PHARMACOLOGY MATTERS

BRITISH PHARMACOLOGICAL SOCIETY
Today's science, tomorrow's medicines

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Raising the profile of pharmacology

through public engagement

self experimentation | guerilla (psycho)-pharmacology | public engagement | open education resources

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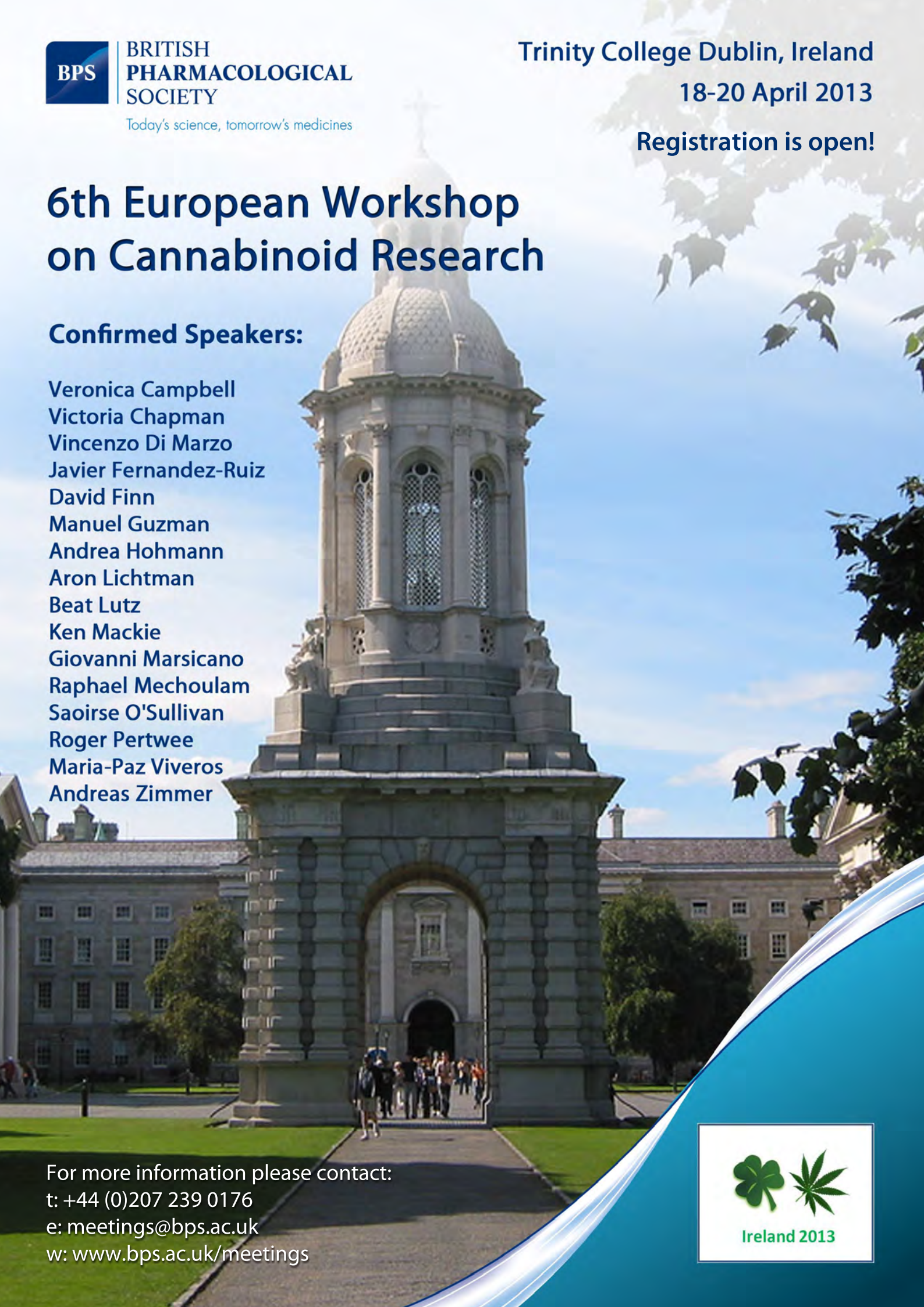

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Guest Editorial

Jenny Koenig
University of Cambridge

Pharmacology touches everyone's lives at some point and people are hungry for reliable information presented in a readily-accessible way. As pharmacologists it is essential that we are capable of answering this need and to this end, the External Affairs committee has organized a symposium *Raising the profile of pharmacology though public engagement* on the final day at this year's Annual Meeting. This is a new departure for the society as we are including an element of professional development in a new symposium format. There will be a mixture of talks and interactive discussion sessions where delegates will have the opportunity to consider how to put what they've learned into practice.

This issue of *Pharmacology Matters* takes up the theme of public engagement and we hope that readers will be inspired by the wide range of articles from David Nutt's *Guerilla (psycho)-pharmacology* to Elliot Lilley's *How does a pharmacologist end up working for the RSPCA?*

Jeffrey Aronson's inspired combination of Nobel Prizes with self-experimentation is a great example of how to use a human story to engage the public as well as describing some of the science involved. Newspapers regularly include articles that rely upon some understanding of risk and this is a very difficult area to communicate well, Edward Sykes explains the Science Media Centre's role in communicating this risk on P21.

In *getting into public engagement,* Liang Yew-Booth and I provide some links to further sources of training, funding and information about public engagement and interview some pharmacologists about their experiences. One of the themes that came through in the interviews was the need to be able to connect with your audience, to entertain and to include some science but not make it overwhelm the human story.

Jenny

Contents

Cover credit: iStockphoto

View from Angel Gate

Jonathan Brüün
Chief Executive BPS

May I begin by offering a warm welcome to all our readers, whether BPS members, members of partner societies and organizations, or members of the public.

This edition of *Pharmacology Matters* is very special to me as it examines the role of public engagement in science. As someone with a background in communications I am especially interested in exploring how we can better explain science as a whole – and pharmacology in particular - to the public, in a way that is as engaging as it is serious, as inspirational as it is accurate.

Helping people to understand the role of pharmacology in public health and wealth is critical, to borrow a phrase, to 'inspiring a generation' of drug discoverers, developers, regulators and prescribers. It is something I believe BPS should take seriously. I'm therefore delighted to highlight new developments in this area.

Firstly, this edition of *Pharmacology Matters* coincides with BPS's first symposium on public engagement at our Annual Meeting. The symposium has been put together by representatives from our External Affairs committee and features two of our best communicators: Professors Clive Page and Colin Blakemore. If you're attending this year's meeting, I would recommend this important and innovative symposium to you.

Secondly, I have been able to welcome two new members of staff to the team at Angel Gate in the past few months, both with a remit to increase our capacity to explain pharmacology to a wider audience. Rebecca Tibbs joined us in August, taking on the newly created role of Education and Outreach Officer. Just like BPS, Becca is an alumna of Wadham College, Oxford, where she achieved a First in Molecular and Cellular Biochemistry, and joins Jess Strangward in the Education team at a time of considerable change and development. Katharine Richardson joined us in October as our new Head of Communications and Membership, with a remit to support our External Affairs activities. Katharine arrived from Virgo Health, where her role as Programme Director / Policy & Access Advisor brought her into direct contact with many pertinent issues for pharmacology today. I'm sure you'll join me in welcoming Becca and Katharine!

One of Katharine's major areas of focus in 2013 will be to drive our year of member engagement, in a campaign called *Your BPS*. Through Your BPS, we hope to offer opportunities for members to interact online and in person, on both a national and regional basis. Included in the programme of activities will be your chance to help shape the future direction of BPS through a member survey, celebrate pharmacological achievements across the UK, rename our Head Office (more information is available at our 2012 Annual Meeting) and get involved in the running of your society through membership of our committees and working groups. Katharine will also be working to help you get the most out of your membership. Watch this space, as they say!

While on the subject of our members' involvement in BPS, I'd like to add a personal note of thanks to those committee members and Trustees who are stepping down at the end of 2012 after several years of service, and to welcome those who will be elected at our AGM to replace them. Committees are the lifeblood of our organization, through which a range of projects in support of pharmacology and pharmacologists are delivered, and by which we can more safely navigate the sector's evolving landscape. Our committee members give a few hours, two or three times a year, and are supported by the excellent team of full-time staff at Angel Gate. If you think this is something you would like to consider, why not contact Ruth Meyer (ruth.meyer@bps.ac.uk) for more information?

I thought I would leave two of the most significant developments for 2013 till last!

In January, the *British Journals of Pharmacology (BJP)* and *Clinical Pharmacology* (*BJCP*) – our flagship publications under the management of Wiley Blackwell – will move to online-only editions. The halting of print runs of these journals will not affect the vast majority of those who use them, as they are already accessed primarily in electronic format. However, I'm aware that some of our members may mourn the loss of the traditional, handy, hard-copy version. I do hope those members will understand that there are sound reasons for making the decision to switch, and that through the move to online only publishing we may be able to provide new resources – for example enriched content, educational support material and semantic tagging. Journal Editors-in-Chief Jim Ritter and Ian McGrath will be available to discuss the move, and answer any questions you may have, on Thursday 20 December at our 2012 Annual Meeting. Please see the BPS stand for more information.

Finally, 2013 will also see the launch of our first Open Access journal: *Pharmacology Research & Perspectives*. The new journal will be produced with our partners, the American Society for Pharmacology and Experimental Therapeutics (ASPET) and Wiley Blackwell, and will feature high-quality, work across all areas of pharmacology from biomedical researchers worldwide. PR&P will encompass all aspects of pharmacology with papers published under a Creative Commons license. Upon publication, papers will be deposited into PubMed Central on behalf of authors.

Looking ahead, it is clear that the model of scientific publishing, which is so important in enabling BPS to pursue its charitable objectives in support of pharmacology, is changing. Papers and supporting data generated through publicly funded research will need to be made accessible. While *BJP* and *BJCP* already offer authors the option to publish their papers in an open access framework, *PR&P* gives BPS a further opportunity to engage fully and enthusiastically in open access publishing, with the support of our partners. In the meantime, we hope you will continue to support our journals, old and new, with your best papers.

Self-experimentation and the Nobel Prize at the Cheltenham Science Festival 2012

Jeffrey K Aronson
President Emeritus BPS

Dr Jeffrey K. Aronson President Emeritus of BPS, is a consultant clinical pharmacologist and physician in the Department of Primary Care Health Sciences in the University of Oxford and a consultant physician in the Oxford Radcliffe Hospitals Trust.

The BPS has been participating in the Cheltenham Science Festival for several years and has organized talks on topics such as the pharmacology of cannabis, curry, and chocolate. For the 2012 Festival I suggested that a session on self-experimentation might be of interest, and the organizers agreed. They invited Barry Marshall to talk about how he discovered that *Helicobacter pylori* causes peptic ulcers, which he did with his usual verve, describing how, as part of the work, he had swallowed a broth of the bacteria. They also asked me to give the warm-up talk, and since Barry had won the Nobel prize for Medicine or Physiology with Robin Warren in 2005 (**Figure 1**), I decided to talk about other Nobel prize winners who had indulged in self-experimentation as part of their prize-winning research. I found nine who had done so.

1. **Niels Ryberg Finsen** Nobel prize 1903, "in recognition of his contribution to the treatment of diseases, especially lupus vulgaris, with concentrated light radiation, whereby he has opened a new avenue for medical science". At various times Finsen exposed himself to high-intensity UV radiation at specific wavelengths from a carbon lamp. A sculpture by Rudolph Tegner, titled "Towards the Light", which can be seen in Copenhagen, commemorates his work.

2. **Frederick Grant Banting** Nobel prize 1923, with John James Rickard Macleod, "for the discovery of insulin". Banting injected an unpurified extract of dog pancreas containing insulin into his arm. As he wrote in his notebook for 23 November 1921: "One of us (FGB) had 1½ cc Berk. ext. subcut. No reaction."

3. **Charles Jules Henri Nicolle** Nobel prize 1928, "for his work on typhus". In Nicolle's words, as later reported by his colleague, Ludwik Gross, "I was trying to find a vaccine against typhus, and I mixed typhus bacilli with blood serum from those patients that had recovered. I injected myself with the mixture and remained in good health. I then injected a few children, because they are more resistant than adults, and you can imagine how frightened I was when they developed typhus; fortunately, they recovered."

4. **Victor Franz Hess** Nobel prize 1936, "for his discovery of cosmic radiation". Hess discovered cosmic radiation by making several ascents in a balloon to 6000 metres: radiation was eight times greater there than at sea level.

5. **Ernest Orlando Lawrence** Nobel prize 1939, "for the invention and development of the cyclotron and for results obtained with it, especially with regard to artificial radioactive elements". During his experiments Lawrence drank a solution of radioactive sodium. The element Lawrencium is named after him.

6. **George de Hevesy** Nobel prize 1943, "for his work on the use of isotopes as tracers in the study of chemical processes". de Hevesy drank heavy water (D2O) on several occasions to study its physiological effects.

7. **Max Theiler** Nobel prize 1951, "for his discoveries concerning yellow fever and how to combat it". Theiler injected himself with a new yellow fever vaccine and then inoculated himself subcutaneously with the yellow fever virus.

8. **Jean Dausset** Nobel prize 1980, with Baruj Benacerraf and Dickinson W Richards, "for their discoveries concerning genetically determined structures on the cell surface that regulate immunological reactions". Dausset had skin from six other volunteers grafted onto his arm.

9. **Werner Forssmann** Nobel prize 1956, with André Frédéric Cournand and George D Snell, "for their discoveries concerning heart catheterization and pathological changes in the circulatory system". I have left the best story to the end. As a medical student Forssmann had been fascinated by a picture in one of his textbooks, showing two French scientists, Auguste Chauveau and Etienne Jules Marey, standing next to a horse whose heart they had catheterized via the jugular vein in 1861. Forssmann was surprised that no-one had tried it in humans, and while a surgical intern in the August Viktoria Home in Eberswade in Germany in 1929 he suggested it to his boss, Dr Richard Schneider, who rejected the idea out of hand. Forssmann was not put off. He persuaded a nurse, Gerda Ditzen, to become the subject of his intended experiment, and she agreed. In an operating room he strapped her to a couch, but instead of preparing her for the operation, he prepared himself, disinfecting and anaesthetizing his antecubital fossa, before inserting a ureteric catheter into the antecubital vein and threading it into the heart. He then released Gerda and persuaded her to take him to the X-ray department, where a technician took a picture of the catheter in place. When Forssmann published his account of the episode, slightly fictionalized in order to deter criticism, it aroused huge controversy. Forssmann had already moved to the Charité Hospital in Berlin, but he was fired by his boss, Ferdinand Sauerbruch, and returned to the August Viktoria. It was another 27 years before he was awarded the Nobel prize, by when he had catheterized himself many more times and invented angiocardiography, by injecting radio-opaque substances directly into the heart.

I suspect that there are few researchers who have not at some

time experimented on themselves. Other Nobel prize winners who have done so have included Sir William Ramsey (Nobel prize 1904), Ilya Ilyich Mechnikov (1908), Karl Landsteiner (1930), and Gerhard Domagk (1939). But in those cases their self-experiments were not related to the work for which they won the prize.

In an analysis of 540 instances of self-experimentation I have found that about one-third were concerned with pharmacology or toxicology. The ethics of self-experimentation have been debated, but it remains an important method of research.

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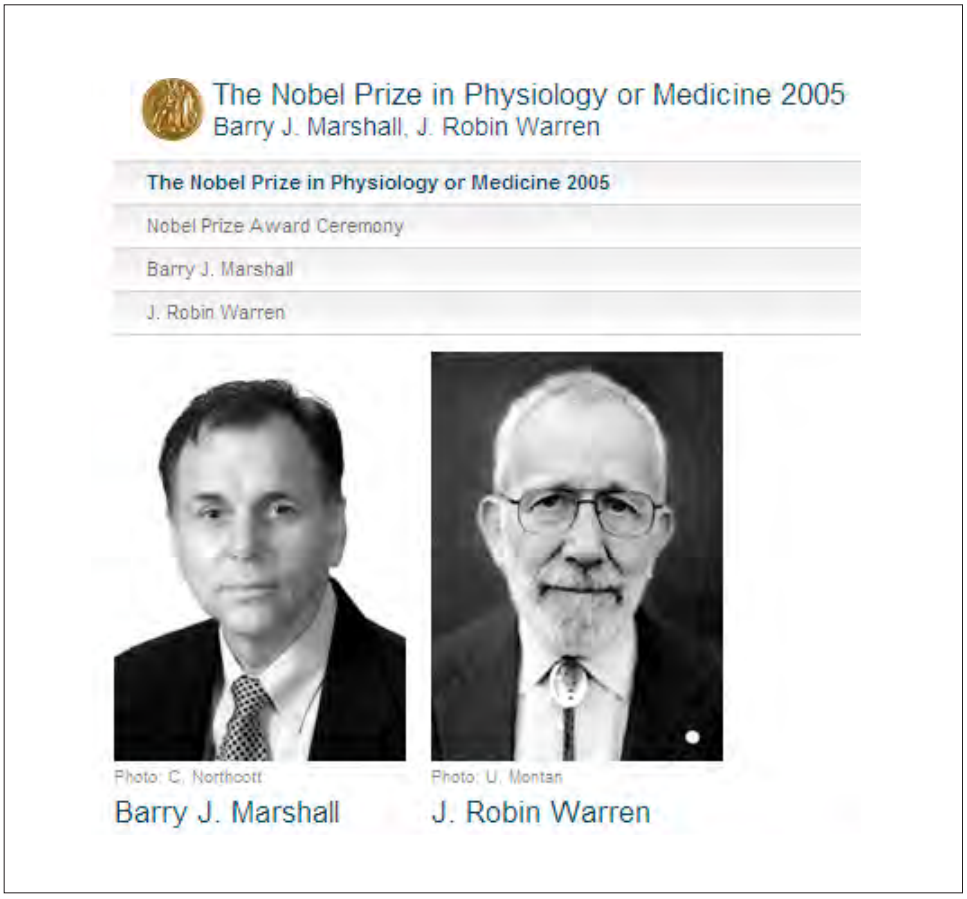
Figure 1.



Guerilla (psycho)-pharmacology: a new approach to brain research in challenging areas?

David Nutt
Imperial College London

BPS member Professor David Nutt is currently the Edmund J Safra Professor of Neuropsychopharmacology and Head of the Centre for Neuropsychopharmacology in the Division of Brain Sciences, Department of Medicine, Hammersmith Hospital, Imperial College London.

He received his undergraduate training in medicine at Cambridge and Guy's Hospital, and continued training in neurology to MRCP. He is currently Chair of the Independent Scientific Committee on Drugs (ISCD) and Past-President of the European College of Neuropsychopharmacology (ECNP), Vice-President of the European Brain Council and President of the British Neuroscience Association. In addition he is a Fellow of the Royal Colleges of Physicians, of Psychiatrists and a Fellow of the Academy of Medical Sciences. He is also the UK Director of the European Certificate and Masters in Affective Disorders Courses and a member of the International Centre for Science in Drug Policy. He has edited the Journal of Psychopharmacology for over a decade and acts as the psychiatry drugs advisor to the British National Formulary.

Previously he has been member and Chair of the Advisory Committee on the Misuse of Drugs (ACMD – 1998-2009), President of the British Association of Psychopharmacology (BAP), member of the HEFCE/NHS Senior Lecturer Selection Panel and member of the MRC Neuroscience Board. Other previous national contributions include serving as the medical expert on the Independent Inquiry into the Misuse of Drugs Act (2000 Runciman report), and membership of the Committee on Safety of Medicines, the Committee on NHS drugs and the Ministry of Defence Science Advisory Board. He was the clinical scientific lead on the 2004/5 UK Government Foresight initiative "Brain science, addiction and drugs" that provided a 25-year vision for this area of science and public policy and in 2006 he was Director of Bristol Neuroscience.

He broadcasts widely to the general public both on radio and television including BBC and Channel 4 science and public affairs programmes on therapeutic as well as illicit drugs, their actions harms and their classification. He also lecturers widely to the public as well as to the scientific and medical communities.

We all know what it is like to lack the funds we need to do the experiments we most want to do. The more senior readers will have had the experience of writing grants that we believe are necessary and important and yet not getting them funded. So what to do then? Well of course there is the time-honoured tradition of rewriting for another funder, though with the change in policy direction by the Wellcome Trust, opportunities for investigator-led projects, particularly small or pilot ones are quite limited. So then what?

We have experienced this in relation to our work in the field of drugs that change mood and consciousness such as psilocybin and MDMA [ecstasy]. These drugs are hugely interesting because they both work through 5HT mechanisms and have profound yet clearly different psychological effects. It seemed to us that using new brain imaging techniques such as fMRI and magnetoencephalography (MEG) to explore their actions would give us important insights into the role of neurotransmitters, particularly 5HT, in brain function and could also help us understand brain mechanisms of mood and consciousness.

However there is a problem with these drugs – they are banned under the Misuse of Drugs Act. This means that working with them requires expensive special licenses and the drugs are hugely expensive to acquire through legal channels. More significantly most funders and many researchers are scared off by the negative publicity that working in this field may attract. For these reasons we have never been able to raise any money for our brain science work on these drugs from traditional funders. Yet in the past year we have conducted three studies with psilocybin and one with MDMA that have provided massive insights into how these drugs act and led to multiple papers in high-impact journals. To do this we went for the guerilla [little war] approach, which seemed appropriate given many of the problems we encountered are caused by the ongoing big War on Drugs!

How did we do it?

First I needed some committed individuals with a shared vision. The Beckley foundation (www.beckleyfoundation.org), a charity set up by Amanda Feilding to promote research in the field of psychedelic drugs, were keen to support a brain imaging study in this area and encouraged me to lead this.

In 2005, Robin Carhart-Harris, a young psychology graduate contacted Amanda and me and asked to do a PhD project on the brain effects of LSD. What he lacked in experience he made up for in hypotheses and aspiration, saying he was willing to self-fund a PhD, which given the problems of getting funding in this research domain, was a real breakthrough. For his PhD he used our expertise in tryptophan depletion and sleep physiology to develop the most sophisticated and sensitive study ever of the hypothesis that repeated MDMA use depletes brain 5HT function. This study revealed no enduring impact of MDMA on brain 5HT function effectively shutting the door on that scare. He also developed more experience of the effects of other "illicit" and legal drugs in a series of questionnaires he conducted. These confirmed the relative safety and the value that users put on these drugs and raised the question of possible therapeutic applications.

In 2009, while Robin completed his Doctorate with me, plans for the first psilocybin fMRI study were hatched. Under my mentorship, Robin has orchestrated the psilocybin and MDMA studies in terms of design, obtaining regulatory approvals, subject recruitment, conducting the experiments, analyzing the data and writing the reports. The publicity surrounding the findings has meant he has also gained some – perhaps unexpected – experience of radio, tv and press interviews!

Two US charities, the Hefter foundation and MAPS made small but helpful contributions towards the running costs of the psilocybin fMRI studies, as did the Neuropsychoanalysis Foundation. I took on the role of liaising with the universities involved to get sponsorship and other institutional approvals, which proved to be challenging and lengthy task particularly as three universities were involved – Bristol – where we were when the research started, Imperial College London where we moved, and Cardiff –where much of the fMRI imaging and the MEG studies were done.

Drs Richard Wise and Suresh Muthukumaraswamy in the Cardiff University Research Imaging Center (CUBRIC) were heavily involved in the science and this meant that the scan costs were kept very low. Overall, the three psilocybin studies were conducted with a budget of less then £50k, and so represent remarkable value for money in terms of £ per publication.

The MDMA study was funded from a different and unique source – Channel 4 television. This study was conceived and conducted jointly with Val Curran, Prof of Psychopharmacology at University College London. Val is a world-leader in MDMA studies and has conducted the only controlled trials of this drug in the UK. She had the additional advantage of holding the necessary Home Office license for MDMA experiments.

Channel 4 approached The Independent Scientific Committee on Drugs (ISCD: www.drugscience.org.uk) about making a research study on MDMA as part of a public education broadcast. With this funding we organized the study in such a way that would allow a number of the participants to be filmed for public broadcast. This we did by having a filmed and non-filmed cohort of subjects [though in fact it turned out there were no real differences between them in terms of the brain effects of MDMA]. This research was shown on TV in Sept this year as the C4 program Drugs Live: the Ecstasy trial It had at peak 2.3 million viewers and has now become the most downloaded C4 program ever. C4 have also agreed to make public through their news programs the results as they become published.

One of the remaining challenges were to find clinical cover for the human drug dosing scans as administering drugs to human volunteers, particularly when used IV as in the case of the psilocybin, requires trained medical cover. We could not have done this without a group of enthusiastic psychiatrists prepared to give up their time to screen volunteers and cover for the drug administration, sometimes at weekends. As this involved travelling to Cardiff for the three psilocybin studies this was a significant time burden.

In addition new fMRI paradigms needed development and code writing. We relied heavily on a few dedicated imaging experts who worked at night and at weekends to do this side of things. The work was particularly demanding for the MDMA study where results needed to be prepared for TV presentation within days of the last subject being entered in the study. None of these received any financial reward: they did it for the science itself and being part of significant publications.

What did we find?

The remarkable finding with the psilocybin studies was that is effects were exactly opposite to those we had predicted. In the first study we examined brain blood flow expecting increases in areas such as visual cortex when people hallucinated. To our surprise we found the opposite – psilocybin produced profound decreases in brain blood flow particularly in the anterior (ACC) and posterior (PCC) cingulate cortex (part of a connected system known as the default mode network or DMN) and the thalamus. The magnitude of the decrease correlated with the strength of the subjective experience suggesting the two were causally related. We replicated these findings using an fMRI BOLD procedure in a separate experiment and also there were able to show that psilocybin-induced positive memories were linked to increased activity in the hippocampus.

Probably because these findings were counter-intuitive there was resistance to accepting them, with a common criticism being that cerebral blood vessels have 5HT receptors so maybe we were seeing a direct effect on blood flow. Although this was unlikely because we had shown that psilocybin didn't affect carbon-dioxide induced elevations in brain blood flow as part of the fMRI scanning controls, we were fortunate that in CUBRIC they are experts at MEG as well as fMRI. MEG only measures electrical activity in cortex and the actions of psilocybin on this measure were profound; it profoundly disrupted electrical synchronisation in many cortical regions particularly those in the DMN. Moreover, other collaborators, Roslyn Moran and Karl Friston at UCL, using a new technique developed by Friston, called Dyanmic Causal Modeling, discovered that the prime site of action of psilocybin was on pyramidal cells in the deep layers (e.g. layer 5) of the cortex. This makes perfect sense as these neurons massively express 5HT2A receptors – the target receptor for psilocybin.

Taken together these results suggest that psilocybin switches off the key integrative hub regions of the brain. This leads to a disconnection syndrome that is manifest by hallucinations and altered perceptions and thinking processes.

The MDMA findings were both similar and different. MDMA reduced activity in limbic regions (the thalamus and parahippocampus) in parallel with its anxiety reducing actions. It also enhanced hippocampal and visual cortex activation to positive personal memories, while making these more vivid and enjoyable to remember, and decreased medial PFC activation to negative personal memories, while making these less upsetting to contemplate. However it did not cause hallucinations nor ego dissolution like psilocybin, which suggests that endogenously released 5HT doesn't act on 5HT2A receptors in the same way as psilocybin. This raises a fascinating question – why do these receptors exist if they are not affected by 5HT? This is one subject for our future research

Where now?

These studies with these two drugs have already had a major international impact on the field. 5HT receptors are involved in many brain functions and I have heard the psilocybin fMRI data talked about in a number of conferences as providing the first human evidence as to what 5HT2A receptors in cortex are doing. It's worth remembering that many drug used in psychiatry e.g. antipsychotics and antidepressants act either directly or indirectly through 5HT2A receptors. The fMRI findings with psilocybin reducing blood flow in fMRI has now been replicated in rats by Prof Trevor Sharp in Oxford, an example of so-called 'back translation".

The psilocybin studies have led to us using it in a clinical trial of depression. One of the most intriguing findings was that we confirmed the reports of Roland Griffiths in John Hopkins University USA that psilocybin exposure can lead to long-lasting improvements in mood. We found in our study the extent to which the ACC was switched off predicted mood improvements 2

weeks after the study. Also the ACC is turned down by treatments of depression such as antidepressants and ECT as well as by meditation. It therefore seemed a good idea to try psilocybin in patients whose depression had not responded to conventional treatments and were pleased to discover that the new MRC Developmental Clinical Scheme was suitable for this sort of research. Our application was successful and the trial is now being set up to start in 2013.

Additionally the disruption of ego-boundaries produced by psilocybin share some similarities with features of schizophrenia particularly the early or prodromal phase. Based on this we have now obtained funding from the new MRC/AZ scheme to see if the tyrosine kinase inhibitor saracantanib might block these effects in humans as it does in rat models of psychosis. This study will give psilocybin to human volunteers on different doses of the possible antipsychotic to see if there is any signal of efficacy that might indicate it being taken to a clinical trial. There are few experimental medicine models of psychosis in human volunteers and we hope that psilocybin might turn out to be a useful one for early screening of potential new treatments.

One reason for the MDMA study was to explore the mechanisms behind the known therapeutic uses of this drug. Before it was banned MDMA was proving a very helpful adjunct to psychotherapy for people with traumatic experiences. It seems that the ability of MDMA to suppress negative emotions allows patients to engage much better in therapy. Our study's finding that MDMA suppresses ACC activation to bad memories probably explains this action and further supports the rationale for clinical trials using this drug. We have since developed a protocol for MDMA treatment of PTSD patients that has been adopted by the Cardiff Mental health network and are now looking for funding to allow us to start. If the standard funders are not forthcoming, then we shall consider crowd-sourcing or other routes.

Its not all been plain sailing. To get the C4 MDMA study through all the hurdles in Imperial College took about 2500 emails and a face-to face meeting with the Home Office because of the scares that showing research with an "illegal drug" on TV produced in the establishment. Also, both the MDMA and psilocybin research has been attacked by the Member of Parliament Jim Dobbin on the grounds that we are in the business of encouraging illegal drug use. The Schedule 1 status of both MDMA and psilocybin means that an expensive special license is needed, and one problem with future use of these drugs for research and treatment is that almost no hospital in the UK holds such a license – not even the Hammersmith Hospital where I work! We were fortunate that there was one in the University of Bristol and another at UCL to allow this work to take place.

Finally I want to give a huge expression of appreciation and thanks to the team of dedicated and enthusiastic colleagues who truly have demonstrated that small can be beautiful when it comes to guerilla psychopharmacology. In addition to those already mentioned these are:- Bristol psychiatry – Dr Tim Williams, Dr Ben Sessa, Dr Mark Bolstridge, Dr Andreas Papadopolous,: CUBRIC Cardiff University – Prof Kris Singh, John Evans: Imperial College – Psychiatry - Dr David Erritzoe, Dr Alessandro Collasanti, Dr Theo Bargiotas: Imperial College/ Imanova – imaging Dr Rob Leech, Dr Matt Wall: UCL – Dr Celia Morgan, Dr Lorna Stewart and Bart Ferguson.

Also I must thank the support we received from the research office teams at Bristol and Imperial College universities who sponsored the studies.

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Communicating risk and benefit in the regulation and use of medicines

Angus Mackay
University of Glasgow

Jan MacDonald
MHRA

Professor Angus V.P. Mackay, OBE, PhD, FRCP(Edin), FRCPsych, served for many years on the independent expert advisory committees of the MHRA, including CSM and CHM and currently serves on the Agency board as a non-executive director. He is a professor of psychiatry at the University of Glasgow, was for 25 years Physician Superintendent responsible for mental health services on the West coast of Scotland, established health technology assessment in Scotland and chaired the Health Technology Board for Scotland, and has published widely on neuropharmacology and biological psychiatry.

Jan MacDonald, BSc, MSc, MRPharmS, is head of Patient Information Quality at the Medicines and Healthcare products Regulatory Agency. She has worked at the MHRA for over 20 years in a variety of roles and was previously employed in the NHS as a quality control and quality assurance pharmacist. She is currently co-supervisor of a PhD studentship at Leeds University researching into risk communication in the context of possible benefit, involving the development and testing of exemplar patient information leaflets.

The trade-off between the risks and benefits of a particular medicine is the basis for most decisions around the regulation of medicines, and also for the choices between treatment options made by those who use medicines and those who provide them. Most attention tends to be paid to the content of the evidence that informs the risk/benefit choice rather than the form in which it is presented, but because this is based largely on probabilities conveyed numerically there is a danger that the correct interpretation may not be made and that adequate allowance may not be made for different audiences. The aim of this short paper is to look at some of the lessons in communicating numerical information contained in Professor David Spiegelhalter's 2012 Annual MHRA Lecture; in relation to current standards, the efforts of the Medicines and Healthcare Products Regulatory Agency (MHRA) in this area, and the various constraints on progress and innovation.

In his lecture, Spiegelhalter gave an eye-opening account of how far the art of graphic visualisation has come as a way of getting messages across about probabilities and uncertainty, with particular reference to ways of conveying risk and benefit in relation to healthcare choices. It has been consistently shown that the general public is not good at making evidence-based choices, and Spiegelhalter's principle tenet was that it is not so much that people are bad at making rational choices, rather that the numerical data upon which their decisions depend are usually presented in unattractive and potentially confusing ways. The main messages from the lecture were;

1. The average numerical literacy of the general population is low
2. Numerical information such as percentages and fractions is precise but often misinterpreted
3. Diagrammatic formats, such as icon displays, can combine precision with clarity and accessibility
4. One size does not fit all; the type of diagram needs to vary according to context and the capabilities of the audience
5. Benefits and risks can be presented in intentionally misleading ways for commercial purposes
6. It is the duty of those involved in healthcare provision to provide information on benefits and risks that is unambiguous, accurate and transparent

(See Spiegelhalter, D., et al., 2011, Science, 333, 1393 1400).

Medicines regulatory authorities have a responsibility to communicate unbiased information clearly to healthcare professionals and the public, in particular the balance between benefit and risk of medicines. Industry too should provide accurate and accessible information without spin or promotional emphasis. The balancing of benefits and risks happens at broadly three levels in the process of getting a medicine to a patient:

- a decision by the patient to opt for the treatment being offered (and to continue taking it)
- a decision by the prescriber about what to offer
- a decision by the licensing authority as to whether a medicine is sufficiently safe and beneficial to be made available to the patient.

The presentational issues bearing on these three contexts will be briefly considered in turn.

Information for the patient

Ideally a patient should arrive at a decision about a medicine through a dialogue with their doctor or other prescriber. The competence of the prescriber's presentation will be considered below. The patient should have access to clear and uniform information on harm and benefit in the Patient Information Leaflet (PIL) and, in the case of over-the-counter (OTC) products, the label on the package. Over recent years considerable effort has been made by the MHRA and its independent advisory groups to improve the quality of information presented to patients. However much of this has the status of guidance that is not mandatory. This results in variable material presented in PILs, particularly with generic medcines.

A key MHRA publication in 2005 was *Always Read the Leaflet – getting the best information with every medicine*. This publication coincided with the introduction of legislation on the need for PILs to be tested with target patient groups. The aim of this publication and the legislation was to ensure that those likely to use the PIL could find and understand key information for safe and effective use of the medicine. MHRA also published examples of good practice in the "PIL of the Month" feature on their website. However there remains much which could be done to improve further the quality of

information that is provided for the patient. MHRA continues to lead efforts in Europe to increase the quality of patient information on medicines.

A typical PIL will often fail on many of Spiegelhalters principles of complete and accessible information and it seems that "the golden age of infographics" (i.e. graphical representations of data intended for a non-technical audience) has so far had little if any impact. For example the PIL for Cipramil, a widely used antidepressant, has no information at all on the size or nature of the benefit, although such information is as available from clinical trials as safety data. For adverse effects, ambiguous terms such as common or rare are used, each being defined as lying within a probability band. There are no graphics. Even a recent "PIL of the Month" on the MHRA website – Imodium (Feb., 2012) – defines uncommon in the following terms; "affects less than 1 in 100 but 1 or more in 1,000 people". This will be incomprehensible to most patients and also prescribers.

In contrast, the FDA has developed a Drug Facts Box as a form of labelling for OTC medicines that encourages the uniform reporting of harms and benefits. The box presents data economically in easily understood columns. There have been several structured controlled, evaluations and there is a consensus that this form of presentation is substantially more effective than standard text, and, specifically, it corrected the over-estimation of benefit relative to risk found in controls who were given standard text. (Woloshin et al. www.fda.gov/downloads/AdvisoryCommittees/UCM150274.pdf). In 2011 the FDA produced an evidence-based Users Guide on Communicating Risks and Benefits. (www.fda.gov/AboutFDA/ReportsManualsForms/Reports/ucm268078.htm).

A particular virtue of pictorial displays is the combination of precision with accessibility – attractive and acceptable to people across a wide spectrum of numerical sophistication, getting closer to "one size fitting all". To provide an evidence base for changes in patient information the MHRA is jointly supervising a PhD student whose thesis will be based on research into risk communication in the context of possible benefit, involving the development and testing of exemplar patient information leaflets.

Information for the prescriber

The prescriber has to be well informed, for obvious reasons, not least in order to engage in a dialogue with the patient about the benefits and risks of the treatment options. Prescribers have many sources of information, including promotional material, IT websites, and official sources such as the manufacturer's Summary of Product Characteristics (SPC), the more commonly used British National Formulary (BNF), and the MHRA Drug Safety Update (DSU), with occasional special guidance from the Commission on Human Medicines (CHM) and MHRA. DSU formatting is clear, with the use of attractive colour-highlighted boxes. Typically, however, the SPC is only slightly more informative on risks than the PIL and there is little explanation or quantification of benefit, making it impossible to arrive at an evidence-based choice between treatment options.

Attention has recently been drawn to a particular problem that is widespread in the communication of risk in healthcare; the ambiguity of single event probabilities. For example a doctor may explain "if you take the medication you have a 30-50% chance of developing a sexual problem". Many patients interpret this to mean that something will go awry in 30-50% of their sexual encounters (Gigerenzer,G. and Galusec,M.,2012, BMJ, 344, 30). This particular ambiguity can be removed by stating the reference class (in this case people taking the drug), and could be unambiguously displayed by means of icon diagrams.

There seems little doubt that uniform reporting of benefits and risks and greater use of diagrams (particularly with the less numerate) would help the prescriber get the important messages across and lead to more informed decisions being made by the patient.

Figure 1a is an example of how this might be achieved through the use of icons to depict the chances of both benefit and adverse reactions to a medicine, in this case statins, in the same graphic. A summarized version (Figure 1b) allows the benefit/risk balance to be appreciated at a glance. (Hippisley-Cox and Coupland (2010) *BMJ* based on routine observational data)

Lay input to regulatory advice

Numeracy and the skills of interpretation are clearly greater in both the professional and lay members of the Agency's independent expert advisory structure than the general public. However if most is to be gained from input into regulatory decisions by the lay members of these committees then thought should be given to recognizing that one size does not fit all, even in that context. Much of the discussion at CHM and its Expert Advisory Groups involves reference to a large number of data sources, but in certain cases, cancer drugs for example, the question can often be boiled down to a numerical trade-off between years gained and/or years of better quality, and side-effect probabilities, readily converted into icon diagrams. Even for more complex data there may be scope to help understanding through the greater use of infographics that might facilitate participation in discussion by all around the table.

The weighting problem

Patients, particularly those with chronic conditions, may take a view about the importance of the risks and benefits of a medicine that is different from the regulator. This is a personal value judgement about the impact of the medicine on the person's quality of life that is influenced by many factors, not least experience of the illness.

The MHRA makes a value judgement about what is an acceptable trade-off between risk and benefit on behalf of patients, usually without any information on the weightings given by the patients themselves. The transparency and accessibility of these decisions are hampered by the fact that weightings are subjective and not numerical. Some movement towards greater objectivity around this final ingredient in the risk/benefit decision would allow a greater public, and professional, understanding of licensing decisions. Furthermore, if the weighting being applied was based on data derived from patients with experience of the medicine and of the disorder for which it is taken, then validity would be enhanced as well as transparency. Although attempts are currently being made to give patient representatives a direct voice during consideration of a licensing decision, this can be no substitute for information collected directly from groups of patients who have received the medicine. This can come either from a clinical trial or post-licensing, and might ideally be expressed as a metric that represents the weight given to both risk and benefit. This question may be amenable to techniques developed by health economists, where different health states are weighted according to patient preferences recorded under conditions of uncertainty. The measure of the health state is traditionally the health-related quality of life, or "utility", mapped on a scale of 0-1 (a value of 1 representing perfect health). Utility values can be derived by testing the strength of preferences of a sample of the population of interest (eg. MS sufferers) for different health states, including their current illness (with no treatment) and the state achievable after treatment. Although less commonly used in health economics, the unwanted results of treatment can be weighted in a similar way to give units of utility decrement

or "disutility". The advantages of such an approach include the availability of patient-derived weights to those making regulatory decisions, a way to express both weighted benefit and weighted risk in the same units, and the potential for a greater degree of objectivity in licensing decisions. There is currently an emphasis on gathering patient-centred outcome measures in clinical trials, and if health-related quality of life data can be recorded directly and routinely as part of all structured evaluations of medicines, both pre- and post-licensing, then patient-derived weightings could become available as a new ingredient in regulatory decisions.

Constraints on innovation

The European legislation has so far been silent on the form, as distinct from the content, of the information which is required for both the healthcare professional and the patient. It sets out what information must be included but gives no detail on how that information should be presented or expressed. There is no reason why an applicant company cannot use a graphical representation to express risk better, but because this is not required within the legislation the company may be reluctant to employ such tools for fear of rejection and delay to approval. Without the lever of legislation the regulator cannot insist on innovative tools such as graphics, symbols, the use of colour, and colloquial language, even although it might see these as improving clarity and quality. Where the letter of the legislation is met, the regulator cannot refuse to authorise the information unless a serious risk to public health is perceived. For its part, the European Commission has produced templates to aid those producing SPCs and PILs and although this is only guidance many applicants stick rigidly to the wording of these documents despite the fact that research has shown them to be poorly understood by the target audience. Lack of a real understanding of the patient experience with the information provided also means that improvements are not seen as necessary, and the value of user testing of PILs is not widely appreciated.

Interestingly, the fear of rejection is particularly the case when considering the inclusion of "benefit" information which applicants believe may result in rejection on the grounds that the information is promotional.

Commercial pressures such as the time and cost involved in developing information of better quality undoubtedly account for much of these shortcomings. Even the physical size of the paper which can be accommodated on the packing dictates the amount and size of the information that can be communicated in the PIL, regardless of the way in which this may be received by the patient. The net result is that the PIL tends to represent a least-cost regulatory requirement rather than a tool that has been designed and tested to aid patient understanding.

Researchers in the field of medicines information who have worked closely with the MHRA on the development of guidance in this area have provided evidence on quality improvements which could be realized if the appropriate legislation were in place. There is a growing appetite for this within national regulatory agencies across the EU – not just within the UK. A key point from the recent European pharmacovigilance legislation is that the European Commission is charged with producing a report on the shortcomings of the current medicines information framework. This report is expected in 2013 and there is hope that it will lead to legislative amendments. The UK is in a good position to influence the outcome of this assessment.

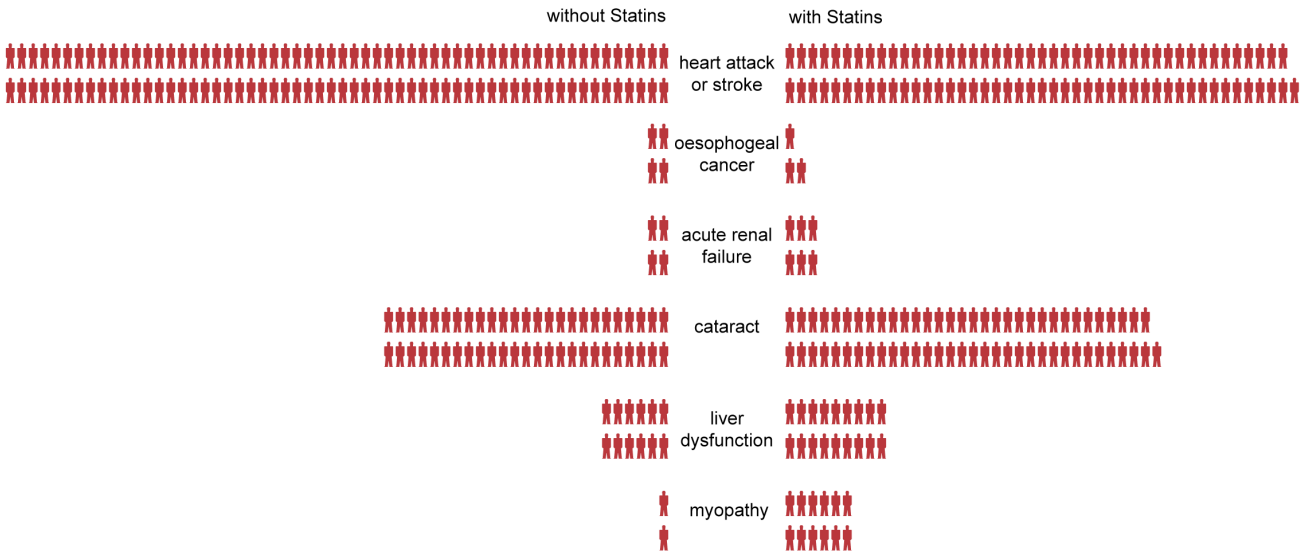
As for the routine provision of weighted quality of life data to the regulator, the methodological obstacles are considerable, but in addition to the advantages laid out above there would be the added advantage of having benefit expressed in a metric that was equally useful for both medicines regulation and health technology assessment (HTA).

Acknowledgements

The authors are grateful to Sir Alasdair Breckenridge and Professor David Spiegelhalter for helpful comments.

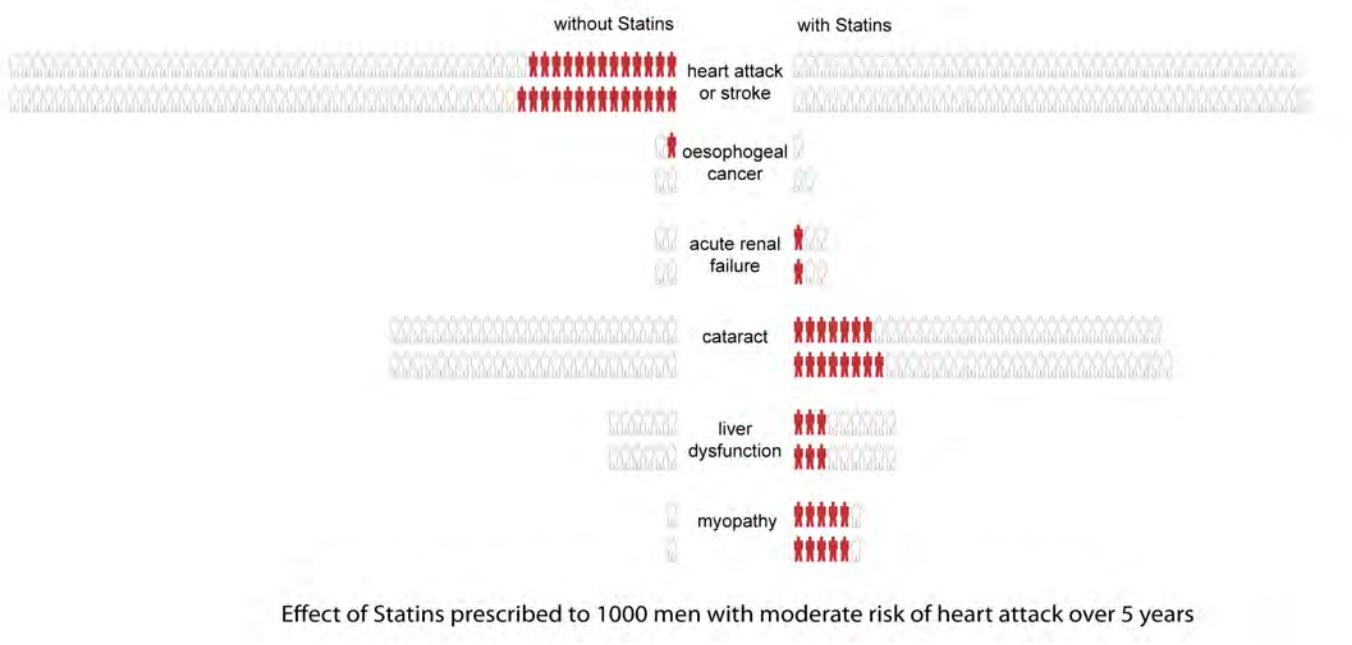
Figure 1a.

Icon display of the benefits and risks of statins



Effect of Statins prescribed to 1000 men with moderate risk of heart attack over 5 years

Figure 1b.



Legend: Derived from Hippisley-Cox and Coupland, 2010 (*BMJ*, 340, 2197), an observational study of a primary care population based on data from the general practice research database. Reproduced with the kind permission of David Spiegelhalter, the graphic is shown for illustrative purposes only.

Outreach and Understanding Animal Research

John Meredith
Education Manager UAR

John Meredith is Education Manager for Understanding Animal Research, a membership organization which aims to achieve broad understanding and acceptance of the humane use of animals in biomedical research in the UK, to advance science and medicine.

It is coming up to morning break on a sunny September Tuesday at Homewood school in Tenterden, Kent, and sitting in front of me on a hard wooden floor, watching with veiled, indecipherable expressions are 180 Year Eight students in uneven rows, shoes off, shuffling intermittently in a half-hearted attempt to revive the circulation … and in silence.

What is outreach?

This is outreach. Or a big part of it anyway: the first step. I have reached out from the – to these children – strange and alien world of biomedical science to explain what we mean by animal research, what really goes on behind the sinister, closed doors of their imaginations, what it means to the animals and why we have to do it. But standing in the room, giving a presentation, showing the slides and videos, is the easy part. What I want to know is whether I have really reached them? Those hearts and minds, have they been touched? So the silence is eerie.

The question has been given a sharper edge on this occasion with the discovery, on arrival at the school, that the group has first been spoken to by other outreachers, the education team from Animal Aid, a campaigning animal rights organization intent on abolishing all in vivo work and willing to employ any amount of half-truths and pseudoscience in the service of that aim. I know the sort of things Animal Aid will have told them, the lurid descriptions of a Holocaust of helpless animals, the stories of inefficient regulation, insincere welfare provisions, vested interests, obvious species differences that make the 'predictive' value of animal models no better than a coin toss, selective readings from critical reports, and astonishing 'true facts' such as the claim that more people are killed each year by their medicines than their diseases, all due, apparently, to the use of inappropriate animal models.

Of course, Understanding Animal Research (UAR) exists to counter this misinformation and so I have arrived prepared. I think I have anticipated most of the objections, and provided enough facts and solid argument to act as an antidote to the comfortably simplified picture of the world of medical research offered by Animal Aid (and many similar abolitionist organizations). But it would be nice to know for sure.

Why should we trust you?

And so, as usual I have invited questions and comments, and, as usual, there is the little period of awkward silence to get through, the moment when you wonder if all you are going to get is sullen acquiescence or, worse, mute resentment. Actually, this particular talk has been pretty lively all through, lots of questions during the presentation, lots of comments and challenges, and so I am pretty optimistic that I have been getting through, pretty sure that despite the deep discomfort of the parquet they are parked on the students are engaged and interested and aren't taking the anti-animal research position at face value. But still, I have left 15 minutes for questions and so it is a relief when the first hand creeps up.

And the question is a doozie: 'How do we know that you are telling us the truth? You just told us that we should be sceptical of the other speakers, so why should we trust you?'

Well, how does she know? I think we have made the better arguments, presented the better science, but if the abolitionists are saying that the science is bogus, and I am saying that it isn't, how does this 12 year old girl, concerned about animal suffering, and confused about the issue, decide who to believe?

Luckily, I have something that the other side don't have: you. By 'you' I mean, of course, the community, the science community of researchers, theorists, learned societies, technicians, pharmaceutical companies, universities and charities the overwhelming majority of whom support our message that humane, well-regulated animal research is essential if we want to discover new medicines and treatments. This isn't an argument from authority, we still need to make our case, to present facts and persuade, but it helps answer that question 'why should I believe a word you say?' It helps answer it because I can reply: 'all these people agree with me that's why. We may still argue about the ethics, the rights and wrongs, but on the facts, on the science, there is no argument. Can those others say the same?' The force of the reply lies in the fact that the community has been prepared to stand up and be counted, to make itself visible, to reach out. It wasn't always like that, but it is now and it makes a difference.

Can you make a difference?

And this science community I am conjuring isn't just theoretical, it is real and it is mobile. UAR has hundreds of volunteers throughout the country who have put themselves forward to speak in schools about their work with animals. These volunteers do most of the heavy lifting when it comes to the schools programme and through them we aim to deliver about 100 talks like the one I have described at Homewood every term, meaning that we will engage some 9,000 young people in a year. Volunteers talk about animal research, of course, but as part of the broader context of their work in science which means that they touch on far more wide ranging topics and tick all sorts of boxes for resource starved teachers including an insight into science as a possible career that many young people cannot get from any other place. We know that the volunteer visits make a difference because we ask teachers and we survey classes but it is only when you stand in a real school in front of an actual class that you realize how profound this impact can be.

What's more, the impact is two-way. It can be nerve-wracking for volunteers to make the first step into a classroom, no matter what we do to prepare, but once they have made that step, they nearly always want to go back. Far from being the intimidating, even menacing environment many of them expect, volunteers discover that schools are warm, welcoming, supportive places, a little chaotic sometimes but full of young people who are lively, energetic, and interested. If we take the time to come to them and explain ourselves, they will, in general, return the compliment by listening respectfully and engaging. Yes, they often argue back, and challenge, and the occasional individual is resentful and combative, but those things are features, not bugs: it is when you are making most impression that you excite the most response and usually have the most fun.

More practically, by finding a way to talk about complex science to young people who have little, sometimes no specialist scientific knowledge, volunteers typically notice an improvement in their own confidence and communication skills, an improvement that can translate to every area of their professional life. This is probably the least recognized benefit of public outreach work among scientists, a profession which, let's face it, has not always been celebrated for its ability to explain itself clearly. Not only does outreach help increase public understanding, to allay fears and to combat misinformation, it creates a virtuous circle by helping scientists to clarify for themselves the larger meaning and context of what they do, why it matters, and how to get that across, which in turn makes them better at educating a public that becomes better versed in science, more trusting of scientists and therefore more receptive to new ideas … and so it goes on.

Declining public support?

The issue of outreach has become a little more pressing for UAR in the last few weeks as a new MORI poll revealed a drop in public support for animal research. The drop is a timely reminder that complacency is never an option: if we are not out there actively explaining, we are losing ground. Here's one ray of sunshine though: the downturn in support revealed by MORI was not evident in the 15-25 age group, precisely the sector of the population that has been most likely to have encountered a UAR schools volunteer in the last four or five years. Of course, I am not claiming that our volunteers are uniquely responsible for holding the line, but I am quite sure they make a profound difference every time they address a class, and every young person who becomes a vocal supporter of animal research because of a volunteer visit has the potential to influence dozens of others and so, quite honestly, who knows?

But what about that awkward questioner, the one who asked 'how do we know you are telling the truth?' Was she satisfied with my answer? Here is what she said (from memory I am afraid, but this is the gist of it): 'I see what you mean. I'm still not sure if I agree with it, but fair enough, if there is proper science, I might have to think about it a bit more.' This, I think you will agree, is at least a step in the right direction.

Students explore the strange and alien world of biomedical science!

How does a pharmacologist end up working for the RSPCA?

Elliot Lilley
Senior Scientific Officer RSPCA

Elliot Lilley is a Senior Scientific Officer in the Research Animals Department of the Royal Society for the Prevention of Cruelty to Animals (RSPCA). Prior to joining the RSPCA he spent 15 years as a pharmacologist in the pharmaceutical industry and has been a member of the BPS since 1994.

My first exposure to the ethical debate regarding animal use in scientific research was during my GCSE English lessons. Back in the late 80's I was one of the first wave of students doing the 'new' examinations and as part of our English language course work we took part in a series of debates. We were presented with a list of contentious issues and asked to split into pairs, chose opposing sides and prepare for a short debate. My partner and I chose animals in scientific research as our topic and set about developing our opening arguments. I was given the role of defending research; to this end I chose to focus on the importance of research into cancer, HIV and heart disease and the potential benefits of science. My partner chose to focus on the fact that animals were not patients and that the results of research on animals may not be relevant to human disease. The debate went well and a lively discussion was had. What interested me about the debate then and now is that it is easy to take an polarized, black or white, view of the situation but much harder (although intellectually more fulfilling) to negotiate the moral middle ground. I eventually went on to study for a biomedical science degree at King's College London where I was lucky enough to enrol in a second year course on Experimental Neuropharmacology led by Dr Alan Gibson. Alan was a passionate educator and managed to excite this (up to then) fairly lazy student into a quest for knowledge. Alan went on to become my PhD supervisor and I enjoyed three years of in vitro research into nitrergic neurotransmission. Towards the end of my PhD training I received a call from Nigel Shankley at the James Black Foundation (JBF) in south London asking if I would like come for an interview at the Foundation as a pharmacologist. I had my interview (including a terrifying 10 minutes with Sir James Black) and was honoured to be offered the job.

My next 10 years at the Foundation were spent contributing to research programmes that led to compounds moving forward into clinical development. Within a year or so of joining I was asked to contribute to the writing of a project licence and it was during this process that I once again began to become much more engaged with the debate. I found myself unhappy with the slightly cavalier and lazy attitude that some of the scientific community had regarding animal use for research, reciting the "all research is justified" and "animals don't suffer in research" rhetoric. I became very focused on making sure that the work I did generated meaningful, decision-influencing data, that the minimum numbers of animals were used and that animals were not wasted.
In the early noughties I joined Novartis in Horsham to help set up the pharmacology labs in the newly formed Gastrointestinal Disease Area (GIDA). This time I was a lab head but additionally I became a member of the local ethical review process (ERP) and Home Office Liaison Officer for GIDA. The ERP created a challenging but constructive environment where protocols were often questioned and practical suggestions made to improve welfare. Three Rs initiatives were actively encouraged and regular poster competitions arranged with best entries voted on by a group led by a Home Office inspector. Quality science was the main focus of my work at Novartis but it was refreshing and encouraging to work in an environment where welfare and ethics were taken seriously as well.

My first contact with the RSPCA, in a science context, was when Penny Hawkins (deputy head of the RSPCA Research Animals Department; RAD) joined the ERP committee at Novartis. I was encouraged by the stance that RAD had towards the issue of animals in scientific research. The RSPCA is clear that it wants to see an end to the use of animals in research; a goal that I think we can all agree on. Until this can be achieved the Society adopts a constructive, practical approach, arguing the need to reduce the conflict between the interests of animals and science as far as possible. They believe it is essential to work with the research community to critically question the necessity and justification for animal use, to help ensure that the minimum numbers of animals are used and that they experience minimum suffering and have the best possible quality of life. It was refreshing to hear an animal welfare organization that, while strongly challenging, was willing to work constructively with the scientific community rather than simply disregard all research as invalid and cruel (that is not to say that some research may well be both!).

I left Novartis after four years and enjoyed a partial career break during which I focused on being "Daddy" to my kids and teaching receptor theory for the BPS on their General and Advanced Receptor Theory (GART) pharmacology diploma course and on under- and post-graduate courses back at King's. During 2011 I began to think about getting back into full time work and I saw the advertisement for a Job as a Senior Scientific Officer at the RSPCA. Had I not been aware of the way that the RSPCA approaches the issue of animals in research I would have been wary about applying for the job and even more surprised if they would have entertained hiring a former pharmacologist! As it was, I was invited to interview with Maggy Jennings and Penny Hawkins and was very happy to later receive the call offering me the position.

RAD consists of specialist, scientifically trained, individuals; experts in the fields of animal behaviour and welfare assessment, toxicology, biotechnology, ethical review and education. I joined to focus on refinement of models and procedures to reduce suffering; a full-time commitment to an area that I was passionate about during my research career. I have first-hand experience of working for an organization where animal welfare was a high priority; this is an ethos that I believe is more widespread in the UK today than many would think. There are research groups

in the UK that try hard to develop a *culture of care*, where the welfare of the animals used for research is a key consideration when study protocols are designed and implemented. I would like to challenge all researchers to place animal welfare issues and concerns at the top of the page, alongside the aims of the study, when designing experiments and to work hard to ensure that these have equal effort given to them during the study.

A big area of concern is research where animals can experience substantial or severe suffering (as defined by the legislation regulating animal use in research). During my time working in industry I frequently had to come up with stretch objectives, both for myself and my direct reports. I'd like to suggest a stretch objective for the UK research community: to reduce and then eliminate substantial/severe suffering for animals in research. This is a stretch objective, which may prove difficult, but I believe the effort would be worth making.

I know that many researchers, in collaboration with dedicated animal technologists, work hard to reduce suffering for laboratory animals. I would like to see research establishments make a greater effort to identify and promote refinements that are being made so that more animals can benefit; I want to help with this. I would like to encourage researchers to work with me to set up expert working groups (similar to the Joint Working Groups on Refinement[1]) to help develop refinements. This work builds on previous RSPCA projects[2] looking at recognizing pain, suffering and distress in laboratory animals and welfare assessment protocols where input from the scientific community was invaluable. Together, I believe that we can make a real difference for the welfare of animals used in research.

I'm very happy to consider myself a pharmacologist as well as an advocate for animals, I don't feel any conflict between the two and that's why I work for the RSPCA.

If you would like to find out more about this project or about other RSPCA RAD work please contact the department (research.animals@rspca.org.uk) – or see our website: www.rspca.org.uk/sciencegroup/researchanimals

[1] http://tinyurl.com/cw9ru9f

[2] http://tinyurl.com/ck2cz7v

Getting into public engagement

Liang Yew-Booth
Imperial College London

Jenny Koenig
University of Cambridge

Liang Yew-Booth is finishing her PhD in the Respiratory Pharmacology group at Imperial College London. She has given talks on her research as part of the Understanding Animal Research volunteer school speaker programme and at the Dana Centre. She currently sits on the BPS Outreach, Young Pharmacologists, and Women in Pharmacology committees.

Dr Jenny Koenig is a Fellow at Lucy Cavendish College University of Cambridge where she teaches Pharmacology and Maths for Biologists. Jenny particularly enjoys bringing maths and pharmacology together. She also has her own Science Education and Communication consultancy, Science ETC.

How do you get involved in public engagement?

There are many ways of getting into public engagement and a range of different types of activities and audiences. Science Festivals are a good place to start and many Universities and Research Institutes take part during National Science and Engineering Week (March every year). Science Festival audiences are fairly enthusiastic as they've made the effort to get there but can be a challenge as audience ages tend to be broad in range.

A good starting point for getting into schools is your local STEMNET contact (http://www.stemnet.org.uk/). They will link you to a school, and help you target your activity effectively and to the right age range through the STEM Ambassadors scheme. You can also volunteer with one ofthe British Science Association local branches.

The National Co-ordinating Centre for Public Engagement website (http://www.publicengagement.ac.uk/) contains useful links to sources of funding as well as training materials and news about training events, you may also be able to access training through your University or research funding body.

If you'd like to engage with older audiences then the University of the Third Age has regional sections which often look out for potential speakers. Women's Institutes don't just make jam! Their website lists the regional federations so contact them to get onto their speakers list.

Liang (LYB) and Jenny (JK) interviewed several pharmacologists about their experiences of public engagement.

Last year Dr Susan Duty (SD), Senior Lecturer in Pharmacology at King's College London, went into a primary school armed with a cauliflower in a crash helmet and chocolate brain moulds to talk to the year fives about the brain, how it controls our actions and what happens when things go wrong in Parkinson's disease.

LYB: *How did you first get into doing public engagement?*
SD: My daughter kept nagging me for three years! I'd been meaning to do it for a while though as I thought it would be great fun.

LYB: *In what ways have you had to adapt your language or approach to get your message across?*
SD: It was a challenge but I had a huge advantage in that I could double check with my daughter which words she understood. I also asked the teachers what the children would know.

LYB: *What have you got out of it (at a personal level)?*
SD: I felt great! It was so nice to see the kids so enthusiastic about science; to see their faces light up about something I'm really passionate about. Some of them said to the teacher afterwards, 'I really want to be a neuropharmacologist'. I was surprised at how much I enjoyed it and would definitely do it again!

LYB: *Have you found anything difficult or were you concerned about any aspect of your public engagement?*
SD: Not really. As they were young children I wasn't that worried about any tricky or controversial questions. The most difficult thing was deciding what to do with them that would keep them occupied, engaged and interested.

LYB: *What advice would you give to someone thinking of starting out in public engagement?*
SD: It's really important to know the level of the people you're talking to especially with respect to terminology. Everybody will only be pleased and grateful for what you do so don't worry. Get out there and get involved!

Professor Sara Rankin (SR) is Professor of Leukocyte and Stem Cell Biology at the National Heart and Lung Institute, Imperial College London. She is involved with the Reach Out lab at Imperial College, public debates and radio interviews. Recently she has collaborated with the artist Gina Czarnecki to create a sculpture, Palaces, using thousands of baby teeth donated by the public (http://palaces.org.uk).

LYB: *How did you first get into doing public engagement?*
SR: When I was 16 I visited a lab in a hospital and found it incredibly exciting and it inspired me to become a scientist. Having had that personal experience I always wanted to give that opportunity to other people. I started doing outreach as a PhD student and gave talks and ran experiments in schools.

LYB: *In what ways have you had to adapt ...?*
SR: It is really important to simplify but not patronise. I've found this

easier because I've done public engagement from early on in my scientific career.

LYB: *What have you got out of it?*
SR: Initially, going into schools when I was younger was fun and instantly rewarding. I've really enjoyed the fact that it's extended my professional network, adding a new dimension to the types of people I interact with. It's also made me read a lot more around my subject so I know the latest developments and understand the big picture in stem cell biology. That's really important so I can understand the significance of my work and how it fits in.

LYB: *Have you found anything difficult …?*
SR: At first I was a bit concerned regarding discussing my work on rodents but I haven't had anybody target me in a negative way. Also if I ever say to people that I'm a stem cell scientist they immediately assume that I work with embryonic stem cells as they don't appreciate that you can get stem cells from other places.

LYB: *What advice would you give…?*
SR: Do it! You never know what you might get out of it and where it might lead.

Professor Philip Strange (PS), Emeritus Professor of Pharmacology at the School of Animal and Microbial Sciences at the University of Reading.. He writes for a number of websites and has his own blog at http://philipstrange.wordpress.com/

JK: *How did you first get into doing public engagement?*
PS: I wanted a different life and that was the stimulus to take early retirement and move to Devon. It was a natural progression. I had always done talks for schools and open days and had included topical new articles to supplement undergraduate lectures.

JK: *In what ways have you had to adapt …?*
PS: I enjoyed the journalism aspect of this approach and like to interweave the science inside a human story. It is really important to adapt the language to the audience and not to use technical language.

JK: *What have you got out of it?*
PS: Learning something new, meeting lots of new people and getting to different, interesting places is really inspiring.

JK: *Have you found anything difficult ….?*
PS: It is a very competitive field, there are lots of people wanting to write. It can be difficult to enter the mainstream media and difficult to make an income out of it. Many writers are prepared to work for free and editors are happy to take advantage of this.

JK: *What advice would you give …?*
PS: Follow your enthusiasm, write about topics you're really interested in and that will come across in your writing.

Professor Munir Pirmohamed (MP) is NHS Chair of Pharmacogenetics and the Head of the Department of Molecular and Clinical Pharmacology, University of Liverpool.

JK: *How did you first get into doing public engagement?*
MP: Back in 2004 I found myself at the centre of media interest on a paper I had published on adverse drug reactions and admissions to hospital. More recently I've given talks at the BA Science Festival and recently I was an adviser to Y-Touring company about a play on personalised medicines (see www.theatreofdebate.com/Projects/Dayglo/Story.html).

JK: *In what ways have you had to adapt ...?*
MP: It has been necessary to consciously adapt by trying to remove technical terms and to explain things from first principles, finding out what people know already and starting from there, not making any assumptions, always checking that the audience understands.

JK: *What have you got out of it?*
MP: A different perspective: you get questions you'd never thought of which prompts you to develop the ability to frame things in a different way. The involvement with a theatre company has resulted in the development of a very human story which allows people to think about the implications of the science.

JK: *Have you found anything difficult …?*
MP: Sometimes people come along with very fixed ideas based on their own experiences and it can be hard to reason with them. Often it is only the interested few who come to talks, and these are often people who have some background in the area. How can we reach the wider public?

JK: *What advice would you give …?*
MP: Try things out on your family first, start with a small audience then build up experience: dip your toe in the water before jumping in!

Carmen Marx (CM) is a PhD student in the Department of Pharmacology at the University of Cambridge

JK: *How did you first get into doing public engagement?*
CM: My PhD supervisor asked me if I'd like to take part in the Cambridge Science Festival working on the Pharmacology Department's Water Fleas experiment demonstrating the effects of drugs such as caffeine (in Red Bull), nicotine and ethanol on the water flea's heart rate. There is more information about the water fleas experiments at http://www.phar.cam.ac.uk/outreach/daphnia.html

JK: *In what ways have you had to adapt …?*
CM: At the Science Festival there is a very wide range of ages and backgrounds from very small children to adults so it is important to be able to adapt quickly depending on the audience. You need to find out a little about the questioner to see what their background is and what their interest is in order to be able to phrase your answer appropriately.

JK: *What have you got out of it?*
CM: Communicating the science to others helps to keep a bigger picture which is a real contrast to PhD work where you focus in a lot of detail on a smaller area. It is a great opportunity to practice communication skills and to get excited about science.

JK: *Have you found anything difficult …?*
CM: When I started I was worried about going over their heads… but the reality was that it wasn't as difficult as I thought. If you're enthusiastic, people respond positively to you.

JK: *What advice would you give…?*
CM: Be enthusiastic, break down concepts and try to use several different levels to suit different age ranges, knowledge and interest.

Can't Find What You're Looking For? Try our website:

www.quadratech.co.uk

Please come to see us on Stand 4 at the BPS Winter Meeting

QUADRATECH

Science Media Centre: our role in public engagement

Edward Sykes
Senior Press Officer, SMC

After 15 months as Media Manager at the Australian Science Media Centre, Edward returned to the UK in 2012 as Senior Press Officer. In Australia, Edward arrived just in time for the Fukushima nuclear crisis, while in the UK he led on issues such as the swine flu pandemic, for which he gave evidence to the Hine review. He has spoken at many events and been interviewed for BBC and Sky News on the media's handling of scientific issues. In his other life he did a PhD in Evolutionary Biology, giving live talks and appearing on the Guardian Science Weekly podcast and in The Times and The Sun.

Maintaining public trust in science

The news is full of science stories. Causes and cures of cancer, GM and climate change make the news almost every day. And every few months along comes another story that grips the public – just think of badger culls, fracking, flooding or swine flu and volcanic ash. There is a huge appetite for these stories and whilst people reading this article probably dive into journals, blogs and specialist programmes, the vast majority of the public get their science from the mainstream media – the Daily Mail, the 6 o'clock news and the BBC website – and of course where public opinion leads, Government policy often follows. So if the media get it wrong, so does everyone else.

It was the same scenario ten years ago when the focus was on GM, BSE and, of course, the MMR vaccine. Back then many scientists were nervous of putting their heads above the parapet, others who wanted to engage didn't know how to get their voices heard and still others didn't see the point. The result was misinformation across the board.

The proposed answer?

The Science Media Centre (SMC) – an independent press office for scientists across the UK. Our sole aim is to ensure the public have access to accurate, evidence-based information when science is in the headlines.

Our independence is paramount. We are a charity that accepts donations from around 100 different organizations, small amounts from each so that no one organization can influence what we do. You can check out our funding on our website (www.sciencemediacentre.org) – if journalists didn't trust us then we wouldn't be doing our job and, rightly, it's one of the very first questions that everyone asks.

What do we do?

We work most closely with the specialist reporters. They do a brilliant job and one of the first things you should do when you see an article or watch a clip is check out who has put it together. When their editors receive a story from a campaign group or PR company the journalists call us to find an expert who will help them put the story into context and understand whether the claims are evidence-based or not. They care about the accuracy too as they understand the science and it's their reputation on the line if they make a mistake.

We are often very reactive. When there's a breaking story journalists call us to be put in touch with scientific experts in a matter of minutes. When journals press release their new research we send out comments from independent experts who can put it in context and say whether it justifies the hype or should be consigned to the bin.

But perhaps what we are most proud of is our proactive work. We bring panels of scientists together in London where they brief the national media - not only on topics in the public consciousness but also on issues that matter to the scientific community. We run about three press briefings a week and it is great to see media coverage of a story go from polemic and he-said, she-said journalism to in-depth, nuanced pieces that focus on the questions the scientists are really debating.

The SMC is at its best on the most controversial and messy issues of the day – and whatever the issue we make sure journalists hear from the people who have actually done the research. We have received many plaudits as we've reached our 10th anniversary, (http://bit.ly/TkvL3I) but that is down to the excellent scientists on our database. We are only as good as the scientists we work with - and we will only get the media to 'do' science better, when we get scientists to 'do' the media better.

Pharmacology? Pharmacoology!

Nothing is certain except death and taxes. And pharmacology

Jess Strangward
Head of Education and Outreach

Explaining the importance of pharmacology in the modern world by extending BPS outreach activities

If the education department were thinking about getting a work related tattoo – it would probably be the above statement – in the BPS branding colours and font of course! The BPS is putting itself 'out there' Pharmacology is declaring itself open for business. It's not a hard sell, from my work desk I can see a cup of coffee, paracetamol and a bottle of vitamin tablets. I know I'm preaching to the converted but we all interact with the concepts of pharmacology every day, and it's our job to share this knowledge. However we do need help furnishing our shelves with pharmacology stock. We need your stories, perhaps you're already selling pharmacology at your local schools, science festivals, maybe you run a blog that we could promote via our website?

The Council are keen that BPS becomes a 'hub' of pharmacology outreach resources for all audiences. If you have any successful talks or activities that explain pharmacology – please let us know so we can share them with others. We're particularly keen to develop activities relating to the drug discovery process as this is an area we know schools have to study and there's a great appetite for it.

Our public engagement grants

Luckily the BPS have a new addition to the shop floor: Rebecca Tibbs joined in September as our new Education and Outreach Officer. She's going to be spearheading this scheme of work, so get in touch (education@bps.ac.uk) if you've got the seed of an idea – we'll help it grow and we've even got some fertiliser on offer:

The BPS offer three types of public engagement grants:

Member Grants: These grants are intended to support outreach and public engagement projects. The maximum amount for each grant is £500. The Society has a yearly maximum £2000 to spend on outreach and these will be awarded biennially.. These can be used for venue hire, buying supplies – whatever you want!

Member Travel Grants: These grants are intended to support outreach and public engagement projects in schools delivered by members. The maximum amount for each grant is £50. Ten grants will be awarded each year. We expect the grants to be used to travel to schools to deliver careers talks. The Society office is happy to help promote and support your activity wherever possible. The Society has created resources to deliver a Drug Discovery day and encourages members to run these.

Teacher Grants: These grants are intended to support outreach and public engagement projects in schools delivered by teachers. The maximum amount for each grant is £50. The grants will be awarded biennially. The Society has a yearly maximum of £500 to spend on this initiative. The Society office is happy to help promote and support your activity wherever possible. The Society has created resources to deliver a Drug Discovery day and encourages teachers to run these.

Application details can be found on our website (bursaries and grants). We're really looking forward to reading your submissions!

Rebecca Tibbs completed her degree in Biochemistry at the University of Oxford and joined BPS in September 2012. Becca developed an interest in education and outreach work while leading a student-run campaign encouraging students to consider higher education at university, and is looking forward to applying her enthusiasm to the new challenge of supporting the BPS' pharmacology education and outreach work.

Coming to a science festival near you…

In order to meet our commitment to share the importance of pharmacology, the BPS are hitting the road, like a rock band, for a grand tour of the best festivals the UK has to offer:

Big Bang Fair

The BPS is taking over 5m^2 of one of the busiest areas of the busiest science festivals in the UK. Our theme is Drug Hunters. We'll be making use of the experiments Julie Keeble, King's College London, has been developing this year using *Daphnia*.

Students get to see the effect of caffeine on the *Daphnia's* heartbeat = pharmacology in action!

Brighton Science Festival: Pharmacology-on-Sea

We'll be running a series of talks at the Brighton Science festival as well as taking up residence at Hove School. The festival runs throughout the whole of February and we're really excited that we're going to be so involved.

Cheltenham Science Festival

We are definitely hoping to repeat the success of our 'The Science of…' talks that are the stalwart of Friday night at the Festival. Thank you to all members who give up their time to make sure all these events are a huge success. On page 5 Jeff Aronson describes self-experimentation and the Nobel Prize from a BPS talk at this year's Festival.

Dana Centre: Shakespeare's Medicine Cabinet

If pharmacology be the food of love, play on… Rod Flower and a team of Shakespearian Players will be illuminating the fact that The Bard makes frequent references to drugs, poisons and medicines in his plays. Some of his plots - Romeo and Juliet and Hamlet, for example - depend absolutely upon their use as a dramatic device. Shakespeare was unusually well versed in the traditional herbal lore of his day, and there is evidence that he might have obtained this knowledge directly as a result of personal acquaintance with contemporary physicians and apothecaries.

We'll need help from everyone to create a vibrant and thriving outreach programme. We'll be particularly looking for volunteers to help us on stands. Please email education@bps.ac.uk if you'd like to be involved.

Representing pharmacology: The next generation of bioscientists

The BioScience Brethren aka The Avengers

LSCC Life Sciences Careers Conference

Tweet us!
@pharmacologynow

Society of Biology's new HE teaching website promotes Open Education Resources

Eva Sharpe
HE Policy Officer at the Society of Biology

Dr Eva Sharpe graduated from the University of Edinburgh in 2005 with a BSc in Pharmacology, which she followed with an MRes in Integrative Biomedical Sciences at Imperial College London and a PhD in Biochemistry at the MRC Clinical Sciences Centre. Eva joined the Society of Biology in 2010 and is the HE Policy Officer. Her work covers Higher Education policy, careers advice and guidance, learning and teaching, and working with the Society's HE Special Interest Group, the Heads of University Biosciences (HUBS), and the Accreditation Working Group. Eva is currently project managing a JISC and HEA funded project on Open Education Resources.

This summer, the Society of Biology received funding from the Higher Education Academy[1] and JISC[2] through their Open Education Resources (OER) Programme. We were to work with our Special Interest Group, the Heads of University Biosciences (HUBS)[3] to identify, collect and promote UK OER to the bioscience community. Through this project we have recently launched a new Higher Education (HE) teaching website at: http://heteaching.societyofbiology.org.

OER are learning, teaching and research resources freely available for the teaching community to use and adapt that have been released under specific intellectual property rules.

There are many excellent teaching resources publicly available across various websites, publications and discussion forums. Although some of these resources are featured in specific sites such as the UK's national repository for OER, Jorum[4], many are hosted directly on institutions' own websites and may require extensive searching to find them. Results of a survey of the bioscience teaching community that we carried out over the summer suggest that one of the biggest barriers to the use of OER is not being able to find what you are looking for, or even knowing where to look.

The project allows us to identify resources for bioscience higher education, and signpost them to the teaching community via a new website, reducing the time spent by individuals searching the web, ensuring better access to quality teaching resources, and introducing and encouraging those who are new to OER.

Working closely with the HUBS Executive Committee to ensure the project meets the needs of those working in HE, we have focused on resources that support practical biology and research-led teaching in higher education. The website features a mixture of case studies, best practice, practical and multimedia protocols, health and safety information, and field trip ideas. It is widely acknowledged that practical science is essential to the development of high level skills by enabling students to apply their knowledge, consolidating theory and enhancing learning. However, laboratory and fieldwork are costly to teach; TRAC data released by HEFCE[5] put the average cost of running a bioscience course at over £2,500 per student per year more than a humanities subject. It is essential that we recognize and share best practice to make more efficient and effective use of our resources.

Over the summer we surveyed the biosciences community to find out what they would find most useful from the website. We asked about current use and barriers to using OER and comments on our plans for our website. We received a mix of responses, from those familiar with and already using and creating OER to those who had never heard of or used them before.

In response to our suggestion that we focus on practical biology teaching resources, respondents felt that lab and field work protocols, data handling exercises, videos of techniques and multimedia alternatives to wet lab work would be the most useful resources to feature. In collating the resources for inclusion, we have searched through large national OER repositories, institutional websites, and themed collections featuring fieldwork teaching resources, and online multimedia practicals to provide a comprehensive collection of practical resources across the biosciences.

Feedback from those already using OER highlighted that although there was a number of very good resources available, there was a huge variety in the quality of the resources and a deal of searching and sorting was needed to find high quality resources. To address this we have included an element of peer review in the project, recruiting a team of experts in the bioscience teaching community to review all of the resources we find.

When asked about the main barriers to creating OER, the overwhelming response was unsurprisingly that of time, but many responded that they did not know how to go about releasing their teaching materials as OER, or even whether their institutions would allow this. Resources such as the JISC OER infokit[6] and STEM OER Guidance wiki[7] provide information on using and creating OER, covering copyright and intellectual property issues, and 'dos' and 'don'ts' for creating your own resources.

The uncertainty over whether institutions allow and encourage their staff to create and release OER is something we do all need to be addressing together as a community. Institutional policy needs to be disseminated and embedded at a departmental level and departments need to make it clear what staff training is available to support this. In our work with departmental heads through HUBS, and teaching practitioners in our membership and beyond, we will be promoting institutional change to support the use of OER and championing reward and recognition for those involved.

Setting up this new website to promote the use of OER has been the start of this project for us, and we look forward to working with you all on this in the future. We will be adding new resources as they are released to keep the website up to date and useful. If you are creating new resources, or know of a great resource that we have missed, then please let us know via the 'Submit resources' section of the site!

For more information on the project please see:
http://heteaching.societyofbiology.org

[1] http://www.heacademy.ac.uk
[2] http://www.jisc.ac.uk
[3] http://www.societyofbiology.org/hubs
[4] http://www.jorum.ac.uk
[5] http://www.hefce.ac.uk/pubs/hefce/2012/12_04/
[6] https://openeducationalresources.pbworks.com/w/page/24836480/Home
[7] http://stemoer.pbworks.com/w/page/6111366/STEM%20OER%2Guidance%20Wiki

BPS Meetings: an update

Karen Schlaegel
Head of Meetings and Events

Professor David Webb
Vice-President Meetings

Review of 2012

2012 has nearly come to its end and we are looking back at a year in which we held a number of exciting meetings. We won't be able to mention all of them, but here's a selection of what the Meetings Committee got up to:

Together with the Physiological Society and Wiley-Blackwell, we supported the meeting on the *Biomedical Basis of Elite Performance* which was held in London in March - coinciding with the Olympic Games being held on home turf. With almost 500 delegates the meeting was very well attended and ran very successfully.

In April, the *4th Focused Meeting on Cell Signalling* took place at the newly refurbished conference centre at the University of Leicester. With nearly 200 delegates, a lively poster session, an interesting after-dinner speech by Professor Humphrey Rang and keynotes from Professors Terry Kenakin and John Scott, the meeting was another great success and we are already looking forward to the 5th meeting on 28 - 29 April 2014: save the date in your diaries now!

In June we first celebrated the Queen's Diamond jubilee and later that week around 100 delegates from around the world attended the *BPS Focused Meeting on Neuropeptides*, held at King's College London in association with the European Neuropeptides Club and the American Neuropeptides Summer Conference. The scientific programme was excellent and included a number of oral presentations from young researchers. We were very proud that Laura Kilpatrick - one of our AJ Clark students, based at the University of Nottingham - was awarded the prize for the best oral communication! We also took the delegates on the Duck Tour across London on land and water, which proved very popular - luckily it stopped raining during the tour.

The 2012 EPHAR meeting took place in sunny and hot Granada in Spain. The BPS supported three symposia at the meeting and we were represented with an exhibition stand. Our I ♥ pharmacology T- shirts proved so popular that they sold out halfway through the meeting. If you haven't got one yet come and find us at the BPS stand at the Winter Meeting!

See you at the Winter Meeting!

For the first time in (recorded) history, last year's Winter Meeting was fully booked and we had to close registration early. Judging by the feedback we received, delegates really enjoyed the busy and buzzing meeting that offered excellent science, interactive poster sessions and oral communications as well as great opportunities for networking. The success of the 2011 Winter Meeting has certainly raised expectations for 2012!

At the time of writing, we are preparing for this year's Winter Meeting, which again is fully booked. All exhibition stands were allocated in September and registrations went so well that we are looking into options to book a bigger space at the QEII for Pharmacology 2013 - our renamed Winter Meeting. For the first time we are organizing a treasure hunt and a number of our exhibitors have made exciting prizes available. Check your Winter Meeting programme book for the details, hunt down the answers to all questions and return the form to the BPS stand to be in for a chance to win a prize.

Attendance at the Winter Meeting is still complimentary for BPS members. This has caused us problems in determining actual attendance rates, which in turn makes it difficult to establish catering requirements and causes issues with the venue's capacity. We are therefore asking all delegates to update their registration as soon as possible, or to simply contact the BPS office (020 7239 0176; meetings@bps.ac.uk), once it's clear that you are no longer able to attend. For the first time, we have introduced a no-show fee of £65. Members who are registered but do not pick up their name badge at the meeting, will be charged after the meeting. We very much hope that you will work with us to reduce the number of no-shows substantially, and so reduce food wastage and allow as many delegates as possible to attend the meeting.

Meetings in 2013

We are also busy with the meetings planned for 2013 and beyond; April and July next year will be particularly busy:

7–10 April

Festival of Neuroscience – the BPS is one of many supporting societies, working with the British Neuroscience Association on this festival in London

18–20 April

6th European Workshop on Cannabinoid Research – after organizing the 3rd workshop in Nottingham in 2007, the BPS is once again organizing this biennial meeting, which will be held in Dublin

20–24 April

Experimental Biology 2013 – together with our American sister society (ASPET), the BPS is holding joint sessions at the EB meeting in Boston

4–6 July

EACPT Summer School – BPS will be hosting next year's Summer School and we look forward to welcoming young clinical pharmacologists from all over Europe to Edinburgh

9–13 July

Joint Meeting with the Chinese Pharmacological Society in Shanghai

14–18 July

The International Narcotics Research Conference 2013: Symposia sponsored by the BPS and the British Journal of Pharmacology in Cairns, Australia

Pharmacology 2013

will be held at the Queen Elizabeth II Conference Centre, from 17 - 19 December 2013. For further information and an overview of all our meetings, please visit the BPS website (www.bps.ac.uk/meetings).

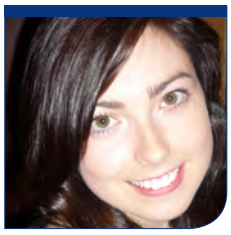
Last, but certainly not least, we would like to take this opportunity to thank all members of the BPS Meetings Committee, the scientific organizers and our speakers - without whom there would be no meetings! We would also like to thank our exhibitors and sponsors for their on-going support of the Society.

If you have any ideas, or comments, we would love to hear from you! We would greatly appreciate it if you took the time to complete our recently launched survey (http://bit.ly/Y2HkAk). Please do not hesitate to contact us (ks@bps.ac.uk) or come and speak to us at the Winter Meeting!

With season's greetings and all best wishes for an event-full 2013!

Delegates from our Focused Meeting on Neuropeptides enjoyed an excellent scientific programme.

Young Pharmacologists: an update



Hannah Watson
Young Pharmacologists Committee

Hannah Watson currently studies Medicine as an undergraduate at the University of Edinburgh. She has just entered into her fourth year of study. In 2008-2009 she completed an Honours year in Pharmacology, also, at the University of Edinburgh.

As always the Young Pharmacologists are hard at work on a variety of projects. We have had a great 2012 and are already planning some exciting events for 2013!

BPS Winter Meeting 2012

Excitement is building for the Winter Meeting that will be held in London on 18–20 December. As in previous years, the event will be held in the prestigious Queen Elizabeth II Conference Centre.

The Young Pharmacologists will be hosting a Welcome Reception on Tuesday 18 December, the first day of the meeting. Although, it is an informal reception it is a great place for networking with peers of similar interests. Our keynote speaker this year is Professor Humphrey Rang, who is sure to make the night all the more special, alongside musical entertainment from Daryl Kellie. Sold out!

Experimental Biology 2013

This annual meeting is to be held in the glamorous location of Boston, MA. Scientists and researchers from a number of disciplines from anatomy to nutrition will gather to discuss all the exciting recent advances in science. During EB2013 the Young Pharmacologists are organizing a Stem Cells symposium as part of EB2013, so watch this space for the final programme!

Pharmacology Societies

We are encouraging young pharmacologists to set up pharmacology Societies/clubs if their institution does not already have one!

Pharmacology Societies are a great way to discuss current pharmacology topics and:

- Share ideas during networking events – opportunities for collaboration galore!
- Gain experience presenting in poster sessions and informal talks in a comfortable environment
- Host exciting talks from current top pharmacologists
- Arrange outreach activities to tell the public how amazing pharmacology is! A great way to improve your CV and get the pharmacology good news in the public domain

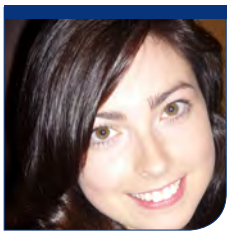
If you would like to know how other young pharmacologists set up a Society at their institutions contact Hazel (hom@bps.ac.uk) at the BPS office.

Some of our Young Pharmacologists enjoyed dinner at last year's Winter meeting.

Partnerships in the Life Sciences:

an interview with Dr Martino Picardo, Chief Executive Officer of Stevenage Bioscience Catalyst

Martin Todd
BPS Member



Hannah Watson
Young Pharmacologists Committee

Martin has been a member of the British Pharmacological Society for 40 years and has recently retired. During his career he worked in academia at McMaster University in Canada, at Wyeth Laboratories at Slough in the UK and for ICI/Zeneca/ AstraZeneca at Alderley Park in Macclesfield. He has always had an interest in education and in developing educational materials to promote the interest of our young people in science and in pharmacology. He has served on a number of BPS Committees and on Council. He is currently enjoying the opportunity to pursue his interests in singing, photography and walking.

Hannah currently studies Medicine as an undergraduate at the University of Edinburgh. She has just entered into her fourth year of study. In 2008-2009 she completed an Honours year in Pharmacology, also, at the University of Edinburgh.

Partnership Ventures

The United Kingdom (UK) has a strong legacy in drug discovery. However, with greater competition from the worldwide scientific community it is imperative that the UK continues to develop the life sciences and biotechnology sectors. This is in order to deliver improved healthcare, economic benefit and the creation of new jobs. There has been a recent withdrawal in the number of Pharma companies investing in research and development activities in the UK. To negate this impact, new opportunities are being taken within the UK to re-energize the sector, by improving the development of new partnerships between industry and academia. These partnerships have the potential to create a unique culture to drive both the early stages of drug discovery and further pre-clinical and clinical drug development, which could result in new drugs delivering benefit for patients.

One of these partnership ventures is Stevenage Bioscience Catalyst (SBC), which opened in February 2012 making it the UK's first open innovation bioscience campus. It has an array of resources for start up activities and for the provision of the skills and capabilities to drive forward the evaluation of new products. It lies geographically at the epicentre of a number of key players in the life sciences industry, including, Cambridge, Oxford and London. SBC's founding partners, GlaxoSmithKline (GSK), the Wellcome Trust, the Department for Business, Innovation and Skills, the Technology Strategy Board and the East of England Development Agency, have invested £38M to deliver their objectives to promote innovation through partnership working. SBC is unique in that it is the UK's first open innovation bioscience campus that has been established with facilities co-located with a Pharma company (GSK). The aim is that the SBC model could help accelerate new high quality drug discovery projects.

We interviewed the Chief Executive Officer of SBC, Dr Martino Picardo to hear about the progress so far and to hear about what needs to be done to ensure the success of this and other similar ventures.

Bioscience innovation in the UK

Martino sees the UK as an attractive location for the Biosciences with a prominent history of important drug discovery and a thriving culture for start-up companies and investors taking projects from inception in the laboratory right through to clinical trials. A key issue for all concerned is the high attrition of projects from the early to the latter stages of drug development and the high costs of moving projects into clinical testing. His view is that the high project attrition rate means that the way in which drug discovery and development is carried out and funded needs to be made more efficient. Drug discovery projects need to be managed with a key focus on evaluating both opportunities and risks, identifying key 'make or break' experiments and developing closer dialogue with funders about project success as well as about project attrition. This is a view that would be shared by Big Pharma who are very used to the need for a balanced portfolio of projects, some with a high risk and high reward profile and others with lower risk and lower reward. In Big Pharma there is an unrelenting focus on both the individual projects and the overall portfolio of projects and an approach that is often described as 'fail early' so that projects, which have significant shortcomings, are terminated to allow investment to be concentrated on potential 'winners'. In contrast the small, one project, start up company or the University researcher with a new treatment concept has a very different view of their project. Here there can be a focus on 'keeping the project alive' rather than seeking early termination.

While Big Pharma have reduced their activities in the UK the net result is that incubator groups like SBC in Stevenage and BioCity in Nottingham have access to scientists and managers with previous Pharma experience who can provide skills in project evaluation and help to facilitate a dialogue between project scientists in small companies, academia and with funders.

Translational relationships

The University of Cambridge recently announced the location of a centre of innovation at SBC, so that projects in the life sciences at the University can progress more rapidly with development and eventual commercialization. An important aspect of this translational relationship will be the ability of research scientists from the University of Cambridge to work alongside scientists at SBC and GSK. Martino believes passionately in this kind of close working relationship and believes the benefits to all concerned will

be great. He is equally keen that scientific successes should be communicated more widely and celebrated appropriately so that the scientific endeavour is seen as valuable and that this: attracts research workers to the UK; attracts companies with technologies and capabilities relevant to drug discovery; and attracts our young people to the excitement and achievement available in science. In addition success stories will attract funders and also promote the development of new business models, which will hopefully make this a sustainable scientific cycle.

Strategic alliances

Big Pharma is increasingly keen to see 'early stage' drug discovery taking place in academia, whilst Universities have become attracted to seeing patent filing and technology transfer as a source of income. There is however a long route from a 'filed patent' based on a potential disease mechanism to a molecule with biological activity in a test tube, then in an animal, then an animal model and then in man. Dr Picardo confirmed that the previous academic kudos attached to the formation of a small start-up company and the filing of patents by academics is shifting. The previous methods of working led to the priority being given to gaining intellectual property and negotiating deals. Nowadays, this shift has focused more on strategic alliances between institutions, e.g. AstraZeneca, GSK and the University of Manchester in the area of inflammation, rather than deals with individual scientists on a project-by-project basis. So what does this mean in practice? It allows a portfolio of projects to gain funding and expertise over one stand-alone project. This takes us back to ways in which we need to tackle the high rate of project attrition and at least in theory this means a greater chance of success. It also means that scientists in academia need to be able to work in partnership with colleagues and with external bodies and to understand the kind of criteria which will be used to determine project risk and opportunities as seen by funders.

Our Government is responsible for funding both the health and education sectors on a long-term basis, whereas, when it comes to science Government interest is often short-term. Martino sees a need to maintain a constant dialogue with Government about the successes that have been created by the community of Science Incubators across the UK and to build a visible 'portfolio of methodology' that acts as a foundation to be built on to prevent achievements evaporating with each new Government.

Future challenges and opportunities

As CEO of SBC, Martino naturally has a great deal of responsibility but what are the main challenges for him and SBC in the upcoming year? He is incredibly passionate about the advancement of incubator organizations and as such all his aims are based around the success of the venture in Stevenage, as it will act as an example across the UK on the worth of such a business model. So how is he preparing to build on SBC's successes? He is adamant that creating the right environment for collaboration is the crux, as investors must feel confidence in what they are funding regardless of the stage of innovation. Meaning that investors must feel comfortable funding even very early stage drug discovery projects, this will be determined by successes and reputation in the industry. It is equally vital to build a dialogue and a reputation with a range of investors that may be interested at different project stages, and willing to fund at varying degrees of risk. To facilitate this kind of collaborative project working it is essential that the SBC is integrated into the mainstream provision of life sciences skills and capabilities throughout the UK.

Becoming involved with other scientific communities and societies has become one of many priorities for Dr Picardo. He wants SBC to become a focal centre for the training and development of events aimed at students of all levels - from school age Year 9, who can become involved with the "Making it in Medicines" challenge (taking place at the SBC in December 2012) to PhD students across the country. Inspiration must occur at all levels of education and the UK scientific societies have the opportunity to become more involved with educational activities within the life sciences incubator community in the UK.

There is a great deal of responsibility in the title of CEO but what keeps Martino awake at night? He was quick to answer with "keeping key stake-holders on-side", an inevitable worry of somebody in such a position.

Dr Picardo was passionate about all aspects of SBC and this was adamantly clear from the tone of his voice to his in-depth, practical answers on any topic we threw at him. From the successes of SBC so far, it is clear this venture is only going to build on its current successes, to become a model within the UK and further afield.

The keys to success in partnership ventures like this are developing a shared picture between all stakeholders of both the scientific value and the financial value of projects, as they travel along the road from project inception to product delivery. This challenge creates an ideal opportunity for organizations like SBC.

CAPE TOWN, SOUTH AFRICA
WCP 2014
17TH WORLD CONGRESS OF
BASIC & CLINICAL PHARMACOLOGY

Graeme Henderson
First Vice-President IUPHAR

The next World Congress of Basic and Clinical Pharmacology (WCP2014) will take place in Cape Town, South Africa, 13 – 18 July 2014. What an exciting prospect – great science and a wonderful cultural experience!

WCP2014 has three main aims. First to provide an outstanding scientific programme that reflects recent major developments across all of pharmacology. Second, to combine basic and clinical pharmacology under the theme of "Cutting Edge Pharmacology: from Cradle to Clinic". Third, to nurture pharmacological research throughout Africa.

Those who attended WorldPharma 2010 in Copenhagen will know that the format of the IUPHAR Congress has changed somewhat. Themes run through the programme thus ensuring that there are sessions of interest for participants on each day. In addition basic and clinical pharmacology are integrated within each theme.

The Congress will be held at the Cape Town International Convention Centre (CTICC), a truly first class venue for a large scientific meeting, located close to the beautiful V&A Waterfront district. Excellent hotel accommodation priced for different budgets is located close to the convention centre as well as in neighbouring parts of Cape Town. The city is known for its restaurants, which serve delicious fresh seafood, award-winning wines and the Cape's own distinctive Malay-inspired cuisine.

Many who travel to the Congress in South Africa will take the opportunity to explore this fascinating country. There is much to see and do close to Cape Town including Table Mountain, the magnificent coast line, Cape winelands and Robben Island. Those interested in wildlife may wish to arrange a trip to Addo Elephant Park which provides sanctuary to over 500 elephants, lions, buffalo and black rhino.

There are also opportunities for whale watching and shark diving. An ex student of mine who has been shark cage diving near Cape Town likens the experience of having a couple of great white sharks swimming towards him showing their teeth as how he felt on meeting his PhD examiners at his viva!

The Congress organizers are keen that African pharmacologists have an opportunity to attend and participate in the meeting. To this end they have asked all national societies in IUPHAR to consider sponsoring an African delegate. Financial support is important as there are no budget airlines offering cheap tickets for flights in Africa and little government support for research, let alone travel to international meetings. The BPS Young Pharmacologists Group are raising money to sponsor young African scientists to attend the congress. You may have already purchased one of their I ♥ Pharmacology t-shirts or donated funds on the meeting registration form. I urge you to give the young pharmacologists your support in their fundraising. Rumour has it that a limited number of t-shirts autographed by a famous pharmacologist will be given away as prizes at the Winter Meeting. Will they end up being auctioned on eBay I wonder!

Details of the 17th IUPHAR Congress and much more about visiting South Africa can be found on the WCP2014 web site http://www.wcp2014.org/

I am really looking forward to attending WCP2014 and hope to see you there too.

Graeme

IUPHAR Executive Committee love pharmacology!