, there has been an overall decline in cases of louse-borne relapsing fever (LBRF). However, in certain populations this is not the case. Sally described how in some prison communities LBRF is on the increase and described a case of a prisoner being moved from their bed and a sea of grey lice being left behind. Sally posed the question whether now we were being encouraged to do laundry at lower temperatures could louse-borne infections begin to increase?

The final speaker of this session was Nick Phin (Health Protection Agency, UK) his topical presentation was on "*Swine Influenza — a 21st century pandemic*". Nick gave an overview of the pandemic so far and also showed current figures for the spread of the pandemic. Nick discussed what we had learnt from previous influenza pandemics in the UK and the measures we are taking in the UK to manage the current pandemic.

Tuesday afternoon saw a session on **Wildlife and companion animals**. The first speaker of this session was Tiziana Lembo (University of Glasgow UK) who discussed "*Bats, bites and fury — can we control rabies?*" Rabies has been feared for thousands of years and there have been


## information

For more information about the Society's meetings please visit the website at: www.sfam.org.uk

You can also find details of next year's meetings on pages 27 to 31 of this issue of *Microbiologist*

# Fur, feather and fever — zoonotic challenges of the 21st century

references to the disease as early as 2,300 BC, yet it has not been eliminated. There is still no cure for the disease once a person presents with clinical symptoms. In Africa and Asia, incidences of human rabies infection are increasing. Tiziana discussed one of the current methods of controlling rabies, compartmentalisation. This involves controlling infection rates within the reservoir population using mass vaccination. It was first trialled in fox rabies in Europe and was very successful. Since then it has also proved successful in controlling dog rabies in Mexico. However, whilst these methods are known to be successful, rabies is still uncontrolled in Asia and Africa. There are many reasons for this both social and environmental. Tiziana then discussed some case studies in Tanzania where dog vaccination programmes had been successful in controlling rabies. Tiziana and her team are now looking at alternative ways to control the disease including developing new targeted, methods of distributing vaccine and educating policy makers about the economic impact of rabies.

The second talk of the afternoon came from Glyn Hewinson (Veterinary Laboratories Agency UK), and was entitled "*Controlling wildlife reservoirs for bovine tuberculosis*". Bovine tuberculosis (bTB) costs the world economy around $3 billion annually. Glyn discussed three different control methods for bTB in, Australia, New Zealand and Great Britain and Ireland. Glyn summarised by discussing the three methods of controlling wildlife reservoirs for bTB:

- Keeping cattle and the reservoirs apart
- Culling wildlife reservoirs
- Vaccination

Glyn concluded by explaining that all three methods have their own merits and should not be viewed as mutually exclusive.

Anna Meridith (University of Edinburgh, UK) presented the next talk on "*Zoonoses in UK wildlife and their detection through sentinels*". The first known example of a sentinel is the use of canaries by coal miners to detect toxic gases such as carbon monoxide. Sentinels are used as early warning systems for disease, in this case animals used as indicators of the presence or absence of a disease. Anna presented her research and results from an ongoing study investigating both predator and prey populations as well as scavenger populations in the use of carnivores as sentinels. Anna explained they were looking at three different pathogens, *Encephalitozoon cuniculi*, *Leptospira* species and *Coxiella burnetii* and presented the results of the study to date.

Next Tiziana Lembo (University of Glasgow, UK) presented on "WHO initiative for the control of neglected zoonotic diseases"(NZDs). Many endemic tropical diseases are classified as neglected by WHO, these include rabies, anthrax and brucellosis and are mostly present in developing countries. These diseases help to perpetuate poverty as they threaten people's health and livelihoods and so their control in the developing world is imperative. However, there are real challenges facing any attempt to control NZDs as there is often a poor veterinary infrastructure and zoonotic diseases are often classified as neither medical nor veterinary. Tiziana explained that in order to control NZD's a combined approach from different sectors, veterinary, livestock and human health is required.

**Clare Doggett**

The following session was by Marc Artois (Ecole Nationale Veterinaire, France) on "*Controlling wildlife zoonoses without eliminating wildlife*". Marc described how, in Europe, during the last few decades, several trials have attempted to control the reservoir of zoonotic pathogens by limiting the size of the maintenance host population below a minimal threshold level. This approach has so far had limited success in eradicating rabies and *Mycobacterium bovis* by culling red foxes and Eurasian badgers respectively. The use of vaccines instead of elimination has also been trialled in red foxes, deer and feral horses. Marc then went on to discuss the concepts of 'zoning' and 'compartmentalisation' and suggested that at present there remains a gap between the theory and practice in controlling zoonotic agents without killing their host.

The lectures continued with the theme "**Livestock and foodborne zoonoses**". The first in this series of lectures was presented by Pierre Wattiau (VAR, Belgium) and was entitled "*Anthrax — wool sorters disease in Belgium*". After reminding the audience of the organism and diseases caused by *Bacillus anthracis*, Pierre described an investigation into the microbiological flora of a Belgian scouring factory, which processed wool and goat hair from all over the world. Anthrax spores were found in goat hair fibres, air dust and unprocessed wastewater. Although no cases were proven, a low number of workers demonstrated positive serology against anthrax (none had been previously vaccinated). Next, there was a fascinating presentation by Philip Elzer (Louisiana State University, USA) on "*New challenges and perspectives on Brucellosis*". Recently, new *Brucella* strains have been isolated from marine mammals and voles. In animals, brucellae are linked with reproduction problems, but in humans the illness can cause fever, chills, malaise, arthritis, dementia and possibly death and infection requires prolonged antibiotic treatment to prevent relapse. Of all the different species, *Brucella melitensis* (found in goats and sheep) has the lowest infective dose (1-10

organisms). Philip finished by discussing the current vaccines available, their effectiveness and how current strict regulations on the control of *Brucella* make it difficult to do further research on the organism. The final lecture of the morning was given by Rachel Chalmers (NPHS Swansea, UK) on the subject of "*Cryptosporidiosis — challenges for control*". Rachel described the common symptoms of cryptosporidiosis which has a mean duration of 12.7 days, with 14% of patients requiring hospitalisation. The infectivity of cryptosporidia may be as little as one oocyst and how each oocyst contains four infective sporozoites. Infection in man is usually caused by either, *Cryptosporidium parvum* (through contact with farm animals) or *Cryptosporidium hominis* (through foreign travel). Rachel then went on to discuss an unusual outbreak of cryptosporidiosis in the East Midlands area of the UK from June 2008. Here, 23 patients developed symptoms and were diagnosed with a very unusual genotype of cryptosporidia, which appeared to affect females more than males, possibly due to greater water consumption in the former. Eventually the source was traced back to a dead rabbit in the chlorine control tank, which explains why the rabbit genotype was detected.

After lunch, we were treated to a very entertaining talk by Didier Raoult (Unite des Rickettsies, Marseille, France) on "*Unravelling the mysteries of Q fever*". Didier described the reason why the causative organism was previously described as a *Rickettsia* species. This organism is hardy and can survive inside amoebae, at low pH and for 60 minutes at 60°C and can even multiply inside macrophages. Now called *Coxiella burnetii*, Didier went on to describe the infective stages and that the most common route of infection is from sheep and goats. Males in rural communities are most at risk with a ratio 2.5:1 against their female counterparts. This differential is not seen in children and it has subsequently been shown that the oestrogen component (17β-oestradiol) provides the protection for females. The final talk in this session was given by Tom Humphrey (University of Bristol, UK) on the subject of "*Farm to fork — are happy animals safer animals*?" Tom described the two huge challenges for the EU of eliminating *Campylobacter* in broilers and *Salmonella* in eggs. Vaccination is achieving success in the latter, but *Campylobacter* is still present in 70% of chicken carcasses and causes illness in 1% of the population of the EU, of which 70% have chicken involvement. Stressed chickens produce more noradrenalin, which affects iron concentration and removes lactobacilli, creating the opportunity for *Campylobacter* colonisation, whilst also increasing the virulence of *Campylobacter jejuni* often leading to liver invasion. This liver invasion and inflammation, allows the gut to become more permeable allowing easier tissue invasion. Finally, Tom went on to describe how co-infections with *Campylobacter* and other enteric pathogens (EPEC), also allows *Campylobacter* to destroy the liver! Tom's presentation concluded a very enlightening and entertaining series of lectures.

**Steve Davies**

After the coffee break, Wednesday afternoon was dedicated to presentations by student members of the Society. Gemma Chaloner opened this year's student session with a presentation on the genetic structure of *Bartonella henselae* isolates from the UK. Gemma's work utilises Multilocus

sequencing typing (MLST) to investigate associations in sequence type and host species of human and feline isolates. Her results indicate that the UK population demonstrates a similar genetic structure to that described in the rest of the world, with human isolates belonging to a genetically-limited subset of the *B. henselae* population.

A comparison of serological methods for the detection of *Chlamydophila abortus* in experimentally infected pregnant ewes was discussed by Patricia Marques. Her research concluded that an immunoblot technique was more sensitive than two commercial ELISA assays, for the detection of *C. abortus* in animals challenged both sub-cutaneously and orally.

Next Emma Moynihan gave a presentation on pathogen survival in soil and the biotic factors which may contribute to pathogen inactivation. Emma discussed the need to identify and clarify the role of biotic factors such as microbial diversity and community complexity. Further work was described to tack pathogen survival in soil mesocosms which contain a gradient of microbial diversity.

The final talk was given by Philip Richards who presented his research investigating best hygiene practices in the production of venison in the UK. By determining the microbiological quality and pathogen contamination levels of venison meat, Philip has been able to conclude that there is little difference in the hygienic status of deer carcasses slaughtered in an abattoir compared to in the field. Philip noted however this is dependent on standard methods and hygiene practices being followed precisely.

The student session was a great success, with four excellent presentations and once again illustrated the high calibre research being undertaken by student members of the Society.

**Victoria McCune** Newcastle University

The final session of the conference was on **Emerging and re-emerging zoonoses**.

The first presentation of this session was given by Nigel French (Massey University, New Zealand) who talked to a slightly jaded audience (this was the morning after a very successful conference dinner) about the challenges and

*Members of PECS enjoying the conference dinner*

successes of modelling zoonotic disease. He used an example of human campylobacteriosis in New Zealand where numbers have halved over the last year. Models were used throughout the control strategy in this example. Comparative modelling tools, using epidemiological, genotyping and microbial exposure data were described and their use in monitoring other zoonotic pathogens was explained.

The second presentation, with a title recognised by the Star Wars fans in the audience was: "*MRSA ST398: attack of the clones, an organism on the move*" and was presented by Mark Fielder (Kingston University and S*f*AM Honorary General Secretary). Mark began by explaining that MRSA strain ST398 is an animal-specific strain which could potentially be deemed a new zoonosis. He spoke about its association with treatment problems in hospitals and the importance of clear communication about this sometimes controversial subject. Mark then went on to describe the holistic approach being adopted in the study of this strain in comparing it with other *Staphylococcus* strains. He described their approach to investigating both animal and human isolates for discrepancies in phenotypic, genotypic and proteomic characteristics of this 'fit' pathogen.

Following this came Dilys Morgan (Health Protection Agency Centre for Infections, London) who asked the question: "*Predicting pandemics or scaremongering?*" Dilys began by describing the current situation regarding information about infectious diseases, quoting the WHO (2005): "*77% of the world's first news about infectious disease events now comes from informal sources including press reports and the internet*". She also explained that an 'event' can involve either cases of actual disease in humans, or the potential exposure of humans to a disease. The reporting of events has changed over recent years due to technological development, including text messaging and blogging/microblogging. Dilys explained why event-based reporting was used and she described multiple surveillance systems which have been set up to detect medical events. She emphasised the importance of assessing the zoonotic potential of animal infections in risk surveillance, as well as the importance of the use of robust and clear terms when communicating risk in reporting infectious disease.

The following presentation in this fascinating session was presented by Ernest Gould (Unites des Virus Emergents, Marseille, France) whose talk was entitled: "*Emerging/re-emerging viral zoonoses*." Ernest began by defining an emerging infectious disease as: an infectious disease with an incidence that has increased in the recent past, is currently increasing or threatens to increase in the near future. He went on to list some of the human activities which influence virus emergence and re-emergence, including transportation, outdoor activities and land reclamation and urbanisation programmes. Ernest then gave the audience an outline of the vectors and the influence of human activity on the spread of a number of emerging/re-emerging viruses, from dengue virus to hantavirus, arenaviruses and chikungunya.

The final presentation of this session was given by David Hill (Director of the National Travel Health Network and Centre (NaTHNaC) and Honorary Professor of London School of Hygiene and Tropical Medicine). He spoke about: "*travel and its influence on infectious disease dynamics*." He began with an overview of the driving forces for emerging infectious disease including environmental and demographic changes, globalisation in trade, changes in lifestyle and increased travel. There are 70million UK residents who travel overseas each year and one billion international travellers globally, so a disease that occurs in one corner of the world can be carried within a day to another corner thousands of miles away.

David used influenza to illustrate the global spread of infection and informed us that the current pandemic influenza strain was originally found in children in southern California on 21 April 2009. He described the evolution of the H1N1 influenza virus and acknowledged a number of the questions that the spread of H1N1 has raised about the nature of this disease, including its pattern of spread in the Southern hemisphere and the safety and efficacy of preventative vaccines. David then touched upon other imported infectious diseases and surveillance and risk assessments made in attempting to control their spread. A combined approach where risks are identified through surveillance and then clearly conveyed to travellers, will help in controlling the spread of infectious disease. David concluded with a quote from Margaret Chan of the WHO (May 2009) who said: "*between the extremes of panic and complacency lies the solid ground of vigilance*".

The conference was a great success and the scientific sessions were interspersed with some excellent social activities, including the ever-successful Quiz Night, hosted by our Honorary General Secretary Mark Fielder and the Trade Show, where exhibitors and delegates mingled over a glass of wine and an anagram quiz. This was followed by the Bad Bugs Book Club (see *Microbiologist*, vol. 10 no. 3 p26). On the final evening of the conference was the conference dinner, at which the S*f*AM Communications Award winner, Anthony Hilton, provided us all with an entertaining, yet evocative speech emphasizing the importance of scientists communicating with the general public through the media and to school children.

**Lucy Harper**

# Environmental Microbiology Lecture report

This year, the annual lecture held to celebrate the journal *Environmental Microbiology* was entitled "*Deciphering microbial community dynamics from genomes to biomes*" and was presented by Professor Ed DeLong, Distinguished Professor, Departments of Biological Engineering and Civil and Environmental Engineering, Massachusetts Institute of Technology (MIT). The event, held at the Royal Society of Medicine, was well attended by many high-profile microbiologists. Professor DeLong, a world leader in the field, explained the techniques he and his team are using to examine microbial genomics and metagenomics.

"*There are more microbes in the ocean than stars we can see in the sky*", he said. The diversity of these oceanic microbes is one of the reasons the ocean is used for microbial studies. Prof. DeLong explained that new technologies are being developed to give scientists an accurate way of measuring and classifying microbial life in the ocean. Through genomic analysis it is now possible to better understand the biodiversity of microbes in the environment without being restricted to what will grow in culture in the laboratory. However, genomic studies still don't explain the biochemistry or physiology of these microorganisms. By studying these microbes at the genetic, biochemical, community and environment levels, Prof. DeLong and his team are working towards understanding why certain genes and proteins are expressed, and what their ecological relevance is. At this level, they are looking at the contribution that microbes make to energy flux and matter cycling on earth.

Initially Prof. DeLong took us through a brief history of microbial analysis techniques, from the limitations of culture techniques, through to molecular phylogenetic analysis, a technique which isn't limited to the nature of growth media. He then moved on to classic genome sequencing technology, looking at sequence data which can be analysed individually or through cluster analysis. Prof. DeLong explained his work with the Monterey Bay Aquarium Research Institute on microbial plankton using bacterial artificial chromosome (BAC) libraries and asked the question: does the genome content tell us anything about the biochemistry or physiology of organisms we've not been able to culture?

Prof. DeLong explained the myriad of techniques he and his team have used and the enormous number of results they've generated to alter the way we think about energy transfer from light to biochemical energy within bacteria through rhodopsins.

He and his team have examined the genes of organisms collected from various depths of the ocean just off Hawaii, the expression patterns of which can tell us a lot about the organisms that live at such depths. They have also looked within communities of bacteria using genomic techniques to find out which genes are expressed by these populations, whilst minimising perturbation of the population during sampling and analysis. This can provide information so detailed as to allow us to tell what time of day it is by just looking at the expression patterns of bacterial communities! "*That's an expensive way to tell the time*" said Prof. DeLong.

He concluded by talking about the environmental conditions necessary to regulate gene expression in some populations. "*We still have a lot to learn*", said Prof. DeLong, but it was clear that this community-based approach will contribute to expanding our knowledge of the living ocean and will ultimately help us understand the relationship between us (humans) and microbial species.

Prof. DeLong was presented with a commemorative plaque by Ken Timmis, Chief Editor of *Environmental Microbiology* and Geoff Hanlon, *S*fAM President (see below).

The lecture is available online at: www.yada-yada.co.uk/Blackwell/SFAM2009/SfAM2009.html.

**Lucy Harper**
Communications Manager

## Monday 11 January 2010

# Winter meeting

- **Advances in biocide development**
- **Tuberculosis**

■ Including the Denver Russell Memorial Lecture

**Royal Society, London, UK**

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**CPD ACCREDITATION 6 CREDITS**

## Programme

**10:00 - 10:30** **Tea, coffee and registration**

**Chair:** **Geoff Hanlon**

**10:30 - 11:15** **The Denver Russell Memorial Lecture — Biocides and public health: the more we look the more surprises we find**
G. McDonnell, Steris, UK

**11:15 - 11:50** **Development of new drugs for the treatment of latent tuberculosis**
Prof. Douglas Young, Imperial College London, UK

**11:50 - 12:25** **Pitfalls in the use of biocides in practice**
I. Hosein, North Middlesex NHS Trust, UK

**12:25 - 13:30** **Lunch**

### Session A Tuberculosis

**13:30 - 14:05** **Diagnosis of latent tuberculosis**
Prof. Agit Lalvani, Imperial College London, UK

**14:05 - 14:40** **Understanding the evolution of tuberculosis by palaeomicrobiology**
Dr Helen Donoghue, Centre for Infectious Diseases and International Health, University College London, UK

**14:40 - 15:00** **Tea and coffee**

**15:00 - 15:35** **Epidemiology of *Mycobacterium tuberculosis* infection**
Dr Grace Smith, HPA West Midlands Public Health Laboratory, UK

**15:35 - 16:10** **Bovine tuberculosis in the UK**
Dr Mike Hutchings, Scottish Agricultural College, UK

### Session B Biocides

**13:30 - 14:05** **European legislations: biocide product authorisation and the revision of the BPD**
Dr Ludger Grunwald, Ecolab, Düsseldorf, Germany

**14:05 - 14:40** **Laboratory testing of biocides: towards international harmonisation**
J Holah, Campden BRI, UK

**14:40 - 15:00** **Tea and coffee**

**15:00 - 15:35** **Bacterial mechanisms of resistance to biocides: significance in practice**
Jean-Yves Maillard, Cardiff University, UK

**15:35 - 16:10** **Biofilm evaluation — a necessity**
Rodney Donlan, CDC, Atlanta, USA

**The programme for this meeting was correct at the time of going to press**

# 2010 WINTER MEETING BOOKING FORM and INVOICE

## SfAM WINTER MEETING MONDAY 11 JANUARY 2010

**Only ONE person per form please. CLOSING DATE FOR REGISTRATIONS: Monday 21 December 2009**
**EARLY BIRD DISCOUNT of £30.00** is applied to all bookings made before **Friday 11 December 2009**

**Cancellation policy:** Up to 30 days prior to the event all cancellations will be subject to a 10% cancellation fee, up to 14 days prior to the event there will be a 50% cancellation fee, and no refunds will be given on cancellations made within 7 days of the event.

***Non members: You can add 1 year's membership to your event booking using this form, then register at the member rate and spend the same amount of money or less!**

| FEES | Before 11/12/2009 | Between 12/12/2009 and 21/12/2009 |
|---|---|---|
| Full member | £50 ☐ | £80 |
| Student member | £30 ☐ | £60 |
| Honorary member | £30 ☐ | £60 |
| Associate member | £30 ☐ | £60 |
| Retired member | £30 ☐ | £60 |
| Student non member | £60 ☐ | £90 |
| Non member | £100 ☐ | £130 |
| IBMS members | £75 ☐ | £105 |

## YOUR INTERESTS

Please indicate which of the two afternoon parallel sessions you wish to attend

**Session A:** Tuberculosis ☐ **Session B:** Advances in biocide development ☐

## *ADD MEMBERSHIP TO YOUR BOOKING

**Add Student membership (£25.00):** ☐ **Add Full membership (£50.00):** ☐

## YOUR DETAILS

**Title:**_____ **First Name:**_____ **Family Name:**_____

**Organisation/Affiliation:**_____

**Address:**_____

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**Please indicate any special dietary or other requirements (such as disabled access):**_____

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## YOUR PAYMENT

● **For all participants: The Society DOES NOT INVOICE for conference fees. Please treat your completed booking form as an invoice. Cheques must be in £ STERLING ONLY and made payable to 'The Society for Applied Microbiology'. Foreign cheques/ drafts MUST be negotiable for the full amount due.** We accept payment **ONLY** by the following credit and debit cards: VISA, Mastercard, Eurocard, Delta, Electron, JCB, Maestro and Solo.

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## Friday 16 April 2010

# Spring meeting

Latest developments in gastrointestinal infections

## 4th broadening microbiology horizons in biomedical science

■ Including the Procter & Gamble Lecture

**The Stratford Q Hotel, Stratford upon Avon, UK**

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**CPD ACCREDITATION 6 CREDITS**

## Programme

| | |
|---|---|
| **09:15 - 10:15** | **Coffee, tea, trade exhibition and registration** |
| **10:15 - 10:20** | **Chairman's welcome** |
| **10:20 - 11:00** | **Procter and Gamble lecture**<br>Topic and speaker to be confirmed |
| **11:05 - 11:35** | **Recent developments in *Salmonella***<br>Prof. John Threlfall, HPA Colindale, London, UK |
| **11:35 - 12:05** | ***E coli* O157**<br>Dr Geraldine Smith, HPA Colindale, London, UK |
| **12:05 - 12:35** | **Cryptosporidia**<br>Dr Rachel Chalmers, NPHS, Swansea, UK |
| **12:35 - 14:00** | **Lunch and trade exhibition** |
| **14:00 - 14:30** | ***Campylobacter* — a food microbiologist perspective**<br>Dr Frieda Jorgensen, HPA, Bristol, UK |
| **14:30 - 15:00** | **Developments in culture media**<br>Steve Dimmer, Oxoid, UK |
| **15:00 - 15:30** | ***Clostridium difficile***<br>Dr Jim Gray, Birmingham Children Hospital, UK |
| **15:30 - 16:00** | **The gut health of animals and food borne zoonoses**<br>Prof. Martin Woodward, VLA, UK |
| **16:00** | **Finish, tea and coffee** |

**The programme for this meeting was correct at the time of going to press**

# BOOKING FORM and INVOICE

## SfAM SPRING MEETING FRIDAY 16 APRIL 2010

**Only ONE person per form please. CLOSING DATE FOR REGISTRATIONS: Friday 9 April 2010**
**EARLY BIRD DISCOUNT of £30.00** is applied to all bookings made before **Friday 19 March 2010**

**Cancellation policy:** Up to 30 days prior to the event all cancellations will be subject to a 10% cancellation fee, up to 14 days prior to the event there will be a 50% cancellation fee, and no refunds will be given on cancellations made within 7 days of the event.

***Non members please note:** You can add 1 year's membership to your event booking using this form, then register at the member rate and spend the same amount of money or less!

| FEES | Before 19/03/2010 | Between 20/03/2010 and 9/04/2010 |
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| Full member | £50 ☐ | £80 ☐ |
| Student member | £30 ☐ | £60 ☐ |
| Honorary member | £30 ☐ | £60 ☐ |
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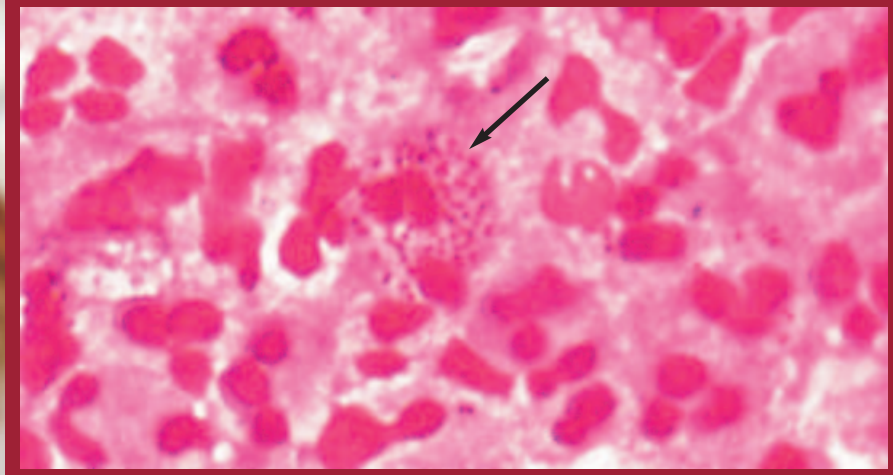


*Male urethral smear showing a background of polymorphs with gram negative intracellular diplococci (arrow) diagnostic of Neisseria gonorrhoeae*

# STIs

## Sexually Transmitted Infections: a universal and enduring epidemic

Sexually transmitted infections (STIs) are infections transmitted to and from the genital tract during unprotected sexual intercourse. The mucosa of the genital tract and the genital skin are the principal sites of pathogenesis for most STIs, although a few disseminate early after genital infection. More than 30 different bacteria, viruses and parasites are sexually transmissible. The key infections in the UK are syphilis, gonorrhoea, Chlamydia, herpes, genital warts and HIV. These infections comprise some of the most common infections in both industrialised and developing countries. The World Health Organisation (WHO) estimates that more than 340 million new cases of bacterial and protozoal STIs occur worldwide annually. STIs affect all communities and are largely hidden epidemics because of their biological and social characteristics. The spread of infection is rooted in human behaviour and closely linked to fundamental societal problems and history has proven that there are no easy solutions to the public health challenge presented by STIs.

## Epidemiology in the UK

In the UK, STIs are not notifiable diseases but data on infections treated in genitourinary medicine (GUM) clinics is collected nationally and reported by the Health Protection Agency (HPA). Substantial and increasing numbers of infections are also being diagnosed and managed outside GUM clinics — in general practice, community contraceptive services and a range of community healthcare initiatives. The past decade has seen a steady and substantial increase in the total number of cases of STIs diagnosed in the UK. The highest burden of infection is seen in young people aged 16-24 who represent only 12% of the population but account for nearly half of all the STI diagnoses made in the GUM clinics.

Genital tract Chlamydia infection is the most commonly diagnosed bacterial STI in the UK with more than 200,000 cases identified in 2008, more than double the number of diagnoses made 10 years ago. The true incidence of infection is unclear because the rise in cases partly reflects increased testing and the expansion of the National Chlamydia Screening Programme which performed more than a million tests in 2008. According to the HPA, the rate of identified Chlamydia infection exceeded 1,400 per 100,000 population in females aged 16 – 19 years in 2008. Gonorrhoea displays a similar spectrum of clinical disease to chlamydia but is much less common (135 per 100,000 population in females aged 16 – 19 years in 2008) and has shown a downward trend for the past five years. Syphilis remains relatively rare in the UK (2524 cases in 2008) despite the pronounced increase in infectious syphilis from 1997 to 2005. Unlike Chlamydia, syphilis and gonorrhoea show geographical clustering and are concentrated in specific population groups.

Diagnoses of first episode genital warts and genital herpes have steadily risen over the past decade. These are caused by Human Papillomavirus (HPV) and Herpes simplex virus (HSV) respectively. The number of reported cases of these viral infections poorly reflects their true prevalence because many infections are subclinical and undiagnosed. Serological surveys suggest the prevalence of HSV type 2 rises from zero before the onset of sexual activity to more than 20% by 40 years of age (Looker *et.al.*, 2008). Prospective cytology studies with repeated sampling have indicated that HPV infection is extremely common in the first few years after starting sexual activity. The crude age-specific HPV prevalence in women aged less than 25 years with normal cytology in the UK exceeds 20%. The WHO's HPV Information Centre states that the lifetime prevalence of genital HPV infection exceeds 50% in young people. Approximately 33 million people live with HIV worldwide (UNAIDS report, 2008) and an estimated 77,400 people were living with HIV in the UK at the end of 2007 (HIV in the UK 2008 report).

## Clinical aspects

Sexually transmitted infections cause a wide spectrum of disease ranging from latent/asymptomatic infection through localised genital symptoms to life threatening conditions including late stage syphilis, AIDS and squamous cell carcinoma of the uterine cervix. The most common clinical presentations relate to genital symptoms, either discharge from inflammation of the mucous membranes of the genital tract (urethra, vagina, endocervix) or a genital skin rash, notably ulceration or rash/spots. A high proportion of those infected with STIs within a population have no symptoms. Infected individuals who are unaware of their infection are a major source of ongoing transmission of infection. Some STIs can be transmitted from mother to baby during passage through the birth canal with potentially devastating consequences to the newborn baby.

## Mucosal infections

*Chlamydia trachomatis* and *Neisseria gonorrhoeae* primarily infect the mucous membranes of the urethra and endocervix, resulting in symptoms in men of urethral discharge and pain on passing urine and in women of vaginal discharge, intermenstrual/postcoital bleeding and abdominal pain. More than 90% of men with urethral gonorrhoea will have symptoms whereas the majority of the women with chlamydial or gonococcal infection will be asymptomatic. Both these infections can ascend the genital tract to cause abdominal pain in women from inflammation of the endometrium and/or pelvic organs or testicular pain and swelling in men from epididymitis. Pelvic infection in women can cause permanent scarring of the fallopian tubes and result in infertility, ectopic pregnancy or chronic pelvic pain. Past chlamydial infection is a significant cause of tubal factor infertility. Both *C. trachomatis* and *N. gonorrhoeae* can infect the rectum either by direct inoculation during penetrative intercourse or by passive spread of infected genital secretions in women. Rectal infection is usually asymptomatic but may cause discharge or perianal discomfort.

Chlamydia and gonorrhoea are not the only causes of mucous membrane inflammation of the genital tract. Non-gonococcal, non-chlamydial urethritis (NGU) is a relatively common condition causing discharge and dysuria in men. It appears to be sexually acquired in most cases. NGU is diagnosed on the basis of symptoms and evidence of inflammation in the discharge on microscopy. Extensive efforts to identify the cause of non-chlamydial NGU identified another pathogen in a proportion of cases: *Mycoplasma genitalium*. The cause in some other cases has yet to be identified. Mucopurulent cervicitis is the

female counterpart of male NGU but again, no pathogen is identified in most cases.

## Skin infections

The common skin presentations of STIs are either ulceration of the genital skin or the appearance of spots or bumps in the skin. Genital herpes is the most common cause of painful genital ulceration in the UK. Episodes may be mild such that the infected person does not seek clinical advice or they may present with severe pain, discomfort on walking, painful micturition, genital discharge, general malaise and fever. Once contracted, HSV persists in the dorsal root ganglia of sensory nerves supplying the infected area. Most of the time the virus is held in a latent state but can undergo intermittent and unpredictable episodes of reactivation. Symptomatic episodes are self-limiting, with initial attacks resolving within three weeks and recurrent attacks within a week. The frequency of attacks is very variable but infected persons may typically experience three or four attacks in the first year of infection, with recurrences becoming less common with time. Virus can be shed unpredictably at times when no symptoms are present.

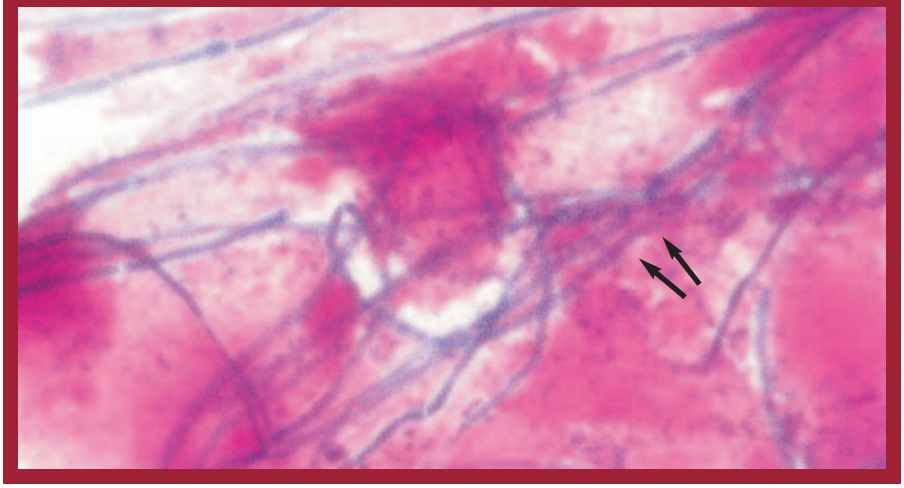
Syphilis is the STI that perhaps evokes most interest in patients presenting with genital ulceration, although it remains uncommon in the UK. The classical presentation of syphilis in its initial phase of infection is a painless ulcer (known as a chancre) with a thickened base and regional lymphadenopathy. The syphilis organism, *Treponema pallidum*, disseminates early from the site of entry and can cause disease in many organs in its secondary and later phases of infection, most commonly a generalised rash which can involve the palms and soles one-to-three months after infection.

There are sexually transmitted causes of genital ulceration other than herpes and syphilis. Chancroid, caused by *Haemophilus ducreyi*, and *Lymphogranuloma venereum* (LGV), caused by the *L.* serovars of Chlamydia, are notable infectious conditions with genital ulceration that are most prevalent in developing countries, although LGV has become an endemic cause of proctitis in men-who-have sex with men in the UK.

Genital warts are the most common cause of bumps or spots on the genital skin. They are polymorphic, usually multiple and tend to develop on the areas of genital skin most traumatised during intercourse. Visible warts are usually caused by low oncogenic HPV types, notably types six and eleven. Normal sebaceous skin structures or molluscum contagiosum are sometimes mistakenly diagnosed as warts.

Most STIs can infect the oropharynx and be a source of onward transmission of infection through oro-genital contact. The oropharynx and orolabial skin seems to have a role in the transmission of syphilis, herpes and to a lesser extent gonorrhoea. Most oropharyngeal infection is asymptomatic.

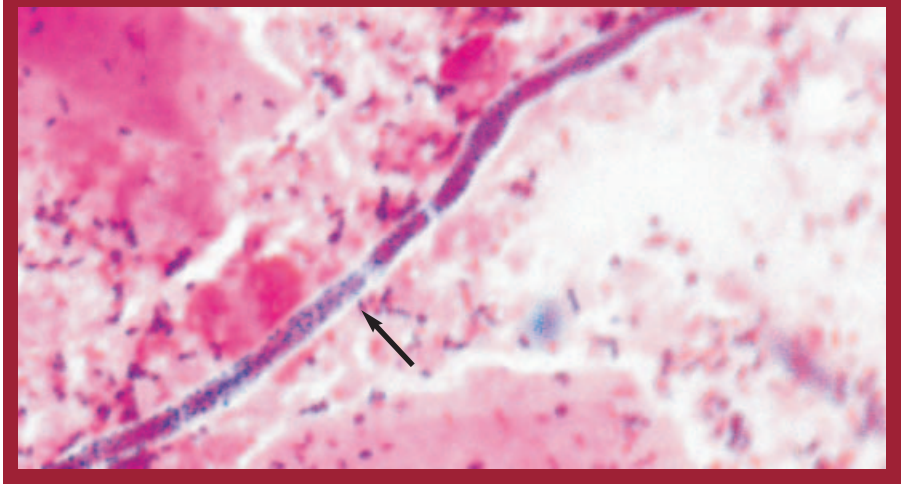
*Gram-stained vaginal smear showing a background of epithelial cells and candidal hyphae (arrows)*



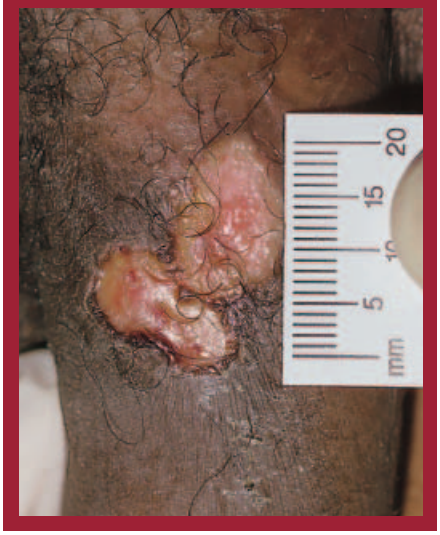
## Diagnosis

The goal of diagnostics for STIs is to identify or reliably exclude the presence of specific pathogens. Microscopy of genital discharge or ulcer exudate has traditionally been used as a rapid diagnostic tool which can confirm the immediate diagnosis of some infections and direct immediate treatment. A major limitation of microscopy is the limited range of organisms identifiable and its poor sensitivity, but it still plays an important role in the immediate diagnosis of gonorrhoea, vaginal discharge (Candida, bacterial vaginosis [BV – see page 39 for an article on BV] and trichomonas) and early syphilis. More recently developed point of care tests using solid phase antigen detection methodologies offer improved sensitivity and benefits for testing in community settings. Nucleic acid amplification tests (NAATs) have dramatically improved the sensitivity and range of STIs that can be identified. NAATs have also been central to the widespread implementation of community screening of asymptomatic

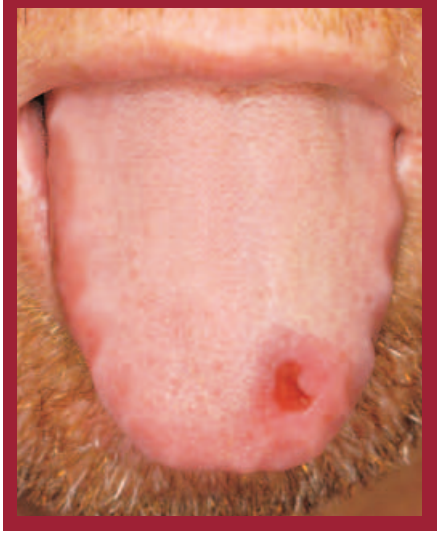
*Vaginal smear showing candidal hyphae ( x 100 magnification)*



*Healing herpetic ulcer in a HIV Patient*




*Syphilitic tongue ulcer*



individuals using non-invasively collected samples (urine or self-taken vaginal swabs). Gonorrhoea is the STI for which antimicrobial sensitivity is particularly relevant at present for direction of treatment. The Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP) report highlights the importance of gonococcal culture being retained for sensitivity testing and surveillance of the evolving antimicrobial resistance to this organism.

## Treatment

The goal in treating bacterial STIs is rapid elimination of the pathogen to allow symptom resolution and prevent onward transmission of the infection. Recommended antibiotic treatments have favoured single dose regimens that can be directly administered under observation. Uncomplicated chlamydial infection responds well to a single dose of azithromycin; tetracyclines for one week form an effective alternative. Persistence of clinical symptoms and signs after treatment has been observed but antimicrobial resistance of *C. trachomatis* has yet to be described. LGV and infections that have spread to the upper genital tract require longer courses of antimicrobials. Acquired antimicrobial resistance of *N. gonorrhoeae* continues to evolve through mutation and gene exchange. Gonorrhoea treatment worldwide is currently dependent on third generation cephalosporins such as ceftriaxone. Reports of a drift towards increasing minimum inhibitory concentrations (MICs) are viewed with concern as options to treat multi-resistant gonorrhoea become very limited. Penicillin remains the treatment of choice for syphilis based on historical efficacy and the virtual elimination of late stage disease. There is a lack of trial data to define the optimal dose of penicillin or the efficacy of alternative antimicrobials in treating syphilis.

The treatment approach to viral STIs is the management of symptoms and the prevention of complications or serious morbidity. The approach to HPV infection is ablation of visible genital warts by patient-applied creams or clinician-delivered physical treatments, together with cervical cytology in women to detect virus induced premalignant change. Vaccination is now being implemented against the main types of HPV associated with cancer of the uterine cervix and is anticipated to reduce the incidence of this cancer by 70%. Clinical episodes of genital herpes in immune competent individuals are self-limiting. Antiviral treatments administered early in an outbreak of ulceration can reduce the duration of symptoms. Vaccination for genital herpes has so far proved ineffective.

## The challenge

The past 20 years have seen some major developments in our understanding, diagnosis and management of STIs. New pathogens have been identified, molecular diagnostics have revolutionised testing and screening for infection, effective treatments are available and vaccination against the most common viral STI is available. Research on sexual behaviour has increased our understanding of transmission dynamics, sexual networks and risk taking. Despite these advances and a much greater knowledge of infection among young people, STIs remain some of the most common infections in our community. They are a major public health challenge in which the laboratory, clinicians, public health, education, politicians, the media and society as a whole all have a vital part to play.

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**Manjula Pammi and Chris Bignell**

# Congenital syphilis:

To many, syphilis may conjure up images of a decadent, promiscuous past; of the 'great pox', painfully treated with mercury; of an almost-forgotten, anachronistic venereal disease. It seems to have no place in modern life, surely consigned to history since the advent of antibiotics and serological screening. Yet this could not be further from the truth. Syphilis remains a significant global health problem with an estimated 12 million people acquiring new infections each year. Nor is it just a disease of developing countries: in the past decade cases of syphilis have more than tripled in the UK (Sims *et al.*, 2005).

Syphilis is a sexually transmitted infection caused by the bacterium *Treponema pallidum*. If it is not treated in its early stages, the disease can become chronic, spreading through the body and causing irreversible damage to the cardiovascular and nervous systems. At any stage of the disease, if a woman with syphilis becomes pregnant, *T. pallidum* may be transmitted to her unborn child via the placenta, causing congenital syphilis. There are serious adverse effects on the pregnancy in up to three quarters of cases. Congenital syphilis causes death in an estimated 15% of the up to 2.1 million affected pregnancies annually — a global total of 315,000 neonatal deaths and constituting 7.8% of all neonatal deaths — a proportion almost three times as high as diarrhoea. Similarly, around 20% of syphilis-affected pregnancies end in spontaneous abortions or stillbirths, syphilis thus accounting for 10.5% of the four million stillbirths per year (WHO, 2007).

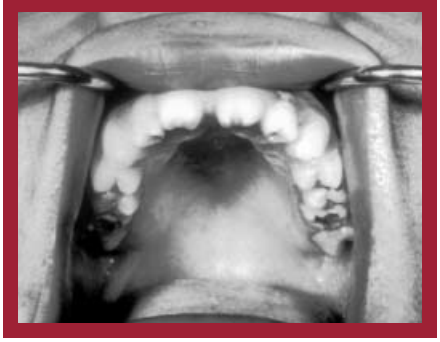
Many infected newborns are asymptomatic and the disease remains latent throughout their lives. Some, however, suffer symptoms of early congenital syphilis including the characteristic rash of blisters or "copper-coloured" bumps (paplar lesions), usually most severe on the genitals, and around the nose and mouth. These infants may fail to thrive and have a characteristic "old man" look. They also often have a bloody nasal discharge causing rhinitis known as snuffles. Within the first three months of life, an affected baby may also suffer painful inflammation of the bones and cartilage, especially of the long bones and ribs. In some cases infants develop nervous system problems including seizures, paralysis, hydrocephalus and learning disabilities.

Late congenital syphilis usually does not manifest until after the age of two. In such cases, lesions of the eye, causing corneal scarring and blindness, are a common complication. Growths and ulcers may develop, causing damage to the bones, particularly facial bones. Teeth are often damaged by congenital syphilis and have a characteristic notched appearance, so-called "Hutchinson's teeth". Congenital syphilis is a quiet killer in developing nations. More newborns are affected by congenital syphilis than by any other neonatal infection, including HIV and tetanus. But attention has shifted away from controlling congenital syphilis, even where efforts have been successful, and has been replaced with a focus on the control of other infections in pregnancy, such as HIV, malaria and tuberculosis. Subsequently, we are now witnessing a rise in the incidence of congenital syphilis. Despite its high burden, its long and documented history, and the availability of cost-effective diagnosis and treatment, syphilis remains a neglected disease that continues to cause undue harm and suffering to women and their babies.

## Diagnosis and screening

*Treponema pallidum* cannot be cultured on artificial media so dark-field illumination light microscopy is needed to identify treponemes in material taken from syphilis lesions, but this technique is rarely used as most people with syphilis are asymptomatic. Traditional laboratory diagnosis of syphilis in adults is based on initial use of a non-treponemal screening test. These tests detect antibody to reaginic antigen, which is found in both *T. pallidum* and some human tissues. They are thus not specific for *T. pallidum*. Examples include the Venereal Disease Research Laboratory (VDRL) test and the rapid plasma reagin (RPR) test. If a screening test is positive, the serum is then tested by a confirmatory treponemal test, using an antigen of *T. pallidum*; examples include the *T. pallidum* haemagglutination assay (TPHA) and the *T. pallidum* particle agglutination assay (TPPA) (Peeling & Ye, 2004). The non-treponemal tests have the advantages of being inexpensive and sensitive (especially in early infection); in addition, the RPR test can be done rapidly. These tests, however, cannot be done on whole blood, they require a microscope or rotator for processing and, because reading of the result is subjective, misinterpretation is common by inexperienced laboratory technicians. A combination of both types of test is usually recommended as studies have shown a wide variation in the reliability of screening results from non-treponemal tests (Peeling & Ye, 2004). However, treponemal tests, while

*Hutchinson's teeth resulting from congenital syphilis — the permanent incisor teeth are narrow and notched. Courtesy of CDC / Susan Lindsley*



# a neglected disease

theoretically more specific than non-treponemal tests, may also give false-positive results. Moreover, they cannot differentiate between individuals with active, untreated syphilis and those who have previously been successfully treated. In both cases, the treponemal test result will be positive. Non-treponemal tests, on the other hand, can distinguish current or recent infections from old, treated infections.

These traditional confirmatory assays require expensive laboratory equipment and technical expertise, and are therefore seldom available outside reference laboratories. Fortunately these can now be replaced by simple, rapid, point-of-care treponemal tests, which use whole blood, require minimal training, and no equipment or special storage conditions (WHO, 2007). A simple strip of paper, impregnated with treponemal antigen, is used to test blood obtained by finger prick and results are available in just a few minutes. Several rapid tests, with sensitivities of 85–98% and specificities of 92–98% compared with standard treponemal assays, are now available and cost less than 60 pence each.

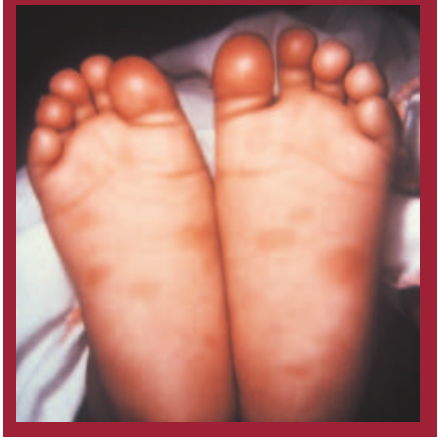
The affordability, convenience and practicality of rapid treponemal tests make them attractive tools, not only as confirmatory assays but also as on-site screening tests in primary healthcare settings or in areas where laboratory services are not available. The availability of simple, cost-effective screening and treatment options could prevent and eventually eliminate congenital syphilis. In developing countries, screening for syphilis using such a rapid diagnostic test could be combined with HIV testing and malaria testing. It would then be even more cost-effective because counselling of patients, taking of blood, and testing could be done at the same visit.

Despite the comparatively low incidence of syphilis in developed countries, like the UK, because of the recently observed rise in cases and the severity of complications of congenital syphilis, routine screening of pregnant women is still recommended (CDSC, 2000), and has also been proven to be cost-effective (Schmid, 2004).

## Treatment

Syphilis in adults is easily cured. Depending on the stage of infection, a single dose of penicillin may be all that is required. When provided in early pregnancy, treatment of the mother effectively prevents infection in the foetus. Even in women who have had syphilis for many years, who themselves would need three weekly doses of penicillin to be cured, just a single dose of penicillin prevents infection to the foetus. Diagnosis and treatment of congenital syphilis in infants are considerably more difficult than diagnosis and treatment of infected pregnant women. Current treatment regimens for congenital syphilis involve penicillin injections every day for 10 days; infants are often hospitalised to ensure they receive the full course of treatment. Clearly, prevention of congenital syphilis by universal screening of women early in pregnancy and treatment, if indicated, is far preferable.

*A newborn baby with symptoms of congenital syphilis including lesions on the soles of both feet. Courtesy of CDC*

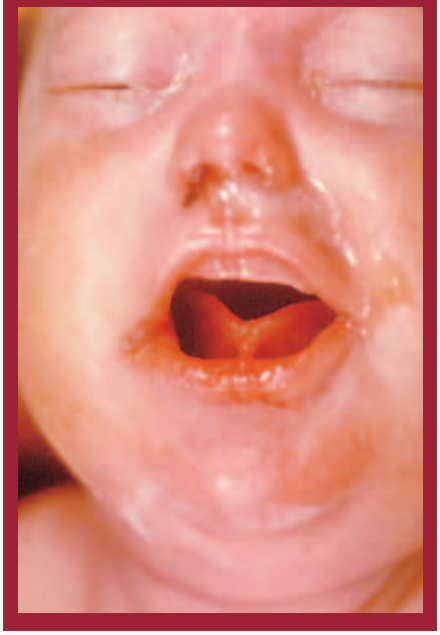


## Challenges to eliminating congenital syphilis

With simple, low-cost screening and treatment, it is perhaps hard to understand why congenital syphilis remains so prevalent. After all, one dose of penicillin costs just 15 pence! In the developing world, however, fewer than 70 per cent of pregnant women access antenatal care and among those that do the average time of first attendance is late, at around five to six months. By this time it is often too late to prevent transmission of the infection to the foetus. Women may be inhibited from accessing antenatal care by the distance that they need to travel — in rural areas lack of roads can make travelling to a clinic take days — as well as other costs incurred. Even where antenatal services are available, a lack of knowledge and training coupled with stigma and embarrassment can mean that service providers are uncomfortable in dealing with sexually transmitted infections. In some settings the appropriate tests are unavailable. In addition there may be little awareness in the community of the disease and its consequences for the unborn child.

This lack of awareness of the disease is relevant for developed countries too. As syphilis makes a resurgence in the UK, reproductive health counselling and screening services for sexually transmitted infections need to be made more readily available to adolescents and adults. Even if a woman is screened early in her pregnancy, she may contract syphilis later on, so healthcare providers need to be able to recognise signs and symptoms of congenital syphilis in newborns. Indeed, Cross *et al.*, (2005) note that: "*Congenital syphilis is a preventable disease and its re-emergence in the United Kingdom reflects a failure of prenatal care delivery systems, as well as syphilis control programmes*."

*A newborn baby with facial symptoms of congenital syphilis. Courtesy of CDC / Dr. Norman Cole*



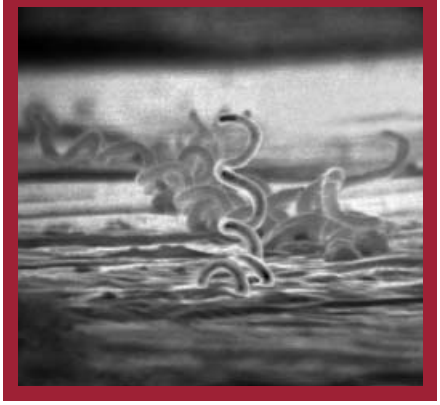
## What's being done?

In an attempt to reduce the burden of disease from this preventable and curable infection, a network of researchers and medical experts has produced a five-year plan to be implemented in the highest burden countries for congenital syphilis. Implementation partners include Ministries of Health, non-governmental organisations, leading research institutions, and in-country medical professionals, who will coordinate via the World Health Organization. This *Global Initiative for Congenital Syphilis Elimination* calls for integrating syphilis screening and treatment into a basic, antenatal care package, and thus strengthening comprehensive health services. This integrated approach advocates for access to antenatal care for all pregnant women. It also promotes connecting various health components into a single, coherent and well-managed activity that addresses a range of conditions in pregnancy, including elimination of congenital syphilis. Focus on early access to services and the quality of comprehensive antenatal care will strengthen efforts to reduce the burdens of other neonatal health problems including HIV, malaria, tetanus, parasites, and accompanying anaemia as well as congenital syphilis.

The overall cost of preventing death and disability caused by congenital syphilis is high but the cost of non-prevention is higher still. The Initiative has estimated that US$12 million is needed to prevent the death and disability of an estimated 1.5 million newborns each year in developing countries where congenital syphilis is most prevalent. At just $8 per child, it's a relatively small sum compared with the estimated annual global cost to nations of congenital syphilis in newborns, which ranges from $55 million to $957 million a year (WHO, 2007).

But with many governments and donors feeling the effects of the current economic crisis, financial support for health-related programmes is harder than ever to find. Just as tackling congenital syphilis requires an integrated approach to healthcare, so does its funding. The Initiative recognises that the elimination of congenital syphilis will likely be more achievable if syphilis screening and treatment activities are an element in broader, more comprehensive and integrated healthcare programmes that have already garnered substantial donor support, such as the prevention of mother-to-child transmission of HIV. This broad approach, of which congenital syphilis is a key part, will strengthen primary and antenatal healthcare more generally, and leave a lasting and positive impact on healthcare systems for women and their children. Through support to such initiatives we hope to silence, once and for all, this forgotten killer.

*Electron micrograph of Treponema pallidum the causative agent of syphilis. Courtesy of CDC / Dr. David Cox*



*Photomicrograph of a Treponema pallidum bacterium, the causative agent of syphilis. Courtesy of CDC / Bill Schwartz*

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## disclaimer

- The author is a staff member of the World Health Organization. The author alone is responsible for the views expressed in this publication and they do not necessarily represent the decisions, policy or views of the World Health Organization.

## information

- More information on the Global Initiative for Congenital Syphilis Elimination is available from www.who.int/reproductivehealth/publications/rtis/9789241595858/en/index.html

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# Bacterial vaginosis — a recurrent problem

If personified, bacterial vaginosis (BV) could be described as a condition with a split personality similar to Jekyll and Hyde. On the one hand it can be completely symptomless and cause its host no problems at all despite recurring inexplicably. Yet on the other hand it can produce very unpleasant symptoms and is associated with pre-term birth in pregnant women as well as acquisition of HIV. As for it's status as a sexually transmitted infection (STI) — this is a topic for debate. To find out more about this complex disease, I spoke to **Dr Philip Hay** of St. Georges Hospital, London

**Q** Let's start with the basics — can you tell us what BV is please?

**A** We think of it as an imbalance in the vaginal flora. A healthy vaginal flora is dominated by lactobacilli which are specific to the vagina. These are not the same species as those which we wish to colonise the gut, though they can be found in the gut and the rectum particularly. Normally, the vagina is quite acidic at pH4.5, but with BV this can rise up to pH6. With this decrease in acidity there is an accompanying overgrowth of anaerobic organisms — principally *Gardnerella vaginitis*, *Mobiluncus species*, *Mycoplasma hominis* and *Prevotella species*. More recently, newer organisms have been described, in particular *Atopobium vaginae*.

**Q** What is the cause of BV?

**A** Normally BV is caused by an imbalance of the vaginal microflora which is triggered primarily by changes in the pH of the vagina as well as hormone levels. Though it can be triggered by behavioural factors and there is a school of thought that says BV is sexually transmitted.

**Q** So, is BV a sexually transmitted infection?

**A** Some people think of it as a STI and there are some epidemiological studies which suggest it is associated with high risk sexual behaviour such as changing sexual partners or having multiple sex partners. It does have some of the characteristics which suggest it is a STI, however, the most compelling evidence to suggest it is not, is that it is found in women who have not had sexual intercourse and it can recur in women who say they're not having sex after treatment. Also, all the studies looking at treatment in the partners of women with BV with either metronidazole or clindamycin have not shown a significant reduction in the recurrence of BV. One way of describing BV in this context is to say that it is sexually enhanced, so some sex behaviours may make you more likely to get BV, but it isn't exclusively sexually transmitted.

**Q** How is BV diagnosed?

**A** Well the symptoms, if present include an unpleasant fishy smell and increased vaginal discharge which is thin and off-white or yellow in colour. Some women find that they have to wear pads during a bout of BV. However, at the other end of the spectrum, about 50% of women who have had BV diagnosed microscopically don't report symptoms. Often if you discuss this with the patient then after treatment they do tend to indicate a difference. This suggests that such cases are subclinical and, understandably, it can be embarrassing to admit to the symptoms at the start of a consultation.

**Q** Assuming a patient has been diagnosed with BV, you mentioned metronidazole as a possible treatment.

**A** Yes that's the standard first-line treatment which is normally successful in getting rid of symptoms and rebalancing the flora of the vagina. However, the problem is that most cases will relapse after treatment because whatever's triggering the BV is still present.

**Q** So how common is BV relapse?

**A** In most treatment studies we've seen relapse within a month in 30% of sufferers and this increases to over 50% within two months.

**Q** That's quite a high relapse rate — is there a way of eradicating it completely from individuals?

**A** I wish there was, but evidence suggests that BV does eventually go because the prevalence in most populations remains fairly stable. So if new people are contracting BV and the number of those affected remains the same, then it must be eradicated in some individuals.

**Q** So, how common is BV?

**A** Very common. In studies in sub-saharan Africa (Wawer *et al.*, 1998), BV was present in approximately 50% in one of the studies. In London we've found it in about 15% of pregnant women (Ugwumadu *et al.*, 2003) and it was reported in 28% of women having terminations in Swansea a few years ago (Blackwell *et al.*, 1999).

**Q** Do you have a figure in terms of the incidence of BV in a 'normal' population during their lifetime?

**A** I would say it's probably approaching 100% — some women get it approaching their period. They get a slight discharge which doesn't cause any symptoms and rights itself once the period is over and they don't even know it's happened. The other portion have recurrent BV, they get it virtually every month and are very symptomatic with it. In one of our studies we asked women with recurrent BV to take a swab of themselves every day (Hay *et al.*, 1997). BV tended to recur either just before or during menstruation. Also, if it was going to subside spontaneously it did so mid-cycle. This may be because women have high levels of oestrogen mid-cycle and low levels approaching menstruation. This provides high levels of glycogen mid-cycle as a substrate for lactobacilli. We know from culture studies that the concentration and prevalence of lactobacilli diminish during menstruation and anaerobes increase at that time whilst the environment is less acidic and there are less sugars, favouring the growth of anaerobes. Also, if you culture

lactobacilli at pH 4.5 — it's very difficult to get *Gardnerella* species to grow in the presence of lactobacilli, but if you repeat this experiment at pH 6, *Gardnerella* will grow quite happily.

**Q** You mentioned that some people get BV but they're asymptomatic. Would that fact mean they wouldn't seek treatment?

**A** Potentially, yes. If we find it incidentally in a patient of the GUM clinic and they definitely don't have any symptoms we wouldn't treat it. Treating it will have little influence on whether it's there next month or three months later and if somebody's not concerned about something, why introduce something to them which then may have a big impact on their lives if they start to become concerned about it?

**Q** Why is BV important?

**A** From a public health point of view, there are three important factors. The first is the association of BV with preterm births. If we could intervene effectively to prevent the birth outcomes which are associated with BV it could have a big impact on the number of new babies needing neonatal intensive care and possibly even the number of children with cerebral palsy. The challenge has been to find a way that can reliably improve pregnancy outcome. To go into a bit more detail, although there is no association between birth defects and BV, theoretically, infection-mediated pre-term birth is associated with an inflammatory cascade and in animal models these can cause apoptosis of the white matter which is the mechanism for the development in cerebral palsy. This is more common in pre-term births where the mother has fever.

The second public health factor is the association with acquisition of other STIs including HIV. Obviously anything that impacts on the acquisition of HIV is important, particularly a condition which appears to be so prevalent in many parts of sub-saharan Africa. The final public health factor is the women who are severely affected by the condition where symptoms are so bad it dominates their lives.

**Q** Can you tell us a little bit more about BV and the association with acquisition of HIV?

**A** There are some cross-sectional studies which show a higher prevalence of BV in women with HIV than without. There was a prospective pregnancy study done in Malawi by Taha Taha *et al.*, (1998) which showed that women who had BV during pregnancy when they were treated for the study, were significantly more likely to seroconvert to HIV, either during pregnancy or during the breast feeding period up to eighteen months or so later. That doesn't prove this is a biological effect. There could be confounding factors. BV may be more common in women with genital herpes which we know is another important risk factor for HIV. Also, BV is associated with other infections which themselves are associated with HIV transmission such as Chlamydia, gonorrhoea, or syphilis. There's also some *in vitro* laboratory work looking at factors like the enzymes produced by anaerobes such as sialidase and glycosidases and the cytokine levels in the vagina.

Another molecule which is protective against HIV infection called SLPI is also negatively associated with BV.

**Q** Could you tell us a little more about your work and what led you to finding yourself in a brothel in Ecuador on your wedding anniversary?

**A** (laughs) That doesn't sound very good does it? I began working on BV in the late 1980s. BV had been redefined as a syndrome according to the Amsel criteria for diagnosis (1983) and little was known about its prevalence, outside GU clinics in the UK. So we did a survey at the gynaecology clinic at Northwick Park Hospital and found it in 12% of the women attending, many of who were asymptomatic (Hay *et al.*, 1992). We then went on to screen women in pregnancy and found BV was associated with late miscarriage with a five fold odds ratio and with pre-term birth with an odds ratio of 3½ (Hay *et al.*, 1994). We did a treatment study at St Georges and St. Helier hospital where we treated women with clindamycin and showed a significant reduction in late miscarriage and pre-term birth (Ugwumadu *et al.*, 2003). This may be taken as proof of concept that if we can treat BV effectively, we can reduce the incidence of these pregnancy outcomes. But for reasons which your members will be well aware, I wouldn't want to start treating 15% of pregnant women with clindamycin. Not only would this not be sensible, it would bring with it the risk of the development of drug resistant BV organisms.

We need to find ways of identifying women who are at greatest risk of these outcomes which will be only a small propotion of those with BV. Over 80% of pregnant women with BV will have a normal term delivery. Alternatively, we need to find a safer treatment than clindamycin which can be given to a larger number of pregnant women. With reference to Ecuador, a colleague of mine studies helminth infections in Ecuador and wanted to do some STI work there so we spent two days interviewing the girls who were working in licensed brothels. This was very interesting and I'd love to do some studies on the changes of their vaginal flora taking into consideration all the self medication that these girls undertake. Anyway, we then set up a study where we linked with one of the helminth studies and screened adolescent girls for BV and found it in 32% of the population — and this didn't vary whether they were sexually active or not (Vaca *et al.*, 2010, *in press*). That's a similar prevalence to that which has been found in recent larger studies. There were ever so slightly higher rates in women who were currently sexually active — but the numbers weren't statistically significant.

**Q** So where do you see the future for BV?

**A** One new concept which is in the very early stages of investigation is BV as a biofilm. One study looked at biopsies of BV biofilms and showed that these biofilms tend to constitute around 90% *Gardnerella* species and around 10% *Atopobium vaginae* with many other species accounting for a small percentage (Swidsinski *et al.*, 2005). In a second study, after treatment little islands of biofilm remained which were not metabolically active (Swidsinski *et al.*, 2008). The islands became more metabolically active with time after treatment. So the next step is to look for biofilms in male partners to establish whether there's a sexual element of transmission of the biofilm. The concept of BV as a biofilm could explain the recurrence of the disease but also provides challenge for treatment studies.

As I say, this has been investigated in only one study so far and nobody has replicated this work.
Future work will also look at alternative treatments for BV such as probiotics and acidification.
Unfortunately the work that has been carried out in these areas is from studies which are underpowered and methodologically weak. That said, it would be desirable not to have to throw antibiotics at sufferers of this complex condition.

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*Daniel Salmon, writing in 1896, unambiguously blamed the Napoleonic campaigns for the spread of CBPP*

***Figure 1.*** *acute disease of CBPP causing marbling of the lung*



***Figure 2.*** *a sequestrum: the chronic lesion in the lung*



# Contagious bovine pleuropneumonia:

## in search of the origins and virulence of 'lung sickness'

**"Behold, however, a bull spitting vapour collapses and vomits blood mixed with froth. Lean flanked, his dull eyes are stricken with paralysis and his head bows down toward the ground under its own weight"** (Virgil 70-19BC)

It is highly likely that the disease the classical writer Virgil is referring to so vividly is lung sickness also known as contagious bovine pleuropneumonia (CBPP), a disease which has probably ravaged cattle since time immemorial (cited by Blancou 1996). Of the other great plagues of cattle, rinderpest is close to global eradication and foot and mouth is largely a disease of international trade with mild clinical effects. CBPP, on the other hand, continues to inflict serious losses on livestock in many parts of the world. Indeed control seems further away than ever as economic hardships, civil wars and droughts affect the countries where the disease is endemic, hampering the work of the veterinary services. So what is CBPP and why is it continuing to cause problems despite its eradication from many parts of Europe and the USA over 100 years ago?

CBPP is a severe pneumonia of cattle

caused by the wall-less bacterium *Mycoplasma mycoides* subspecies *mycoides* small colony variant. The disease is localised in the lungs where it causes a highly characteristic "marbling" of the lung in the acute stages (figure 1) and a lesion known as a "sequestrum" in the chronic form of the disease (figure 2). Mortality rates can exceed 50% when the disease appears for the first time in herds as it did recently in the Caprivi region of Namibia (figure 3). The mycoplasma is transmitted by close and repeated contact with aerial and environmental infection playing little or no role in its epidemiology. Consequently it was recognised very early on that the slaughter of affected and contact animals with strict movement restrictions could effectively control the disease. The difficulty, however, is identifying affected animals quickly enough to prevent the disease spreading because, though the lung may be very severely damaged, clinical signs are often lacking; this is particularly true in European herds where cattle remain housed throughout the year. The disease is much more obvious in the nomadic herds of sub Saharan Africa where animals suffer a hostile environment leading to higher mortality rates than in European cattle.

Like many diseases the origins and spread of CBPP worldwide are controversial and opinion often depends on the nationality of the experts. The most contentious issue concerns the spread of the disease throughout the world in the 19th Century. Daniel Salmon (who would later give his name to *Salmonella*), writing in 1896, unambiguously blamed the Napoleonic campaigns: "*During the period from 1790 to 1812 [CBPP] was spread throughout a large portion of the continent of Europe by the cattle driven for the subsistence of the armies, which marched and countermarched in all directions*".

Others have implicated the increase in live cattle movements seen around this time which was stimulated by the lifting of trade barriers following the end of the French Wars: so either way Napoleon must take some of the blame (see main illustration). The disease had a massive impact on European cattle. In the Netherlands ("the hotbed of pleuropneumonia") nearly 65,000 cattle died of CBPP between 1833 and 1850. Following its introduction from the Netherlands, Britain suffered losses reaching 187,000 in 1860 alone with no real attempt being made to control the disease; thus the number of outbreaks doubled over a 20 year period to over 3000 in 1880. Something had to be done and after much debate local authorities decided to pay full compensation to owners for slaughtered animals which led to a fall in outbreaks to just over 2000 by 1890 (Hutyra & Marek, 1913). Then, once responsibility of CBPP control was transferred to central government in 1890, there was a final drive for complete eradication and the last case was diagnosed in 1892. Britain was declared free from CBPP a few years later without anyone having any real idea what caused the disease. Some insight was provided in 1898

***Figure 3.*** *cow with acute CBPP in Namibia*

when two of Pasteur's pupils, Edmond Nocard and Emile Roux, succeeded in culturing the microbe for the first time. These workers initially classified the pathogen as a "filterable virus" because of its small size which enabled it to pass through bacteriological filters.

Many other European countries became CBPP-free in the early 20th Century although a resurgence was seen at the end of the First World War. These were quickly stamped out but CBPP stubbornly held out in parts of southern Europe with outbreaks occurring in most decades until 1999 when the last case was seen in northern Portugal. From Europe the disease was carried by live cattle to the USA on three separate occasions, in 1843, 1847 and 1859, and to Australia in1858 in a single bull which had been reported sick prior to going on board ship in Cumbria for the two month journey to Victoria. Indecision by veterinary authorities on what to do with the animal on landing allowed the disease to break out to the rest of Australia, where it remained for nearly a century; it subsequently spread to Asia in the early 20th Century. Uncertainty exists on whether South America ever became infected as most text books report that the continent remained free of the disease despite close agricultural ties with Spain and Portugal but Hutyra writing in 1938 stated that: "*In South America the disease is also well known*".

It is well documented that CBPP was carried to South Africa in 1854 with an imported bull from the Netherlands where it spread rapidly via trek oxen into the Transvaal killing 100,000 animals within two years. It further spread by cattle movements to countries now known as Namibia, Zimbabwe and Botswana then eventually to Angola, Zambia and possibly the Congo. Some believe that the infection of North West and East Africa had separate origins possibly through Abyssinia (now Ethiopia) with an expeditionary force led by the British commander General Napier in 1868 to free European hostages held by the Abyssinian tyrant Theodore. However in his detailed account of the expedition the New York Times reporter and explorer Henry Morton Stanley makes no reference to any outbreaks of CBPP probably because it was mules not oxen that were the beasts of burden for the army. Furthermore, there was no evidence at all that India, from where the expedition started, was infected at the time; indeed CBPP was not reported there until 1910. Incidentally Stanley did describe a severe outbreak of "glanders" which was highly fatal in the mules and nearly scuppered the mission at the very outset.

Evidence from molecular epidemiological studies, initially hampered by the close homogeneity of strains of the mycoplasma, is now beginning to shed light on the spread of CBPP worldwide. Using multilocus sequence analysis, the CIRAD group in Montpellier divided African strains into three distinct groups: Central and Eastern Africa, West Africa and Southern African. Variable number tandem repeat analysis at Veterinary Laboratories Agency (VLA) appeared more discriminatory but showed clear differences between strains from Southern and East Africa. These studies support a multi-origin scenario for CBPP to Africa but there is also the distinct possibility that CBPP was

already present in Africa as accounts by the German explorer Gustav Nachtigal around Lake Chad in 1869 described "lungensüche" (the great cattle death) recognised now as CBPP which was decimating cattle populations in the region; Nachtigal reported that these outbreaks were regular occurrences and appeared have spread from the West (cited by Weiss 1998). About the same time there were also accounts of preventative inoculation or "vaccination" being widely practised using diseased tissue (Blancou, 1996). A fascinating account of early vaccination attempts against CBPP or "lung sick" as it was known then appeared in *King Solomon's Mines* by H. Rider Haggard written in 1888. It also clearly shows the fear that CBPP engendered: "*As for 'lung sick' which is a dreadful form of pneumonia, very prevalent in this country, they[oxen] had all been inoculated against it. This is done by cutting a slit in the tail of an ox, and binding in a piece of the diseased lung of an animal which has died of the sickness. The result is that the ox sickens, takes the disease in a mild form, which causes its tail to drop off, as a rule about a foot from the root, and becomes proof against future attacks. It seems cruel to rob the animal of his tail, especially in a country where there are so many flies, but it is better to sacrifice the tail and keep the ox than to lose both tail and ox, for a tail without an ox is not much good, except to dust with.*"

As mentioned earlier, CBPP rumbled on in Europe for the first half of the 20th Century before seeming to die out. Then something quite dramatic happened: after an absence of over a decade it reappeared in France and Spain in 1980 and 1981 then in Portugal in 1983 and finally in Italy in 1990. What was even stranger was that the all strains from these new outbreaks had a genome 10% smaller than contemporary African strains. Now, mycoplasmas are not averse to losing their genes — a process that has been going on for over two billion years as they evolved degeneratively from cell walled ancestors — but the latest was a big loss in a very short space of time. Comparative analysis of these new European isolates with African strains in 1997 by groups at Kings College London and the VLA showed that the European strains did not oxidise glycerol resulting in little hydrogen peroxide production which we attributed to a lack of the enzyme L-α glycerol phosphate oxidase; African strains on the other hand produced copious amounts of this toxic oxygen radical. Subsequently genetic analysis by the Group at the Veterinary Bacteriology Institute, Berne revealed a genomic segment of 8.8 kb, present in African strains, which was completely missing in these new European strains; within this region was a copy of the *lppB* gene, a potential virulence factor, and the glycerol uptake genes. A single European strain from outbreaks in France in 1967, unearthed only recently, did not have this deletion. How had this deletion occurred in the European strains?

Unfortunately the events surrounding the deletion will probably remain a mystery but it is known that concerns about CBPP in Europe were sufficiently grave that research into new vaccines was being carried out in some parts of Europe. This was not widely known because policy to control CBPP in Europe centred on slaughter of affected herds as vaccine antibody would adversely affect serological disease surveillance. Did European laboratories have the technology at the time to attempt molecular attenuation or could serial passage, the most widely practised method, bring about such massive loss of genetic material? Also most alarmingly, how could such a strain appear in cattle in four European countries in such a short space of time? Some have suggested that the movement of cattle "immunised" with this so called attenuated strain may have been responsible for these new outbreaks.

An experimental infection in cattle in Switzerland which compared a single new European strain with an African strain provided some evidence to support the view that this deletion produced strains which were less virulent than African ones. But some doubts remained in those of us fortunate enough to see the lesions in the unexpected outbreaks in Italy in the early 1990s and the on-going outbreaks in Portugal 1983-1999 because of the severity of the lesions we saw. In fact mortality was reported in three French herds in the Pyrenees in 1980. While clinical signs were often absent because of the close confinement of the cattle and, of course, the widespread use of antibiotics in Europe, lung lesions were often spectacular, completely destroying whole lungs. Moreover, exercising these normally stationary animals could readily stimulate coughing. It was true that as disease progressed over time, it became more chronic in nature but this was also evident in cattle in many African countries where CBPP was endemic. In addition there was no evidence to suggest that strains in Europe before 1967 were particularly virulent.

There are clearly still many questions to answer about the mechanisms of virulence of the mycoplasma causing CBPP and indeed a body of work has developed to suggest that the host itself may be responsible for inflicting more damage than the pathogen. The complete sequencing of the genome, carried out in Sweden in 2004, revealed a single circular chromosome of just over 1200 kbps, a fifth of the size of *E. coli*, lacking the genes for classical virulence factors like toxins. With a quarter of all genes unique to this mycoplasma and over 10% with unknown functions there is still much more to do.

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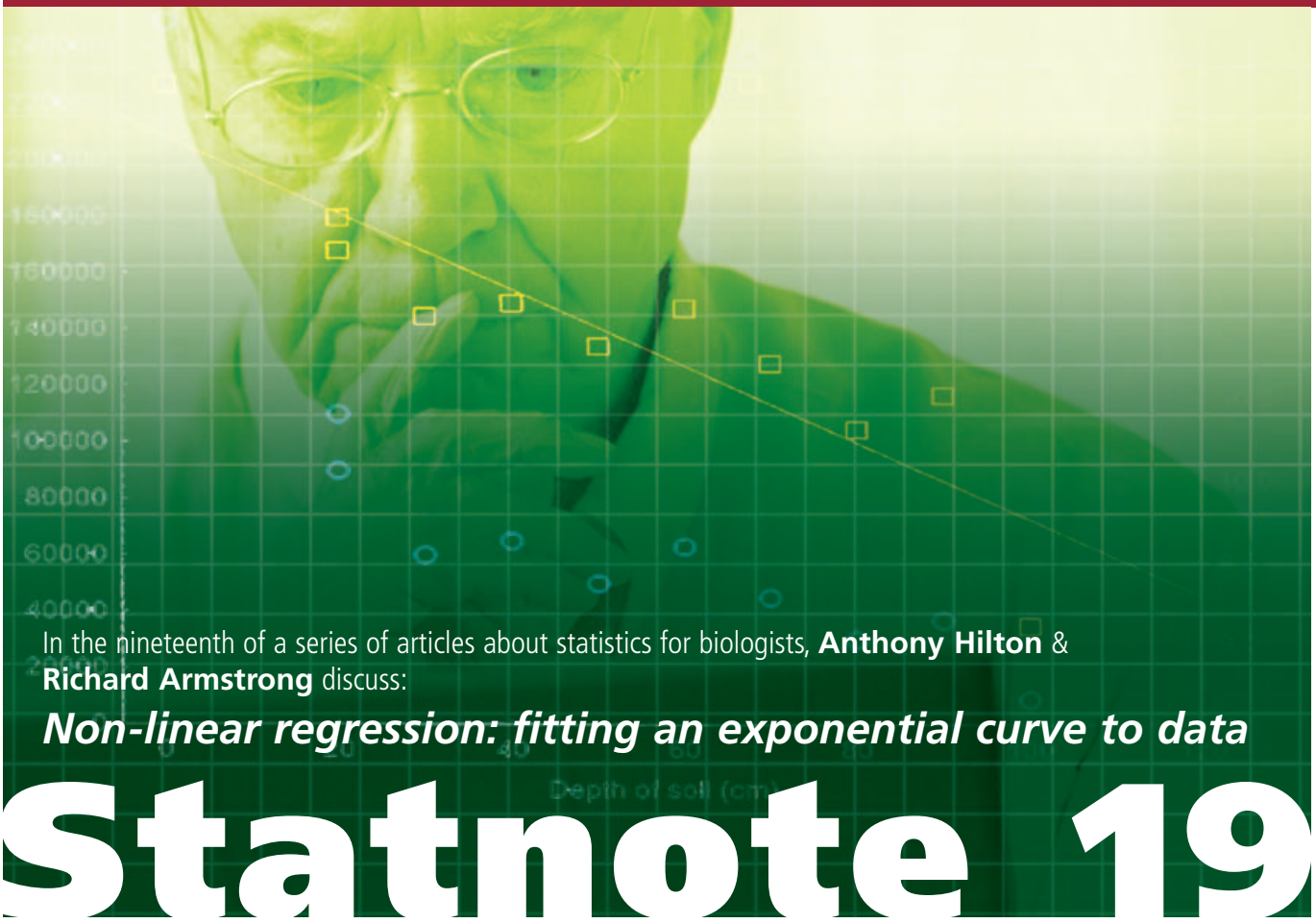


In the nineteenth of a series of articles about statistics for biologists, **Anthony Hilton** & **Richard Armstrong** discuss:

## *Non-linear regression: fitting an exponential curve to data*

# Statnote 19

In previous Statnotes, the use of correlation and regression methods to analyse the *linear* relationship between two variables was described. Hence, Pearson's correlation coefficient 'r' establishes whether there is a significant linear correlation between two variables (*X* and *Y*). Once a linear correlation between the two variables has been established, a regression line can be fitted to the data by the method of *least squares* to describe the relationship in more detail. Linear regression may be adequate for many purposes but some variables in microbiology may not be connected by such a simple relationship. The discovery of the precise relation between two or more variables is a problem of *curve fitting* known as '*non-linear*' or '*curvilinear regression*' and the fitting of a straight line is the simplest case to illustrate this general principle. Curve fitting may be appropriate in a variety of experimental circumstances. For example, an investigator may be interested in the pattern of decline in the number of fungal colonies with depth in the soil or the pattern of penetration of an antiseptic compound into the skin. This Statnote discusses the common types of curve that can arise in microbiological research and specifically the fitting of a curve in which the relationship between *Y* and *X* can be described by an *exponential decay function*. Subsequent Statnotes will describe the fitting of a general polynomial-type curve and curves that require more complex fitting methods such as non-linear estimation.

### Common types of curve

There are four types of curve that commonly occur in microbiological research and these are illustrated in Fig 1. The first curve is the compound interest law or *exponential curve* and is given by the relation:

$$Y = a(exp^{bx}) \quad (1)$$

where 'a' and 'b' are constants to be estimated. This is the type of curve often exhibited by the growth of a bacterial population in a culture when it is increasing in numbers most rapidly. The second curve is the *exponential decay curve* in which *Y* declines to zero from an initial value 'a' as *X* increases and represents the way in which quantities often decay or decline with time:

$$Y = a(exp^{-bx}) \quad (2)$$

The third type of curve is the asymptotic curve in which *Y* increases from a value 'a – b' and then steadily approaches a maximum value 'a' known as the *asymptote*. The asymptotic curve is given by the relation:

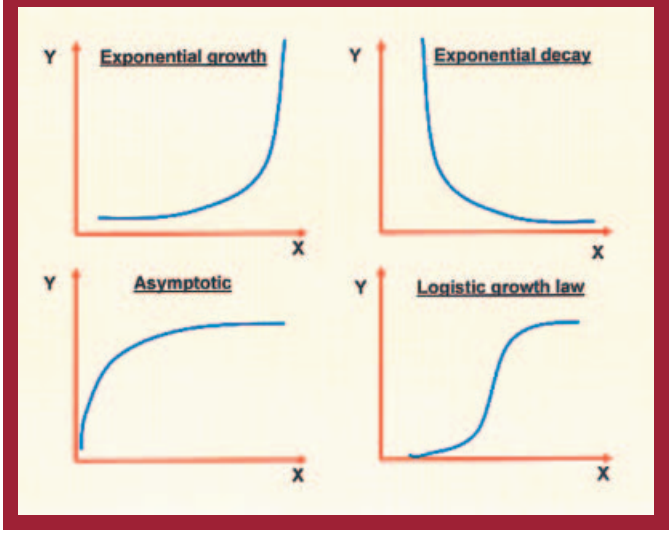
$$Y = a - b(exp^{-cx}) \quad (3)$$

Finally, the fourth type of curve is the 'logistic growth law',

**Table 1.** The number of fungal colonies derived by the dilution plate method from a gram of soil collected from different depths in consolidated sand. (Goodness of fit of regression of Log (*Y*) on *X*: $r^2 = 0.81$

| Soil depth (cm) (*X*) | Colonies per gram (*Y*) |
|---|---|
| 0 | 249,000 |
| 10 | 110,000 |
| 20 | 90,000 |
| 30 | 60,000 |
| 40 | 65,000 |
| 50 | 50,000 |
| 60 | 63,000 |
| 70 | 45,000 |
| 80 | 30,000 |
| 90 | 37,000 |
| 100 | 9,000 |

**Figure 1.** *Common types of curve in microbiological research*




the most common sigmoid type curve and a relationship which has played a prominent part in the study of the growth of microorganisms in batch culture. Hence, the initial lag stage is follows by approximately exponential growth but then as saturation approaches, growth slows down and reaches a maximum stationary value. The logistic growth law is given by the equation:

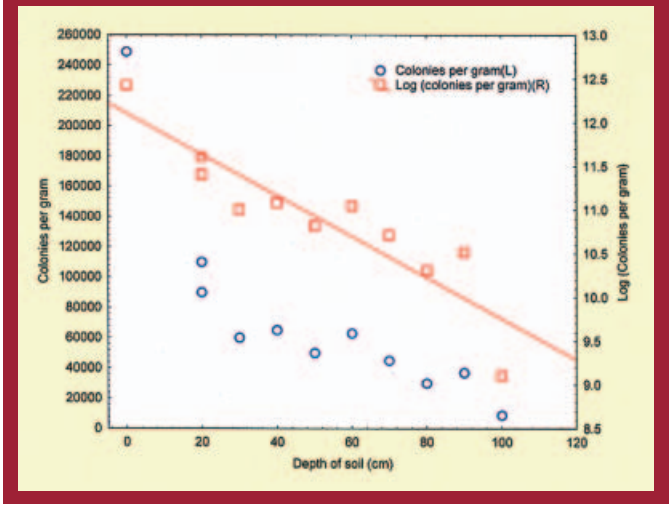
$$Y = a/(1 + bexp\text{-}^{cx}) \quad (4)$$

## Scenario

Soil has various horizons and forms a complex series of microhabitats. If soil has a uniform structure, soil organisms decline markedly within a few centimetre of the surface and continue to decrease with depth. This results in a typical curve exhibited by populations of bacteria in soil of uniform composition (Burges, 1967). It has been postulated that the decline in microbial numbers could be attributable to the falloff in available carbon compounds with depth but a similar decline is also seen in peaty soils which vary little in available carbon with depth. To determine whether soil fungi also exhibit such a curve, the number of fungal colonies at different depths was measured in a sandy soil at a site in the West Midlands. The number of fungal colonies was estimated by the dilution plate method from a profile dug into the consolidated sand at the site. Samples of soil of 1gm were taken at varying depths down to 100cm.

The data are presented in Table 1 and comprise measurements of number of fungal colonies ($Y$) in relation to soil depth ($X$).

**Figure 2.** *Fitting an exponential decay model to the data in Table 1*




## How is the analysis carried out?

To fit an exponential decay curve, logarithms of the $Y$ values are taken to the base 10 and $Log\ Y$ is plotted against $X$. If the relationship is negative exponential, the graph will be linear and a straight line can be fitted using the methods of linear regression described in Statnote 16. This is a similar approach to that used to fit a power-law model to the data in Statnote 14. Fitting such a regression by transformation of a variable makes similar assumptions to those described previously for linear regression. Most statistical packages will carry out this analysis as it requires only that the $Y$ variable is transformed to logarithms and then a straight line fitted to the data.

## Interpretation

The data are plotted on the original scale and on a log scale in Fig 2. A linear regression appears to fit the data of $LogY$ against $X$ well ($r = -0.90$, $P < 0.001$) and the value of $r^2 = 0.81$ suggests that the number of fungal colonies does decline exponentially with depth of soil, a similar type of curve to that shown by the soil bacteria.

## Conclusion

Non-linear relationships are common in microbiological research and often necessitate the use of the statistical techniques of non-linear regression or curve fitting. In some circumstances, the investigator may wish to fit an exponential model to the data, i.e., to test the hypothesis that a quantity $Y$ either increases or decays exponentially with increasing $X$. This type of model is straight forward to fit as taking logarithms of the $Y$ variable linearises the relationship which can then be treated by the methods of linear regression (see Statnote 16).

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**Dr Anthony Hilton[1] and Dr Richard Armstrong[2]**

[1]Biology & Biomedical Sciences and [2]Vision Sciences, Aston University, Birmingham, UK

# careers

## in academia

**Susannah Walsh** reports on the challenges and benefits of an academic career

When I enrolled on the Biology degree at the University of Wales College of Cardiff (now Cardiff University) in 1992 I had only the vaguest of long term career plans; I knew I wanted to be a 'biologist' but had no real idea of how to achieve this and wasn't sure that I was clever enough to succeed in academia. Like many people, I had not had meaningful careers guidance at school, so I picked the subject that I enjoyed the most to study at university.

After two years of rather relaxed undergraduate study, I decided to do an industrial sandwich placement in a large pharmaceutical company. It was during this year out that I really started to think about my future. I looked around at the full time employees (who were sadly being made redundant) and realised that a) I would need a PhD to achieve a position of responsibility and b) I didn't really want to work for a large company when I graduated. My placement supervisor had previously worked as an academic and I decided that, if I could manage it, I would try to work towards that aim. I returned and finished my degree, specialising in Applied Biology and got more and more interested in microbiology (mostly thanks to my personal tutor Prof. Lloyd and my final year project supervisor Dr Wimpenny). I applied for several PhD studentships and was very fortunate to be offered one studying with Prof. Russell's disinfection group in the Welsh School of Pharmacy. I really enjoyed studying for my PhD and received good support from my second supervisor (Dr Maillard) as well as from Denver Russell (sadly now deceased), throughout the process.

Like most PhD students I did a lot of demonstrating for practical classes. I demonstrated on everything I could, from 'chemistry for biologists' to microbiology to rag worms; and was given responsibility for the marking of several biology practicals. I realised that I really enjoyed teaching and thought that I would like to become a lecturer eventually. However, I realised that this might not be possible and that I would need more scientific experience to have any chance of success.

After my PhD I was employed as a research associate (post-doc) in the Welsh School of Pharmacy, but like most post-docs I was preoccupied with what I would do when my contract finished. I decided that I needed to add an extra dimension to my CV. I thought that I would probably have to go back into industry to gain further experience (I had recovered from my year out by this point and was willing to give it another go) and I decided that a business qualification might help me to progress. Fortunately Prof. Russell was kind enough to let me have one afternoon off a week so that I could study for an MBA. Although the MBA was not a typical undertaking for an academic scientist, I found most of it very interesting and it exposed me to people from different fields and backgrounds, many of whom I am still in touch with today. During the last six months of my post-doc, I started to look at the *New Scientist* Jobs section for a new position. One day Prof. Russell brought in a photocopied advert from *New Scientist* for a lectureship in Microbiology and Parasitology at De Montfort University. I had seen the advert, but had not thought that I could apply for a lectureship so early in my career. However, I thought if Denver thinks I can do it then maybe I should have a go!

Much to my surprise I was invited to an interview. I gave a fifteen minute lecture on 'the importance of a sound knowledge of parasites to pharmacy students' and made it through the lunchtime event. The other candidates seemed much more experienced than me and one even had the cheek to say that he thought the job would go to either him or another of the candidates, but not me. By this point I was rather nervous, but I decided that there was no point in being half hearted and if I wasn't likely to succeed then I may as well get as much out of the experience as I could. I think my decision just to go for it, must have come across not too badly; because they offered me the job! I was absolutely delighted, but extremely surprised to have been successful.

I moved from Cardiff to Leicester, which was hard to begin with; and started work in March 2002. I immediately had a few lectures to give and although I found this terrifying, I think it was helpful to have a go at lecturing straight away. Since then I have remained at De Montfort University and

have settled very well into my role.

I found that the main difference between working as a lecturer and a post-doc, was the amount of administration expected of me. As a post-doc I had been able to focus on one area in great detail and was not expected to perform many tasks outside the scope of the research grant. I suppose I thought that lecturing would be much the same, but with more teaching; how wrong I was! I didn't really appreciate the amount of other work that lecturers have to do and the multitasking needed to balance these tasks against each other. At De Montfort University most of the lecturers have responsibility for a specific administration task. Initially I was in charge of organising induction week for the courses in the School of Pharmacy, but two years ago I moved on from this and I am currently the admissions tutor for the MPharm degree scheme (pharmacy). This and other administration tasks take up about a third of my time. Teaching is obviously a big part of my responsibilities, I have about 340 hours a year when I stand up in front of students to deliver lectures, tutorials or supervise practicals. This translates into about 14 hours a week during term time, but varies widely from week to week. It still takes me a minimum of one day to write a one hour lecture and although I have got better at 'winging it' over the years, I still like to spend a few hours going over the material, even if I have given the lecture before. I then have to squeeze in as much research as I can in the time left. When you are faced with unmovable deadlines for teaching and administration, it can be hard to make time for research and other income generation. The pressure to succeed, by gaining funding is quite high and it can be discouraging when you put a lot of effort into a grant application only to have it turned down. Although I have had many disappointments over the years, I have come to realise that I shouldn't take these failures too personally and that it is best to keep trying and eventually, if you are lucky, you will get a break. I do not have time to do any meaningful laboratory work myself, but have been fortunate in having a PhD student over the last few years to help push my research forward. With another PhD having just started this autumn, I am feeling positive about the future.

Making links with other academics in the university and seeing what I could offer them as a microbiologist, has helped to generate new lines of research. I have found that it is easier to get a proposal written when you have other people working towards the same end. If you are working on your own and have a lot of other time pressures, it is all too easy to let a research call slip by. Working in a team can ensure that you meet the deadlines.

So what is a typical day like for me as an academic? Well during term time, if I don't have any teaching first thing in the morning, I usually attempt to get through my emails. This is no small task some days, as I have a lot of enquiries about the MPharm course to deal with. If I have a lecture to give, I will usually have read through my slides the night before, but I will look at them again and make sure that I have the handouts and register ready. After giving my lecture(s) I might have a four hour practical class in the afternoon. I will then spend the evening marking or preparing for any lectures that I have the next day. If I have a research or administration deadline, I usually find myself working evenings and weekends to get everything done. I also work quite a few Saturdays, giving admissions talks and sitting on a stand during the open days. During non-term time, I try to catch up on research activities by applying for funding. I also use some of the time to catch up on outstanding marking, write new teaching material and prepare exam papers. During the summer I spend a lot of my time dealing with admissions. When the 'A' level results come out in August we decide which students we are going to take and then spend the next month or so until enrolment chasing up any outstanding qualifications and dealing with enquiries.

Overall, I love my job, but it is not easy. I found the first few years very hard and spent many nights writing lectures for the next day and trying to keep up. Being a lecturer can be stressful and involves long and often unsociable hours. You need to be very self sufficient and organised, as people are relying on you to deliver. No one is going to check up on you and it is obviously not fair to expect people to do your job as well as their own. Not everything will go smoothly all of the time and you have to be prepared for disappointments along the way. However, would I give up lecturing for a 9 to 5 job? Absolutely not! The university environment, other staff and students are great and make me feel that I am doing something worthwhile. I always enjoyed practical classes, but now that I have got used to it, I really enjoy standing up and giving lectures too. Collaborating with other staff on research projects is really helping my research and I find the buzz of being involved with admissions great fun.

So what advice would I give to anyone considering an academic career? You need to think about what you enjoy. If you didn't like demonstrating, you probably won't like lecturing either. If lecturing is not for you, think about other long term options for a career. If you can, be flexible about where you are willing to work. There are not that many lectureships available, so if you can move you will increase your chances of success. Make yourself stand out! Doing an MBA worked for me, perhaps a teaching qualification (e.g. Post Graduate Certificate in Higher Education) or something else will work for you. If you can, get some experience writing proposals, if you are a post-doc ask your supervisor if you can be named on a grant if you help to write it. Get more involved with teaching and volunteer to help with other tasks within your current institution. Lastly and most importantly, apply for lectureships! I am now involved in recruiting new staff and it amazes me how few of the really good post-docs I know that are out there actually apply for these positions. Be realistic about your skills and what you still need to learn, but perhaps like me, many of you just need someone to tell you that you can do it.

## further information

- www.heacademy.ac.uk/
- www.jobs.ac.uk/
- www.newscientistjobs.com

**Susannah E walsh**
DeMontfort University

# Introducing the new PECS website

News from the S*f*AM Postgraduate and Early Career Scientist Committee


## Congratulations!

Congratulations go to **Gemma Chaloner** and **Pablo Rojas** who won the oral and poster presentation prizes at this year's summer conference. The standard of all the presentations was high this year and it's great to see so many S*f*AM postgraduate and early career scientist members presenting their work.

If you know a S*f*AM student or early career scientist who has been awarded a PhD/ prize/award then get in touch, email Sumeet Kaur at: **s.kaur@londonmet.ac.uk**

**Vicki McCune**
PECS Communications Officer, Newcastle University

With 2009 drawing to a close the PECS committee felt it only right that we should embrace a new technology, commonly referred to as 'the internet'. We have therefore set up a web page, as an extension of this page in *Microbiologist*. The web page allows us to update postgraduate and early career scientist members of S*f*AM on PECS news, committee positions and events in real time. It will also allow members to comment on PECS activities, become more involved with the society and hopefully provide a forum for discussion. You can find the web page, set up using blogger software, at: **www.pecsintheloop.blogspot.com** or via the S*f*AM Facebook page.

Most recently the PECS web page details news of the appointment of our new Chair and Secretary and advertises two committee positions which were recently open to nomination. It also provides information on the roles and responsibilities of some of our committee positions, for those interested in becoming more involved. There is also information on PECS events at the recent summer conference. If you attended the conference it would be great to hear what you thought of the PECS events, why not leave a comment and let us know. The web page also provides contact details for the PECS committee, as well as links to S*f*AM grants of interest to PECS members, such as the conference studentships and President's fund.

Updating the web page forms part of the responsibilities of the PECS Webmaster, but articles can be submitted by anybody. We will be looking to develop the website over the coming months and would welcome your input. Simply use the comments section of the web page to let us know your ideas. Also, if you are interested in becoming part of PECS the web page contains information on who we are and what we do in addition to a picture of us and details of how to get in touch. So to keep up to date with PECS log on to at **www.pecsintheloop.blogspot.com**, we look forward to hearing from you.

**Andrew Hall**
University of Wales Institute, Cardiff

# Students into Work Grant reports

information

## am I eligible - can I apply?

Yes — if you are FULL member who can offer an undergraduate microbiology student the chance to obtain work experience. If you would like to read about the experiences of students who have benefited from this grant, you can do so in each issue of *Microbiologist*.

For further information visit:
**www.sfam.org.uk/grants.php**

## *Coniothyrium minitans* as a biocontrol agent

**In the course of receiving a SfAM** Students into Work grant, I worked in the microbiology facilities of Aston University, Birmingham, UK. My research was particularly focussed on the mycoparasite *Coniothyrium minitans*, a bio-control agent used in Europe and the USA. It has a proven ability to control fungal disease amongst many cultivated plants, particularly those of greenhouse crops. *Coniothyrium minitans* can exploit both actively growing fungal plant pathogens and resilient resting and dispersal structures such as sclerotia which, due to their morphological nature and longevity, are difficult to eradicate by chemical means. Although *Coniothyrium* is naturally present in soil environments, through an improved understanding of complex host-mycoparasite interactions and enhanced biocontrol formulations, the use of biocontrol agents such as *Coniothyrium* may be further advanced, thereby reducing pesticide residues in the greater environment and agricultural products.

We investigated specifically the surface expression of mannose moieties by *Coniothyrium minitans*, as such moieties may influence both the effectiveness of *Coniothyrium* as a bio-control agent and, by contrast, its susceptibility to protozoan predation. Protozoa such as *Acanthamoeba* spp. are naturally present in soil environments hence introducing bio-control agents in the presence of such predatory protozoa may increase protozoan populations, thereby reducing available bio-control entities and their efficacy. However, as alluded to above, studies of this nature have wider implications, as *Acanthamoeba* spp. potentially employ mannose pattern recognition receptors (MPRRs). These potentially have much in common with those found to orchestrate important elements of invertebrate and vertebrate innate immunity. Through the use of FITC-labelled plant lectins and associated protocols to quantify and qualify their binding characteristics, results from my ten week study effectively defined the nature of mannose expression by dispersal agents or conidia of *Coniothyrium*. In particular they showed that the extent of conidia or propagule surface mannose exposure changes with age and strain. Additionally collected data has also shown that the phagocytic ability of protozoa such as *Acanthamoeba* spp. towards *Coniothyrium* similarly changes with time and could be disrupted by appropriate competitive inhibition. The work undertaken presented an insight into aspects of molecular recognition and phagocytosis, as occurs in the environment at large and as part of biological innate immunity.

During my placement, I became familiar with, or was introduced to, some of the many techniques that a microbiologist uses on a regular basis, as well as more advanced experimental techniques. Many students who do not go on a placement while at university lack full or robust familiarity with even simple techniques, including good aseptic technique and undertaking chemical or cellular dilutions. Furthermore, the use of more involved techniques and equipment is mandatory when it comes to advanced research. During my placement I developed a degree of familiarity with flow cytometry, which detects and measures cell population fluorescence amongst other parameters. I also gained experience of confocal microscopy; an important tool for high definition imaging of biological material.

The experience, technicalities and structure of scientific work in a research laboratory is very different from my undergraduate experience. Exposure to an environment where individuals are expected to think for themselves, to plan, to implement and then to further refine their protocols and experimentation, was initially daunting. However, summer placements, such as this, give an individual great insight into the workings of an experimental or research laboratory. My placement has developed "lifelong" learning and insight into generic skills and requirements, such as planning, organisation and structured implementation and demonstrated that these are vital elements of experimentation to ensure microbes, reagents and equipment effectively come together. In turn, the importance of robust documentation, clear protocols and full archiving of raw data has become fully apparent to me. I would like to thank the members of Aston University's microbiology laboratory, Dr Stephen Smith, my project supervisor, but particularly SfAM for my summer placement.

**Bishal Mohindru**
Aston University

## Analysis of the cueA operon in *Listeria monocytogenes*

**During this summer I assisted in a** research project in the Faculty of Life Sciences at the University of Manchester, under the supervision of Professor Ian Roberts and Dr Dave Corbett. The aims of the project were to study the expression of the *cueA* gene, encoding for a copper transporting P1-ATPase, in response to various concentrations of copper and zinc sulphate. To date, little is known about copper homeostasis in *Listeria monocytogenes* and its role in virulence. My studies formed part of a larger programme of work ongoing in this area of Manchester.

*Listeria monocytogenes* is a ubiquitous microorganism and the causative agent of listeriosis, a foodborne bacterial infection. Listeriosis has severe effects on the foetuses of pregnant women such as premature birth and affects approximately 1 in 10,000 pregnancies (Cruikshank & Warenski, 1989).
*Listeria monocytogenes* is a relatively resistant organism, capable of surviving in low pH, high salt concentration and low temperatures (Wilks *et al.*, 2006; Vazquez-Boland *et al.*, 2001).

In this study I determined expression of the *cueA* gene by using a strain that contained a chromosomal non-disruptive *lacZ* fusion 3' to the *cueA* gene. In addition, I looked at a strain in which the repressor (CsoR) of the *cueA* gene was deleted and a control strain with a *lacZ* fusion 3' to the housekeeping *rpoC* gene.

Initially I measured the copper sensitivity of the strains by growing them overnight in 5ml of TSB solution supplemented with increasing concentrations (200 to 600$\mu$M) of copper sulphate. A common trend was observed across all strains, with a steady decline in optical density with increasing copper concentration, although the Δ*csoR* strain was significantly more resistant to higher copper concentrations. This probably reflects that in the absence of CsoR there is constitutive expression of the *cueA* gene leading to increased ability to export copper out of the cell.

The next stage of the research project was to analyse the induction of the *cueA* operon through measuring β-galactosidase activity. Due to the relatively low levels of expression of the *cueA* operon, β-galactosidase activity was measured using the substrate 4-methylumbelliferyl β-D-glucuronide (MUG) which, once broken down by β-galactosidase, forms a fluorescent by-product. Following incubation with MUG the fluorescent product can be detected by excitation at 495nm and fluorescence measured at 414nm. From this experiment I could show that expression of the *cueA* operon was induced threefold upon addition of 400$\mu$M copper. In contrast, the Δ*csoR* strain showed constitutive expression, in keeping with its likely role as a repressor of transcription.

Overnight cultures of the wild type and Δ*csoR* strains were also incubated with other divalent metal cations; zinc sulphate, gold chloride and silver nitrate. No significant difference in resistance was observed between the wild type and Δ*csoR* strains regardless of the metal present, indicating that the CueA protein is not able to export $Zn^{2+}$, $Au^{2+}$ or $Ag^{2+}$ divalent cations. Out of the three metals, both strains showed greater resistance to zinc, achieving concentrations of 10mM compared to 200$\mu$M for silver nitrate and 500$\mu$M for gold chloride respectively.

To further explore the resistance to zinc, a β-galactosidase assay was performed using the *cueA::lacZ* strain and, as a control, the *rpoC::lacZ* strain. The *cueA::lacZ* strain showed no significant induction in the presence of exogenous zinc indicating that the zinc was not inducing transcription of the *cueA* operon.

The 'Students into Work' project has given me first-hand experience of laboratory work beyond that of an undergraduate degree programme. It has been a good insight into what constitutes higher academic research. The experience has improved my laboratory skills, particularly my aseptic technique and also my transferable skills such as time management. I would like to thank Professor Ian Roberts for the opportunity and guidance during the internship.

I would also like to thank Dr Dave Corbett for his help, supervision and most of all patience.

**Thomas Pointon**
University of Manchester

# President's Fund reports

## information

### am I eligible - can I apply?

It is not only our student members who require our help. Senior microbiologists often find difficulty in funding attendance at meetings. If you are in this position you are eligible for this fund.

For Further information visit:
**www.sfam.org.uk/grants.php**

# Mechanisms of action of a blend of citrus essential oils against *Enterococcus* spp

**For many years enterococci were** believed to be harmless to humans and because of their bacteriocin producing properties were used widely in the food industry as probiotics or starter cultures (Foulquie *et al.*, 2006). Recently enterococci have become one of the most common nosocomial pathogens having a high mortality rate of up to 61% (De Fatima Silva Lopes *et al.*, 2005).

In 2005 in the UK there were 7066 reported cases of *Enterococcus* spp. bacteraemia, an 8% increase from 2004, with the Health Protection Agency (2007) stating that, "*an increase in a bacteraemia causing pathogen like this has not been observed in some time*". Also, 28% of all cases were antibiotic resistant (Health Protection Agency, 2007). The risk of death from vancomycin resistant *Enterococcus* spp. (VRE) is 75% compared with 45% for those infected with a susceptible strain (Bearman & Wenzel, 2005). This is mirrored in the USA. In a fifteen year period there was a 20-fold increase in VRE-associated nosocomial infections reported to CDC's National Nosocomial Infections Surveillance (NNIS) (National Nosocomial Infection Surveillance, 2004).

This dramatic increase in antibiotic resistance of enterococci worldwide only highlights the need to find an alternative to these drugs both within the clinical arena, as well as within the food industry. There has been a move from more processed foods towards organic, minimally processed foods which now represent the fastest growing sector of the market. This move has been driven by green consumerism and government legislation to find substitutes for the chemically based bactericides, whilst maintaining the quality and safety of perishable foods (Burt, 2004).

The healing properties of essential oils (EOs) have been recognised since Greek and Roman times but it was in the 13th century that they were first documented as being used in pharmacies. Among native Australians, plant extracts of tea tree have been used medicinally for centuries. The earliest written record of this was in the 18th century during the colonisation of Australia (Burt, 2004). With the introduction of chemical based medicines such as antibiotics, the use of EOs diminished and they were increasingly used for flavour and aroma rather than medicinal purposes. However, more recently the use and mechanisms of action of EOs have become a growing area of research, mainly due to the increasing number of antibiotic resistant microorganisms and the requirement for alternative solutions (Salvat *et al.*, 2004).

The mechanisms by which an EO [a blend of orange (*Citrus sinensis*) and bergamot (*Citrus bergamia*) (1:1 v/v) in both vapour and direct oil form] brings about its antimicrobial effect on *E. faecium* and *E. faecalis* was investigated. A range of techniques were used including assessment of membrane permeability and intracellular and extracellular ATP concentrations. Luminescence and florescence were used to monitor changes in membrane potential and intracellular pH before and after the cells were exposed to either the vapour or oil of the citrus blend. Morphological changes were also observed using transmission electron microscopy (TEM).

Overall, the addition of the citrus blend to *E. faecium* and *E. faecalis* increased the cell membrane permeability twofold in the case of the oil form and up to 40 times in the case of exposure to vapour. Although an increased permeability of the cell membrane was observed, the loss of ATP that was observed within enterococcal cells was not caused by a leak into the surrounding fluid. This suggests that the loss of intracellular ATP may be due to decreased synthesis or increased hydrolysis of ATP. The membrane potential is the driving force of ATP synthesis, thus the reduction of internal ATP is coupled with a decrease in membrane potential in *E. faecalis* and *E. faecium* in oil and vapour form. Morphological changes were apparent although there were differences between those cells subjected to the oils and vapours. Both treatments caused a lack of integrity to the cell membrane but those cells exposed to oil had large vacuoles present, which did not appear in the vapour treated cells, whereas elongation of the cells was observed in the latter. Due to similar changes in ATP, membrane potential and intracellular pH, the effect of the vapour and blend on the cell is thought to be the same but the mechanism by which they bring about this effect may differ.

The results indicate that at low concentrations the citrus blend disrupted the homeostasis of *Enterococcus* cells in both oil and vapour form. The blend appears to be acting upon the cell membrane which acts as a barrier for the cell and is essential for normal cellular function including such processes as energy transduction, solute transport, metabolic regulation and control of energy status and turgor pressure. Thus, damage to the membrane brings about a loss of cell function and therefore is an effective antimicrobial that could be used in a range of applications in both the food and clinical arenas. The bacteriostatic effect of essential oils is well documented but before essential oils can be used as an alternative to chemical based bactericides, both the mechanism by which the EOs inflict damage and the mechanisms by which the bacteria recover need to be fully understood.

I would like to thank SfAM for awarding me a President's Fund grant, which allowed me to attend and present at the 108th ASM General meeting in Boston, USA.

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**Katie Laird**
University of Northampton

## Microbiological Laboratory Manuals from Campden BRI

Campden BRI produces a number of manuals of relevance to laboratory microbiologists. In addition to the well established *Manual of Microbiological Methods* (Guideline 43), now in its fifth edition, we have recently published the sixth edition of the *Catalogue of Rapid Microbiological Methods* (Review 1). Using simple tables for ease of cross-referencing, it lists over 400 kits from around 50 kit manufacturers. It covers pathogens of interest to the agri-food chain, spoilage organisms (e.g. yeasts) and hygiene testing.

In addition to the name and principle for each method, it gives the time taken for the test, the name of the manufacturer along with contact details, comments on validation status of the method, and references for further reading.

As well as these methods publications, *A code of practice for microbiology laboratories handling food, drink and associated samples* (Guideline No. 9), now in its third edition, will help food microbiologists to run their laboratories safely and efficiently and help ensure that they generate results that are valid and meaningful.

**further information**

**visit: www.campden.co.uk**
Tel: +44 (0)1386 842048
Email: pubs@campden.co.uk

# corporate news

The latest news, views and microbiological developments from our corporate members

## Whitley A35 Workstation

The Whitley A35 Anaerobic Workstation is the latest innovation in workstation technology. Complete with built-in, rapid airlock and intuitive touch-screen control panel, this new cabinet allows you to work completely glove and sleeve-free, providing access to the workstation in seconds.

Users can manipulate plates inside the A35 workstation without being hindered by gloves or sleeves and without compromising the internal conditions. A minimal footprint with maximised incubation capacity creates perfect conditions for both low throughput research applications and the far heavier usage normally associated with routine medical microbiology. In excess of 500 plates can be incubated whilst still leaving room for the instrument to be used as a workstation.

Our new, patented glove port system offers substantial savings in both gas consumption and consumables when compared to traditional sleeved systems.

The 12-litre, rapid-cycle airlock will transfer up to 40 Petri dishes in 60 seconds. The airlock is also useful for the introduction of laboratory equipment.

Whatever your application, the A35 can be tailored to your requirements. Options include a built-in, interior electrical socket, a removable front and a 15cm letterbox.

The Whitley A35 Workstation is ideal for both clinical and research applications.

**further information**

**visit: www.dwscientific.co.uk**
Tel: +44 (0)1274 595728
Email: info@dwscientific.co.uk

## Lab M's VCC supplement integral to *E. coli* O157 isolation

Recent UK outbreaks of *Escherichia coli* 0157 infection in young children have again highlighted the seriousness of the ensuing illness, the importance of timely diagnosis and the need to trace the source of infection. Sample enrichment is important for *E. coli* O157 recovery and isolation, and Lab M's Buffered Peptone Water is used with VCC Selective Supplement to prepare a pre-enrichment broth. It also serves as a selective enrichment medium for the isolation of *E. coli* O157 from food and other samples.

Lab M's full range of media for *E. coli* O157 isolation includes modified Tryptone Soy Broth

(mTSB), Sorbitol MacConkey Agar (SMAC) and Cefixime Tellurite-SMAC Agar (CT-SMAC). In addition, the chromogenic medium Harlequin™ SMAC-BCIG is a modification of SMAC agar in which a specific substrate enables differentiation of *E. coli* O157:H7 from other strains on the basis of colony colour.

Rhamnose MacConkey (VTEC O26) Agar is selective for verocytotoxin producing *E.coli* O26, also associated with haemorrhagic colitis and haemolytic uraemic syndrome. Based on MacConkey agar, this medium includes rhamnose rather than lactose; VTEC O26 colonies are unable to ferment the rhamnose present in the medium so remain translucent. Other non-O26 VTEC colonies appear a pink to red.

**further information**

**visit: www.labm.com**
Tel: +44 (0)161 797 5729
Email: info@labm.com

## New Σ-Virocult® range

Medical Wire's new Σ-Virocult® range has played a vital role throughout the recent and current Novel H1N1 influenza pandemic. Vaccines are now becoming available but it remains vital to monitor those strains which are circulating in the population. And as winter takes hold in the northern hemisphere, all the other respiratory viruses will require surveillance. Σ-Virocult® offers the advantage of being compatible with modern rapid diagnostic tests, while allowing the maintenance of viable virus for culture for complete characterisation, and the detection of novel strains for which rapid methods yet to be developed.

Σ-Virocult® comprises a vial of Virocult virus transport medium and a choice of 1, 2 or 3 Σ-swabs® (Sigma-swabs). Upon taking the specimen, the swab is easily snapped into the transport vial. Σ-swabs® have a cellular foam bud that maintains microorganisms in a viable condition within their own microenvironment. The open celled structure allows complete flow through of test reagents for maximum sensitivity of test reagents. Σ-Virocult® is available in a range of formats appropriate for most clinical situations.

**further information**

**visit: www.mwe.co.uk**
Tel: +44 (0) 1225 810361
Email: sales@mwe.co.uk

## New expanded oilfield services at NCIMB

NCIMB Ltd who house the national service Collection of Industrial Food and Marine Bacteria in Aberdeen have launched an expanded facility to service the growing needs of the North Sea oil industry.

NCIMB have for many years engaged in microbial and chemical analytical services in response to offshore operator needs. We have recently enhanced this service as a result of a partnership agreement with local company North East Corrosion Engineers (NECE) who specialise in corrosion monitoring of offshore installations. Corrosion is a serious problem in and around oilfield infrastructure and can cause failures, shutdowns and the need for expensive remedial and preventative measures.

Together with our partners we are now able to offer a following comprehensive range of oilfield services:

- Full microbial off-shore audits; primarily for sulphate reducing bacteria (SRB) and other organisms which are indicative of loss of microbial control in production, storage and water injection systems.
- Corrosion monitoring, including the use of *in situ* metal coupons.
- Detailed chemical analysis to compliment the microbial audit data
- Diesel fuel analysis for oilfield supply vessels MARA toxicity testing of discharge waters and effluents

**further information**

**visit: www.ncimb.com**
Tel: +44 (0)1224 711100
Email: enquiries@ncimb.com

## information

Are you a corporate member of the Society? If so, this section of *Microbiologist* is for you. Here you can publish short press releases, acquisition notices, news of new staff appointments, technical developments and much more.

Each corporate member of the society may publish ***up to*** 200 words on a topic related to their field of activity in each issue of *Microbiologist*. For further information please contact Lucy Harper by email at: **lucy@sfam.org.uk**

Both corporate members and ordinary members of the Society will find a wealth of useful information and resources in this section.

## ProtoCOL 2 Zone system speeds up quality testing of swine flu vaccines

ProtoCOL 2 automatic zone measuring system can increase the speed of quality testing of H1N1 swine flu virus vaccine potency, ensuring vaccines can be rapidly delivered to healthcare professionals.

The ground breaking ProtoCOL 2 takes zone measurement technology to a new level with its unique functionality and performance, and can generate results from a 16-zone SRD plate of swine flu vaccines in minutes. Manufacturers can produce highly accurate and reproducible indications of vaccine potency up to ten times faster than time consuming and error-prone manual techniques.

ProtoCOL 2 has sliding doors to eliminate ambient light and the system's unique red, blue and green LED lighting (patent pending) provides exceptional uniform illumination of SRD plates offering good contrast and reflection-free detection. The unit contains a high-resolution CCD camera that captures precise zone images in seconds and its new advanced Zone software can rapidly calculate a precise average diameter to provide an accurate indication of vaccine potency. These innovative features save hours of highly repetitive work to make ProtoCOL 2 ideal for increasing productivity in any GMP vaccine production facility.

**further information**

**visit: www.synbiosis.com**
Tel: +44 (0)1223 727125
Email: sales@synbiosis.com

## Neogen Filter Test System and ampouled media simplifies liquid microbiological testing

Neogen has developed a disposable membrane filtration system that utilises ampouled media to provide a complete solution to enumerate and detect a wide variety of microorganisms in liquid samples.

The new Neogen Filter Test System, when used with available 2mL media ampoules, greatly simplifies the entire microbiological testing process for liquid samples — Including Petri dish preparation and evaluation, sample preparation, culture media preparation, clean-up and disposal.

The new system can be used with a wide variety of sample types, including environmental and bottled water, raw to finished liquid products — including milk and other dairy products, beer and wine, juices and soft drinks. The Neogen Filter Test System can be used anywhere liquids and/or water is tested for the presence of microorganisms.

Neogen Filter Test System is available with either white or black filters, and each lid has a magnifying circle to make pinpoint colonies easier to identify. Each filter is 56 mm in diameter and has a 0.45 micron pore size. The sterile, ready-to-use Neogen Filter easily conforms into a Petri dish eliminating many of the steps and time, associated with using conventional "membrane replacement" filtration systems.

**further information**

**visit: www.neogeneurope.com**
Tel: +44 (0) 1292 525275
Email: b-reiter-millard@neogeneurope.com

## Expansion of staining solutions

Pro-Lab Diagnostics are pleased to advise the expansion of our range of high quality staining solutions for Microbiology. A full range of convenient staining kits is now available to accommodate different volume requirements, for Gram staining, TB staining, Cryptosporidium staining, Fields Staining and many more. Also available is new reduced hazard DBP (Dibutyl Phthalate) free immersion oil. The Poly Stainer automated staining machine now offers automated rapid staining for up to ten different staining methods. Demonstrations are available on request.

**further information**

**visit: www.pro-lab.com.**
Tel: +44 (0) 151 353 1613
Email: uksupport@pro-lab.com.

# BD Diagnostic Systems

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