BNA
British Neuroscience Association

bulletin

The voice of British neuroscience today

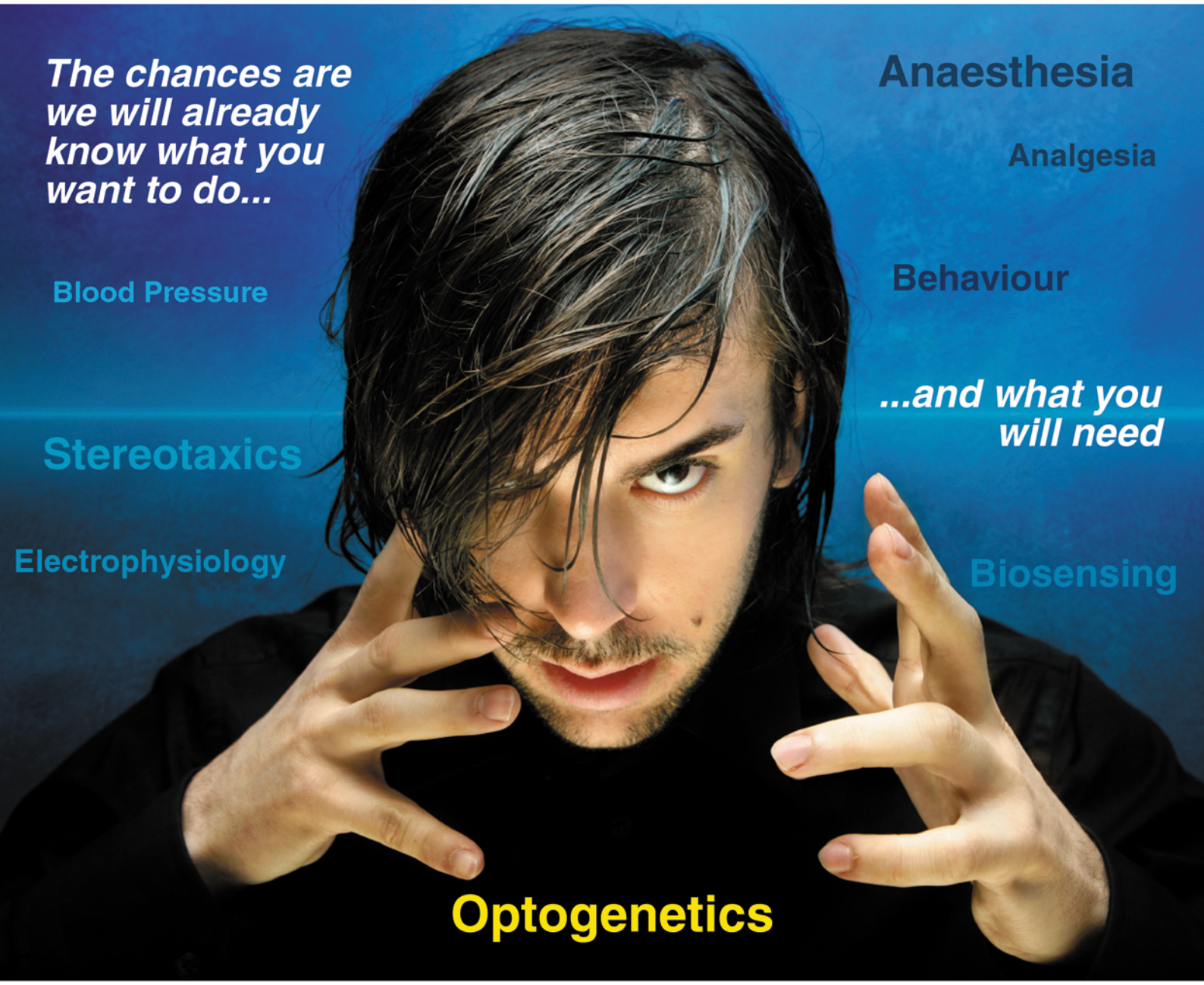
INTO THE BRAINS OF BABES
How a bundle of cells develops a sense of self

BAD SCIENCE and other things that frustrate Ben Goldacre

PMS & PROZAC Could pills prevent pre-menstrual syndrome?

Issue No. 63 Spring 2011

World Precision Instruments



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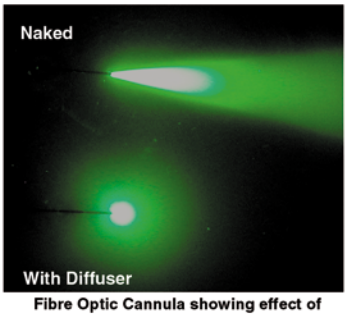

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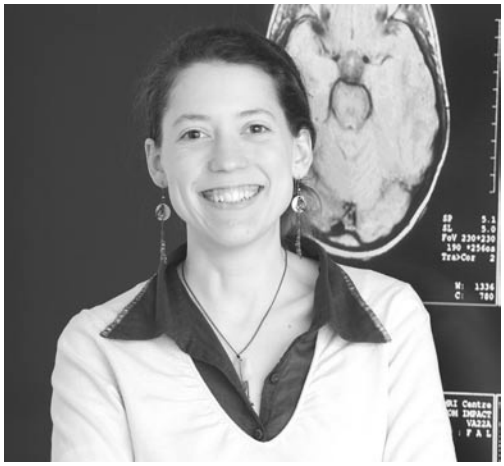
Welcome



A theme that seems to run through this edition of the *Bulletin* is that of new births and beginnings. BNA has a new logo, a new President and a new Chief Executive. For those yet to spot our sleek new logo, see the cover or p21. New President David Nutt takes over from Trevor Robbins in April. Part of Trevor's legacy, who has skilfully steered BNA through a critical phase, is the installation of a Chief Executive for the Society. Meet Ian Varndell, our new C.E., on p5.

Many members may not know how BNA first began; I was intrigued to learn that its birthplace was a certain London pub (p20). Find out how the neuroscience career of BNA member David McAlpine began, with his 'life on the page', on p15.

Then there is the miracle of birth itself. Comedian Robin Ince describes how the birth of his son, and watching a baby's brain develop skills, awareness, and a sense of self, inspired Robin to delve into cognitive neuroscience (p25).

Meanwhile, the neuroscience community is being confronted with unwelcome new challenges. Funding cuts, tuition fees, and the withdrawal of pharmaceutical companies from the UK are pressing concerns for all members. BNA is acting on your behalf; find out how on p6.

To end on a positive note, BNA's 2011 national meeting looks set to be the best ever, and exciting plans are afoot for a new Festival of British Neuroscience. I, for one, look forward to seeing BNA initiate and embrace this and many more new beginnings in years to come.

Anne Cooke
BNA-editor@bristol.ac.uk

Autumn issue: COPY DEADLINE = 15th July 2011

Are you interested in submitting items for the Autumn edition? Are you interested in writing, drawing, doing photography, poetry… or anything else for BNA? Email BNA-editor@bristol.ac.uk - to find out how. All enquiries very welcome

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On the cover: How a bundle of neurons develops into the human brain has inspired neuroscientists down the ages. Robin Ince and Bruce Hood give personal and scientific perspectives on the miracle of cognitive development on p25. *Photography Anne Cooke; artwork Andy Doherty; special thanks to Lizzie Burns*

Acknowledgements: The Bulletin, as always, would not be possible without its many wonderful contributors - see p 47.

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FROM THE PRESIDENT Trevor Robbins

We mark the changing seasons by BNA meetings

After the now traditional Christmas Symposium, this time on the Neuroscience of Social Interaction (with the BNA Award for Public Engagement going to Ben Goldacre), thoughts turn to Easter's Biennial Meeting. We are pleased, but not complacent, about the positive reception to the scientific programme; success for this meeting will depend on you, the participants – and we hope by the time you read this you will have registered and are set ready to come.

This is not the only BNA event this year, with a tremendous one day meeting for September at Edinburgh on developmental and clinical neuroscience already planned.

And inevitably, although still two years before the event, we have to think about the next Biennial Meeting. The exciting news is that this is likely to be a meeting with all of the major societies, clinical and non-clinical, that have an interest in neuroscience. They have signed-up to the concept of a *Festival of British Neuroscience,* to be held in London, convened by my successor Dave Nutt.

Doubtless, as new President, he will be telling you more in the next instalment of this column.

FROM THE SECRETARY Colin Ingram

- The BNA has a fresh new look! Observant ones among you will have noticed the new logo and, following the re-styled *Bulletin*, we now have a new look website. Please do submit news, jobs, and events, to keep the site up-to-date.
- Reorganisation of committee responsibilities has progressed, with priorities informed by an online survey of members' expectations of the BNA. Ian Varndell has been engaged to support development (see p5), Trevor Robbins (President) and David Nutt (President-Elect) have taken on more proactive roles in advocacy, while, under Bruno Frenguelli, there has been increasing participation of local groups.
- As part of the 2010 British Science Festival at Aston University the BNA-sponsored symposium *'Bliss or Blues; Rapture or Rage'* (p 38) explored moods and emotions, covering happiness at work, hormone-driven mood swings, and emotional changes as we age; subjects that affect us all, both professionally and personally.
- Aston nicely prepared us for our Christmas Symposium at the Royal Society: *'T'is the season to be sociable: The neuroscience behind partying!'* (p 41). Over 220 partygoers heard what makes us, birds, and even robots act sociably, after which Ben Goldacre gave an amusing insight into what makes 'bad science' when he was awarded the 2010 BNA Award for Public Engagement of Science.

- The BNA also part-sponsored Bristol's BCNC Young Neuroscientists' Day held (p 40). Exclusively for PhD students and early-career researchers, it included talks and posters, sessions on public engagement, careers, and evening social. If you would like to organise a similar event in your region, contact BNA for advice and possible funding.
- Plans are underway for a one-day meeting, *'Neuroscience means Business'*. If you would like to host a meeting, on a topical subject of broad interest to members, please do contact us.
- Finally it is of course our 21st National Meeting. See you in Harrogate!

FROM THE OFFICE Hannah Critchlow

Hannah Critchlow, on the right, with Arciris Garay-Arevalo

Dear BNA Members

The BNA Office has been very busy planning for the Biennial Meeting, 17-20 April 2011 in Harrogate. We have also organised several other successful activities with your help and input.

The basis of the excellent programme for the 2011 Biennial Meeting was produced at the first meeting of the BNA Scientific Advisory Board (SAB) in November 2009. The BNA Office met again with the SAB in September 2010 to discuss increasing BNA membership and future direction, after which the SAB worked with the BNA to recruit over 100 new members.

As part of increasing the BNA's sustainability we have proposed a collaborative *Festival of Neuroscience 2013* (in place of the BNA Biennial Meeting) receiving positive expressions of interest from all the major UK neuroscience societies. The BNA has also improved the BNA role within other neuroscience societies, discussing services and fees with SfN, Society of Biology, and IBRO.

To formulate the basis of a strategic plan, BNA Directors and Office appointed a Chief Executive (see below) and conducted an online membership survey.

There was an enthusiastic response with 800 members and non-members replying. The following were rated most important:

- Hosting a high profile national meeting 75.8%
- Acting as a national representative for neuroscience 65.2%
- Events to promote the public engagement of neuroscience 59.3%
- News via the BNA website, email alerts, and e.bulletin 56.1%
- Hosting specialised local meetings and workshops 54.0%
- Student bursaries and prizes 50.0%
- Financial support for local activities 29.7%

As part of increasing BNA's profile and services, the BNA website has been revamped; members can now post events, news items, and job vacancies online, and receive news regularly via the e.bulletin.

As we move into 2011, we hope to continue to advocate for you (see information on BBSRC neuroscience cuts p 6-7) and to serve you even better.

See you in Harrogate!

Very best,

Arciris and Hannah
BNA Office

THE CE VIEW

Dr Ian Varndell has recently been engaged as Acting Chief Executive (CE) to help prepare a five-year Strategic Plan for the BNA. Having been in neuroscience since a student, first as researcher and latterly through industry, setting up Affiniti Research Products Ltd (now part of Enzo Biochem) – a 'one-stop shop for neuroscience' - Ian knows BNA well; he has been a Committee member, Treasurer and Director in the past.

As CE he will:

- review membership criteria and benefits
- review finances and revenue generation
- raise the profile of British neuroscience with government and the media
- take forward the 2013 Festival of Neuroscience, and the introduction of an annual BNA meeting

Here Ian gives his view on being CE:
I've been a passionate supporter of the BNA for many years and want to help realise our ambition for the BNA to become the "voice of British neuroscience". This means engaging with our members and increasing our numbers, raising our profile in the media and stating our case with government and its agencies. Another key goal is to become self-financing. My energies will go to help the BNA's directors and committee create and implement a five-year strategic plan to meet our aims. I look forward to discussing BNA's plans with all society members: you can contact me at ian.varndell@bna.org.uk

BNA ADVOCATES FOR UK NEUROSCIENTISTS OVER BBSRC'S 'DRACONIAN' FUNDING CUTS

Anne Cooke

The Biotechnology and Biological Sciences Research Council (BBSRC) announcement, in January, that it was to slash its support for neuroscience by £20 million over five years shocked and dismayed neuroscientists across the UK, many of whom depend on BBSRC to perform the critically important, fundamental research that underpins our understanding of the brain, and, hence, tackling brain diseases. *"The prospects for the future are extremely bleak"* concluded David Nutt, BNA President Elect.

Taking on the role of advocate, the BNA immediately co-ordinated a response from over a hundred of the country's leading neuroscientists to make a compelling and clear statement to the BBSRC, and – via the Science Media Centre – members of the press, voicing the community's concern over this potentially fatal threat to the country's currently world-leading neuroscience research.

BNA's letter to the BBSRC prompted Chief Executive Professor Douglas Kell to counter, on his blog, that the situation was, *"a win for all of us"*, elucidating his reasoning in subsequent correspondence with the BNA. For further details and updates, see bna.org.uk/news.

Media coverage included reports in: Reuters, BBC News: The Today Programme, The Guardian; The Independent, The Telegraph, The Mirror, Yahoo News, Nature, British Pharmacological Society, Science Insider, C+D, and Forexpros

BNA STUDENT PRIZES 2011

- £750 to be won – Deadline: 1st October 2011

British Neuroscience Association

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Open to students who have completed a Ph.D/D.Phil. thesis between 30.09.10 and 01.10.11. Requirements:*

- *Nomination by student supervisor*
- *External examiner report or recommendation*
- *Abstract of the thesis*
- *Statement by the student highlighting the importance of its work (max 300 words)*

**work must be completed and thesis submitted and approved, even if not formally awarded*

UNDERGRADUATE AWARD - £250

Eligible subjects are not limited to just neuroscience per se, but also degrees where a large part comprises neuroscience. Requirements:

- *Nomination by Course Tutor, Course Supervisor or Head of Department*
- *Evidence of success including marks in final exams, summer 2011*
- *Any supporting material e.g. dissertation/ thesis, or report on research performed by the student*
- *A statement of career intentions*

All nominations should be sent to:

BNA Office, Dept of Experimental Psychology, University of Cambridge, CAMBRIDGE CB2 3EB
Enquiries: bnaoffice@neuroscience.cam.ac.uk, (0)1223 766450

BNA LETTER TO THE BBSRC

Professor Sir Tom L Blundell, FRS Chair of Council of the BBSRC
11th February 2011

Dear Sir Tom,

We write on behalf of the British Neuroscience Association and the community of neuroscience researchers in the UK to express our deep concern at the recent (24th January, 2011) announcement from the BBSRC regarding 'Changes in BBSRC grants procedures and processes', in which the BBSRC states:

"In the case of neuroscience, the BBSRC has reluctantly concluded that demand-led funding is resulting in too great a proportion of funding going to that one area, and we are seeking to focus our investment in the areas most relevant to our strategic priorities ...

We shall be asking Committees to prioritise research proposals that clearly address the research priority areas of the BBSRC Strategic Plan. These are, in particular, food security, bio-energy and industrial biotechnology, and basic bioscience underpinning health and wellbeing".

British neuroscientists have valued the funding from the BBSRC, which has contributed to our premier position in Europe for research impact in the field of neuroscience and behaviour over the last decade. In order to continue to flourish in this area, it is imperative that funding is sustained. We cannot understand why the BBSRC should conclude that success in open competition for BBSRC funds should be a reason to withdraw support. Surely that success is an indication of the quality of neuroscience research in the United Kingdom.

The BNA asked Dr Alf Game, Deputy Director of Research, Innovation & Skills & Head of Delivery of the BBSRC what impact this funding decision will have on neuroscience research here in the UK. Dr Game commented:

"The BBSRC currently spends 13% of their annual budget (which amounts to £150 million in total) on neuroscience projects. Although the BBSRC cannot at present put a precise figure on funding cuts I estimate that the BBSRC would be cutting back specifically on neuroscience funding by at least 20%".

We presume that the £150 million refers to the total annual spend for competitive university research grants. On the basis of these figures, a cut of "at least 20%" equates to a loss of support for neuroscience in UK universities of some £4 million a year and at least £20 million during the next five year period.

The BNA has a number of questions and comments regarding this announcement:

- How will the strategic priorities across the research councils complement each other to ensure that all the key research areas of neuroscience will continue to have sources of funding available to them? Specifically, to what extent do the health-related priorities of the BBSRC overlap those of MRC? We, representatives of the neuroscience research community need to have a much clearer definition from the funders as to what they consider in or out of remit, and why.
- Does the BBSRC realise that health-related research is only a fraction of the total range of neuroscience research? Moreover, how does BBSRC plan to fund basic research in neuroscience that is not immediately, in the short term, relevant to translation and application? Who will fund behavioural neuroscience?
- In a recent independent survey of European research institutions conducted over the last decade (Times Higher, 20 January 2011) the highest scores for neuroscience and behaviour research quality were achieved by UK laboratories. It is not clear how the UK will sustain its strength in these areas if funding is reduced. Does the BBSRC accept that a deliberate and selective reduction in funding will inevitably threaten this area of particular excellence in UK science?
- This announcement is likely to affect the career aspirations, development and training opportunities for young researchers in this area – surely these are things that the BBSRC should be trying to protect in order to preserve the contribution of neuroscience to UK competitiveness and economic growth.
- Even with the swingeing global R&D cuts announced this week, Pfizer has identified neuroscience as a core focus for drug discovery, and has plans to open a Pain and Sensory Centre in Cambridge (UK). Despite the withdrawal of GlaxoSmithKline from neuroscience R&D early in 2010, several UK-based biotech businesses (including Proximagen Neuroscience plc, Aptuit plc and Convergence Pharmaceuticals) have acquired the GlaxoSmithKline neuroscience research programmes - demonstrating the need for more, not less, investment in UK neuroscience graduate training, and cutting-edge research. We are alarmed that the BBSRC has decided to reduce neuroscience funding at this time of opportunity and need.

The action of the BBSRC appears to be aimed at reducing the strength of an area of research in which the United Kingdom excels, simply because it is too successful. The BNA seeks clarification on how the BBSRC intends to implement such a draconian cut in support, and on precisely which areas of neuroscience research would not be eligible for future BBSRC funding. Is it the intention of the BBSRC that areas deemed to be ineligible will simply wither, or is there a joined-up strategic plan for equivalent funding to be made available by the MRC?

The BNA believes that investment in UK neuroscience deserves to be supported at higher levels than ever before, rather than being cut, if this country is to maintain its proven reputation as a producer of exemplary research quality. The BNA encourages the BBSRC and other UK funding bodies to reconsider their strategies and not to cut support for neuroscience research.

This letter was signed by 100 leading UK Neuroscience Academics

NEWS

Events, developments, and other news in the world of neuroscience.

Were you brain aware?

Brain Awareness Week (BAW) took place between the 14th and 20th March, with hundreds of events taking place across the UK and internationally, ranging from Open Days in Oxford to Brain Camps in Bangkok. BAW is n annual event organised by The DANA Foundation and its many international partners to "promote public awareness about the progress and benefits of brain research". We are keen to hear about the experiences of both organisers and attendees at this year's events: contact us at BNA-editor@bristol.ac.uk. *CM*

New protein provides insight into brain disorders

A protein crucial for maintaining the health and function of the Node of Ranvier, a part of the nerve fibre critical for fast nervous transmission, has been identified by researchers at the University of Edinburgh. Professor Peter Brophy, said: *"Knowing more about how signals in the brain work will help us better understand neurodegenerative disorders and why, when these illnesses strike, the brain can no longer send signals to parts of the body."* Characterising the protein - Nfasc186, the neuronal form of neurofascin - could lead to new treatment for such disorders. *AC*

Measuring musical pleasure

Have you ever felt growing anticipation and then euphoria when listening to your favourite music? Researchers from Canada used PET scanning techniques to demonstrate that an important component of these feelings is striatal dopamine release *(Nat. Neurosci 14:257–262)*. However, the anticipatory and peak euphoria were dissociable, showing differential activation in the caudate and nucleus accumbens respectively.

Pleasure in music is a notoriously subjective phenomenon; for some it is Holst's *Jupiter*, for others it is *Come Together* by Primal Scream. The authors cleverly circumvented this problem using measures of the autonomic nervous system to record 'chills' in response to music when scanning. What became clear from this fascinating piece of work is that the same neural systems implicated in mediating our response to food, drugs and money are also involved in the encoding of the pleasure we gain from an abstract stimulus such as music. *AI*

Pioneering neurosurgery treats depression

Bristol Neuroscience researchers have carried out a world first, using deep brain stimulation combined with anterior cingulotomy to successfully treat severe depression. Dr Andrea Malizia and neurosurgeon Mr Niunj Patel developed the advanced stereotactic neurosurgical procedure, which targets brain circuits involved in emotion and internal drive, transforming the life of their patient, Sheila Cook, after a decade with depression, a severely disabling condition where many sufferers lose their job, home, friends and family, and about 15% commit suicide. Sheila said: *"Within a few weeks my life changed. I felt happy for the first time in years and began to take an interest in life again."* *AC*

Writers: Anne Cooke, Anthony Isles, Hanno Koppel, Chris Martin

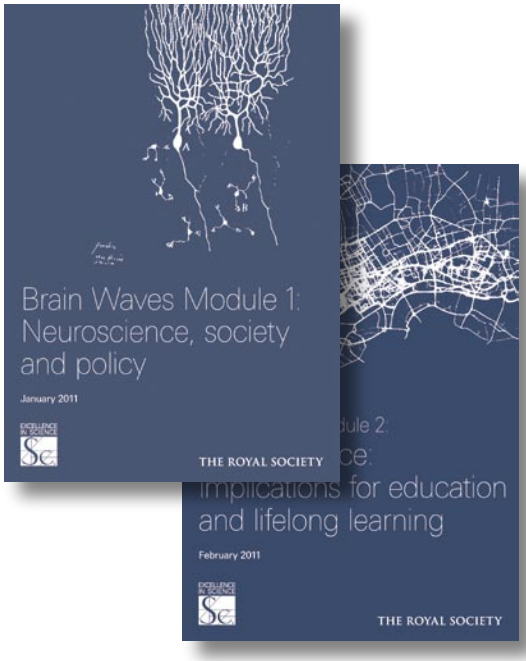
Nutt and mushrooms for Mosley

BNA president-elect David Nutt recently featured in BBC television series *The Brain – a secret history*, demonstrating the activation pattern of silocybin, the hallucinogenic component of magic mushrooms, by giving some to presenter Michael Mosley. It's hoped research on such drugs will lead to therapies for conditions such as depression and obsessive compulsive disorder, the idea being that psychedelics may 'unlock' sufferers from the maladaptive mindsets characterising their condition. Obviously, this work is very preliminary and psychoactive drugs can have negative effects, sometimes making existing neuropsychiatric problems worse.

Even so, Michael Moseley seemed to enjoy his experience; initially feeling the walls of the scanner dissolve and going into 'hyperspace', once released from the scanner in Cardiff University's Brain Research Imaging Centre, our intrepid presenter had one overriding urge - to talk, and talk, and talk, and talk. *AI*

Brain waves

Neuroscience is growing up. Once an infant, nurtured in the safety and privacy of laboratories, it is now out facing the harsh scrutiny of the world. So, the ethics of neuroscience, and its impact on society, are getting ever-increasing attention. The Royal Society has responded admirably to the challenge of opening debate and free access to information, ideas and controversies by setting up a 4-part project called *Brain Waves* that explores, with a series of essays - many by BNA members - neuroscience and (1) society, (2) education, (3) military, and (4) the law. (http://royalsociety.org/brainwaves/) *HK*



BrainFacts.org to bring brain science online

An authoritative, interactive website, due for launch in 2012, will combine the power of the internet, the resources and expertise of the Society for Neuroscience (SfN) and $1.53 million from The Gatsby Charitable Foundation and the Kavli Foundation in order to provide the world with a trusted source of information and a platform to share exciting developments in brain research. BrainFacts.org will allow neuroscientists to, *'engage more actively and effectively in dialogue with the public"* said SfN President Susan Amara. *AC*

Prestigious award for BNA President

BNA President Trevor Robbins and collaborator Professor Barry Everitt, both of Cambridge University, are joint recipients of the highly prestigious 2011 American Psychological Association Distinguished Scientific Contribution Award for their *"long term and distinguished ... contributions to basic research in psychology"*. Their 30-year collaboration has been hugely significant in the field of behavioural and cognitive neuroscience. Alongside the MRC and Wellcome Trust, they credit University initiatives such as *Cambridge Neuroscience* for enabling their collaborative research. Congratulations to both for this achievement for British neuroscience. *AC*

NEWS

Events, developments, and other news in the world of neuroscience.

Intelligence lowered by processed food in childhood

Janet Hudson

Is childhood diet associated with later intellectual ability? A diet high in fats, sugars, and processed foods in early childhood may lower IQ, while one packed with vitamins and nutrients may do the opposite, suggests new research from the University of Bristol.

These findings may be explained by the fact that the brain grows fastest during the first three years of life and that growth at this time is linked to intellectual ability. One might anticipate, therefore, that IQ would be affected by early nutrition.

Data required for the research was obtained from the Avon Longitudinal Study of Parents and Children (ALSPAC), which tracks 14,000 children born 1991-92. Food and drink consumed by ASPLAC children was detailed at 3, 4, 7 and 8.5 years old. A processed food diet at age 3 was associated with lower IQ at 8.5, irrespective of whether the diet subsequently improved. On the other hand, a healthy diet was associated with a higher IQ at the age of 8.5. Dietary pattern aged 4-7 had no impact. *AC*

vCJD blood test breakthrough at UCL

Scientists at the Medical Research Council's Prion Unit at UCL have developed a prototype blood-based assay that offers, for the first time, the prospect of blood screening for the debilitating new-variant Creutzfeldt-Jakob disease (vCJD). Currently, diagnosis of the brain disease, which can incubate asymptomatically for decades, is only possible by brain biopsy or at post-mortem. Dr Graham Jackson, lead author of the paper published in *The Lancet*, hopes the test, *"will become a valuable diagnostic indicator for routine use in the national Prion Clinic and form the basis of an ultra-high throughput assay for screening applications."*

This work has implications for the safety of blood and blood-products used in healthcare, and may also permit more accurate measures of the likely incidence of vCJD. According to Dr Jackson, an important next step will be to increase the number of control samples to confirm the test's high specificity. *CM*

Cambridge professor celebrates women in neuroscience

On November 16th 2010, Barbara Sahakian addressed over 200 neuroscientists at the SfN Women in Neuroscience Luncheon. *"It was a great honour,"* says Professor Sahakian, the first British neuroscientist to have spoken at the luncheon since its inception in 2006.

"I tried to give a few key tips for a successful career in neuroscience, such as being optimistic and resilient and developing a strong skill base," she says. Drawing on both her own experience and those of the students and post docs she has supervised, Professor Sahakian emphasised the importance of a holistic approach to career and family life.

She also stressed neuroscientists' responsibility to engage with wider issues such as neuroethics, the public perception of science, and mental health policy. *"I wanted the audience to recognise that, as current PhD students and post docs*

in neuroscience, they are the future. It's important they use their knowledge to promote mental capital and wellbeing, and create a better society for all its members." JW

See bit.ly/sfn-win

Writers: Anne Cooke, Chris Martin, Jonathan Webb

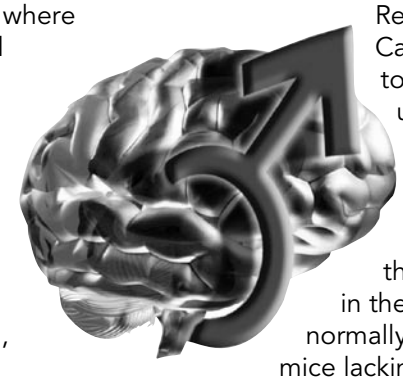
Pain in the headlines

Painkilling seemed to be all over the news in February. Whether it was looking at pictures of loved ones (Daily Mail, Feb 24; originally Younger *et al.* in PLoS One) or watching the pain being inflicted (Telegraph, 11/2; originally Mancini *et al.* in Psychological Science), the newspapers were very interested in how we might numb ourselves during nasty jabs. In fact, most pain studies use heat rather than needles - including both of those, and a third widely reported study from the lab of Irene Tracey in Oxford (Bingel *et al.*, Science Translational Medicine). Interestingly, Professor Tracey found that subjects' expectations of pain relief play an enormous role; negative expectations, for example, could almost completely override the effect of remifentanil. *"It's phenomenal"* she told the BBC. *"It's one of the best analgesics we have and the brain's influence can either vastly increase its effect, or completely remove it." JW*

Buweosman

In the gene of the father

A gene has been found where paternal and maternal copies have distinctly different functions; the copy from the father is solely expressed in the brain and regulates social behaviour, whereas the copy inherited from the mother is active in all other parts, where it is important for foetal growth, metabolism and fat storage.



All genes are inherited in pairs, one copy from each parent. For most genes both copies are active, but for some, one is switched off – a well-known process called imprinting. However, for a gene to have two very different functions depending on which parent each copy is inherited from has never been seen before.

Researchers from Bath and Cardiff Universities worked together to untangle the unconventional character of the gene, called Grb10. They studied mice that lacked a copy of paternal Grb10, i.e. the gene was not active in the brain but worked normally elsewhere. They found mice lacking paternal Grb10 were more domineering and assertive than wild-type companions.

It seems that, for this gene, the father has exclusive rights on one aspect of behaviour. Might we find further genes that have similar split roles for body and brain? *AC*

More than one metronome of the mind

Behaviour such as speech and movement requires precise coordination, but how does the brain perceive time? In particular, how does it perceive duration between intervals in a sequence of sounds, such as rhythms we hear in music?

Using Magnetic Resonance Imaging (MRI) researchers at University College London and Newcastle University have shown that there are different brain mechanisms depending on rhythmic context; for the timing of regular sounds, a network in the basal ganglia is activated, while a cerebellar network is activated for the timing of irregular sequences.

"The cerebellar network measures absolute duration of individual time intervals, like a stopwatch, while the basal ganglia network is involved in the measurement of time relative to a regular beat or rhythm in the sounds, for instance, timing relative to a metronome." explained Sundeep Teki, a UCL PhD student.

These findings could allow movement disorders to be distinguished according to the nature of their cognitive deficits in time perception; basal ganglia disorders such as Parkinson's disease would differ from ones arising from cerebellar pathology. *AC*

TWENTY TWEETS

Four more brave BNA members take on the challenge of tweeting ten replies to ten questions and tackling this issue's Blogbox: 'Do you agree with students paying much higher tuition fees?'

Rochelle Ackerley is an Assistant Professor at Sweden's University of Gothenburg, where she's using microneurography to record single axons in human skin.

Whose brain do you most admire? *Give me any brain, I admire them all. It is their inherent variety and difference that constitute our behaviour and individuality.*

Describe a typical day at work *Check e-mail, coffee, analysis, sticking electrodes in people (microneurography), statistics – great!*

What one thing do you value or enjoy most about what you do? And the least? *Most: recording single units firing in awake humans. Least: that inevitable run of experiments that don't work and you cannot work out why.*

What question would you most like to find the answer to in neuroscience? *What is consciousness? It is the ultimate question about human existence.*

What else do you wish the human brain could do? *Telepathic powers. Evolution has allowed us to infer so much from our senses but to read someone's mind would be much easier!*

If you could discover a miracle cure for one neurological or psychiatric disorder, what would it be? Why? *Dementia. It is debilitating disease that takes away what constitutes our self.*

What one memory would you most like to erase? *None. Our memories make us who we are and we learn from them all (or at least try to). Strive for balance: it is the experience that counts.*

Name one piece of art (visual, aural, literary, anything) that really tickles your synapses. *The Pink Floyd album 'Meddle'. The song 'Echoes' is pure musical genius.*

What do you think you might be doing if not neuroscience research? *Astrophysicist. If I didn't explore our inner world, I would want to investigate outer space. That or a rock star!*

Do you have an amazing, little known fact about the brain or nervous system, human or animal? *25% of humans are supertasters. They experience greater intensities of taste, especially bitterness, through having more taste buds.*

BLOGBOX: *No. It means that a university degree is becoming much less accessible to those with little money. Universities are also turning into businesses these days. Maybe this should be exploited so that ideas from research and technology development are made profitable.*

Gareth Evans is a lecturer at the University of York interested in the cell signalling of development and learning.

Whose brain do you most admire? *My three year old daughter's. Watching brain development in real time is phenomenal.*

Describe a typical day at work. *Green tea, thinking, emailing, troubleshooting experiments, meetings, teaching, marking, writing, lab work (if I'm lucky) & more green tea.*

What one thing do you value or enjoy most about what you do? And the least? *Getting paid to do my hobby. Not having enough time to do my hobby.*

What question would you most like to find the answer to in neuroscience? *That small issue of how consciousness works.*

What else do you wish the human brain could do? *Telekinesis. Not for evil, just for multi-tasking and getting stuff you can't reach.*

What do you think will be the next big thing in neuroscience, in research, medicine, technology, or any other context? *Therapeutic targeting of mitochondrial dysfunction in ageing, neurodegeneration and metabolic disorders.*

If you could discover a miracle cure for one neurological or psychiatric disorder, what would it be? Why? *Religious faith. A bit controversial, but as Laplace is supposed to have said of God, "I have no need for that hypothesis".*

What one memory would you most like to erase? *Hmm. One of the numerous occasions I've opened my mouth and said something I've regretted. eg. Q9!*

What do you think you might be doing if not neuroscience research? *Cooking – it's lab work in the kitchen.*

Do you have an amazing, little known fact about the brain or nervous system, human or animal? *More than 50% of the neurons in the brain are found in the cerebellum, a brain region that comprises only 10% of the total volume.*

BLOGBOX: *Yes if we are to sustain 50% of the population attending university. However, equal access to higher education for all social classes will be impossible. In terms of teaching, if degrees become consumer products, I can see spoon feeding prevailing over independent study.*

Matt Jones is an RCUK Senior Research Fellow in the School of Physiology and Pharmacology at the University of Bristol. His lab works on the network basis of cognition, using tetrode electrodes to record simultaneously from large groups of neurons, in anatomically and functionally related circuits.

What's your favourite bit of the brain, and why? *I don't have favourites – I just want to know how all those bits work together.*

Whose brain do you most admire? *I've not seen many. A composer. Wolfgang Amadeus Mozart will do.*

What is the key thing that first inspired or influenced your decision to go into neuroscience? *Drugs (neuropharmacology, that is): psychoactive compounds and their mechanisms of action fascinate me.*

Describe a typical day at work *Email with a splash of Matlab and a streak of PowerPoint, and hopefully a beautiful new recording or graph from a lab member.*

What one thing do you value or enjoy most about what you do? And the least? *Variety. Bureaucracy.*

What question would you most like to find the answer to in neuroscience? *Are we right? Is this really how the brain works?*

What do you think will be the next big thing in neuroscience, in research, medicine, technology, or any other context? *India.*

What one memory would you most like to erase? *I already got rid of it.*

Name one piece of art (visual, aural, literary, anything) that really tickles your synapses. *Hard Times by Charles Dickens. Hard times are timely.*

What do you think you might be doing if not neuroscience research? *Making rubbish music that I'm very proud of.*

BLOGBOX: *No. By allowing common sense, decency and a long-term view beyond vote winning to outshine private financial and political agendas? It seems there's a lack of public money, not a lack of money per se.*

Dr. Una FitzGerald leads the Multiple Sclerosis and Stroke Research group at the National University of Ireland, Galway studying the role of stress to the endoplasmic reticulum in MS.

Whose brain do you most admire? *Ramon y Cajal. And the brain of the cat, dog, lizard, pigeon, chameleon, guinea pig, rat, mouse, tadpole, magpie, and sparrow he studied.*

What is the key thing that first inspired or influenced your decision to go into neuroscience? *My neuroanatomist father Turlough FitzGerald. If you ask him how he's doing, he'll say 'my hippocampus is doing very well, thank you!'*

Describe a typical day at work.*Check email. Grading. Meet PhD student and postdoc. Admire stained brain sections. Contact collaborators. Write manuscript. Lecture. Admin.*

What one thing do you value or enjoy most about what you do? And the least? *I love looking at stained sections of human or rat brain. Hate checking student writing for plagiarism – the results can be depressing!*

What do you think will be the next big thing in neuroscience? *Drugs targeting pericytes to open blood-brain barrier, allowing therapies excluded before from the brain to be used to treat brain disease.*

If you could discover a miracle cure for one neurological or psychiatric disorder, what would it be? Why? *Depression. A curse on so many lives.*

What one memory would you most like to erase? *The memory of my mother starving to death, because Alzheimer's robbed her of her ability to eat. Also, the effect this had on my Dad.*

Name one piece of art that really tickles your synapses. *Slow movement of Shostakovich's piano concerto number 2. Dreamy.*

What do you think you might be doing if not neuroscience research? *Something to do with music. Didn't a recent study show that the brains of professional musicians age more slowly?*

Do you have an amazing, little known fact about the brain or nervous system, human or animal? *If the human optic nerve wasn't myelinated, it would have to be three feet in diameter to achieve the same speed of impulse conduction!*

BLOGBOX: *No. In Ireland and Scotland there are no tuition fees. Many countries pay for higher education via normal income tax. Graduates easily repay the costs of tuition over their working lives. Introducing fees will prevent many people from participating in higher education*

LETTER FROM AMERICA:

FAITH, PHARMACY AND NEUROSCIENCE IN CALIFORNIA

Robert Halliwell

BNA member and 'foreign correspondent' Robert Halliwell reports on the world of American neuroscience from his lab in sunny California.

As the new California Governor, Jerry Brown, wrestles with the first major challenge[1] of his tenure to close the $25.4 billion state deficit, and universities here face funding cutbacks and hiring freezes, the number of pharmacy schools has doubled in the last ten years and may even treble in the near future. This is an amazing phenomenon given the current economic trends and forecasts, but perhaps even more interestingly, many of these new pharmacy schools are faith-based institutions.

In 2002, when I left Durham University to work at the University of the Pacific, School of Pharmacy (the oldest chartered university in California) there were just four pharmacy schools, namely University of California San Francisco (UCSF), University of Southern California (USC), University of the Pacific (UOP) and Western University of Health Sciences. These schools trained around 580 future pharmacists.

Since then, four additional pharmacy schools have opened, including: Loma Linda University School of Pharmacy, a Seventh Day Adventist-based institute; Touro University California School of Pharmacy, a Jewish-sponsored college; and most recently, California North State College of Pharmacy, a for-profit based college. Notably, also due to open in the next couple of years, is the American University of Health Sciences, a Christian-based, minority serving, pharmacy school, and the California Baptist University School of Pharmacy, an evangelical Christian university affiliated with the California Southern Baptist Convention. The final twelve or thirteen Californian schools may ultimately train over 1000 pharmacists per year.

This may be great news for basic and clinical scientists looking for faculty jobs in the next few years because many new academic appointments will have to be made and, traditionally, pharmacy schools are great, supportive environments for neuroscientists to teach and research. However, the reasons behind the significant increase in faith-based pharmacy schools are unclear; do churches need new sources of income to support their ecumenical missions? Or is there a demand for pharmacists-of-faith?

Is this a West Coast phenomenon or is a similar trend developing in other parts of the world, including the UK? The answers to these questions are not clear.

Moreover, what might the impact be of a faith-based school or university on the teaching of, and research in, neuroscience? Will the pineal gland – considered by Descartes to be the seat of the soul - become bigger and more important again? Will potential staff have to be of the same faith as the school or university?

I jest (a little) of course. More importantly, will lecturers be able to teach with complete academic freedom or will they be encouraged to focus on particular topics, such as spiritual neuroscience and neurotheology? Even more critically, will researchers be allowed pursue any line of enquiry, including those into controversial fields, such as embryonic stems cells?

Again, the answers to these questions are not yet clear. However, those who might think of working in such environments may need to consider these questions, before making final decisions on their careers.

For more information on this, and other California phenomena, watch this space for updates!!

1 There are no problems in the Golden State, only challenges and opportunities!!

Aschaeffer

A LIFE ON THE PAGE:

DAVID McALPINE

Anne Cooke

Half Irish lilt, half Australian twang, anyone hearing David McAlpine speak would be hard-pushed to identify his hometown. But for many people even hearing his voice is a struggle; hearing impairment affects millions worldwide – one of them being David himself. Is this why he now studies audition? Where did he acquire his trans-global accent? How did sheet-metal inspire him to do a PhD? And what's brought him from the murder triangle to making people laugh?

David seemingly contemplating the neuroscience of audition, even though, as an undergraduate in 1987, he didn't yet know it would be the focus of his career.

SURVIVING THE MURDER TRIANGLE

SO WHERE DO YOU COME FROM DAVID?
I was born in Belfast, but, when I was seven, my parents, twin brother and I became '£10 poms', taking advantage of an assisted passage scheme to immigrate to Australia. It was very much a working class family - both my parents left school at fourteen - and working class in Perth promised a better quality of life than working class in Belfast.

But my parents never settled. At thirteen I found myself back in Northern Ireland, at a time of great political and economic turmoil. We lived in a new housing estate that was supposed to bridge between a hard-core Loyalist town and a Republican community, bringing people out of the ghettoes into harmonious coexistence; in reality, it ended up a conflict zone known as the Murder Triangle. It was turbulent on the home front too; starting secondary school in an alien education system (uniform! discipline!) with a new baby brother, another on the way and, within a few days, the knowledge we clearly shouldn't have returned.

So at fifteen I was in Perth again. And at eighteen, the day before I started University, my father walked out. I only saw him once again.

A LIFE ON THE PAGE:

DAVID MCALPINE *CONTINUED*

PEARLS OF WISDOM

Allow yourself to be wrong. It gives you the freedom to find out what is true.

A firm grounding in general physiology is essential.

Work with people who share your belief to enjoy doing science

Seek good supervisors and mentors.

When starting out, create a warm, friendly lab, and enjoy the camaraderie. Recognise it's the only time in life you'll get to do interesting work with people of similar age and outlook to yourself.

Ultimately, you can't make students write up their PhD; it's their responsibility.

Get lucky!

HAVING A LAUGH OUTSIDE THE LAB

In the unlikely event that David switches from science, his fall-back career will bring plenty of laughter; in his spare time he does a mean turn as a stand-up comedian, riffing on hearing loss, music and the army. The next chance to catch him in action will be whenever he next persuades someone to give him a gig!

THESPIAN INSPIRATIONS - AND EXPIRATIONS

IT DOESN'T SOUND LIKE AN UPBRINGING TO ENCOURAGE ACADEMIC AMBITION.

WHAT LED YOU INTO SCIENCE?

In Australia I was in *The Gould League's* nature club for kids, but it was watching Jonathan Miller on the BBC's *The Body in Question*, back in Ireland, that really inspired me. I remember him giving a dramatic demonstration about why we need to breathe by slowly depleting his own oxygen levels until he collapsed. In hindsight, knowing his thespian talents, it was probably greatly exaggerated – but it had the desired effect of making me interested in how the body works.

Education in Ireland opened my eyes to science

I did the wrong subjects in my last years at school – this was back in Australia– and did night school in order to get onto a science course at the University of Western Australia. Even then, it wasn't plain sailing. After my dad disappeared, my mum went back to Dublin, and I found myself living alone on a campus where 60% of students had, unlike me, been privately educated. I left after a term.

But I knew I loved science. The insurance office job I got only emphasised that science was everything economics was not; exciting, interesting, stimulating. After a year I restarted University, and this time I thrived.

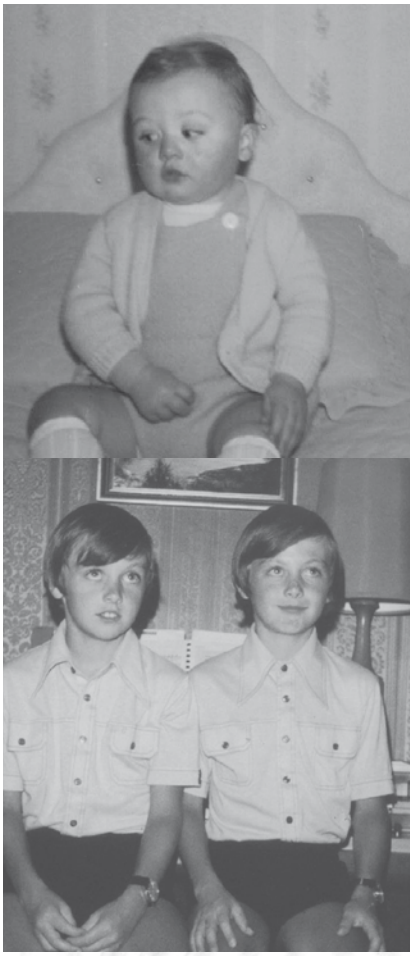
WHY NEUROSCIENCE, AND WHY HEARING?

My dad and uncle were both deaf from working on shipyards without ear protection, and I have tinnitus, but I ended up studying hearing by accident.

I did summer projects with Ian Winter on cisplatinum, an anti-cancer agent which happens to damage outer hair cells in the ear, and with Brian Johnstone in his cochlear mechanics lab. However, the following summer had perhaps greater influence; I took a hard labourer's job in a sheet metal factory where temperatures rose above 50°C. I felt like I had a choice between my dad's working class life, or a career in science. When I walked back onto campus I knew that this was what I wanted. It felt like home.

My dad and uncle were deaf from working on shipyards

After that it was a PhD with David Moore in Oxford, followed by research at Nottingham's Institute of Hearing, and now London, where I am Director of the UCL Ear Institute.



PIVOTAL PEOPLE AND PLACES

WHAT HAS BEEN KEY TO YOUR NEUROSCIENCE CAREER?

I've always been self-motivated but that isn't enough if you don't have any knowledge of what's out there to direct it towards. Being exposed to the disciplined, structured education in Ireland opened my eyes to science in a way that I didn't experience in my more laid-back Perth schools.

The importance of working in an amazing, supportive group of people, and enjoying life to the full. Within eleven months of graduating in Perth, I had got married, moved to the other side of the world, started my PhD and become a father! Oxford was tough; standards were high and I wasn't sure I was good enough. But David Moore ran a warm, sociable lab, and I got into sport. I'm not sure how, but by the end I could do research, and knew what I wanted to study.

Wearing an invisible wrist-band saying, *"What would Alan Palmer do?"* He is a seminal figure for me; everything I learnt in his group in Nottingham informs how I now work.

And a great postdoc in Alan's group, Dan Chang; we really bounced off each other. It was phenomenally productive - fourteen papers in three years. It made my career.

Having said that, if you want 'A Career', don't do science. If you want to do science, do science. I simply couldn't live any other way.

1 Joint author of seminal paper on basilar membrane in 1967

Clockwise from top left: As a baby in Ireland, 1968; With his twin brother (unsure who's who!) With family and friends at the University of Western Australia, 1987; David today; In Australia, 1986; David (possibly right?!) with twin brother, around 1977.

PICKING HOLES IN BAD SCIENCE

Becky McCall

Science thrives on objective criticism of findings and analysis of the evidence, yet media coverage often portrays an over-hyped or distorted version of the truth. Ben Goldacre, author of ***Bad Science****, and winner of the 2010 BNA award for* ***Increasing Public Understanding of Science****, tells us why he is so driven to expose where science and its communication to the public gets it wrong.*

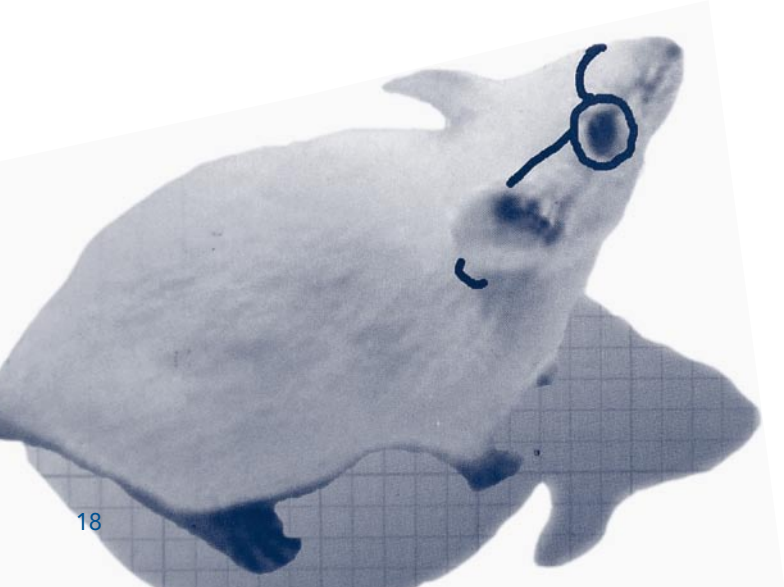
You've received the BNA Award 'Increasing Public Understanding of Science', in honour of your science communication efforts, which encourage people to question claims and media reports. What motivates you in this respect?

Firstly, I find it frustrating that the media so often gets things wrong on the most basic things in science, so it's nice to have an outlet for that [frustration], to put the record straight. But more than that, pointing out where something has been misinterpreted, or over-interpreted, or badly analysed, is an opportunity to talk about the right way to do things. In some respect, writing about 'Bad Science' is just a gimmick for normal straight-up science communication work.

It's also a good way to show people how real science works - by critical appraisal, by reviewing and critically analysing the evidence for someone's position. Picking holes in someone's case isn't a mean thing to do, or a weird aberration, it's what science is all about.

Do you think the general public is too willing to unquestionably believe science they read about in the mass media?

I'm not so sure: I think everyone reads newspapers differently. If anything, one problem now is that people know the media have misled them on so much, that some people are disinclined to believe anything they read, and have a kind of undifferentiated cynicism. I can absolutely understand where that comes from. The response to it is to think about what good alternative sources of information there are to mainstream media.



How do you choose which piece of science is next in the firing line?

A mix of things. It has to be something that's not just wrong, but interestingly wrong: there has to be the opportunity to explain a point of science, whether it's something simple like cherry picking, or something a bit trickier like Bonferroni's correction for multiple statistical comparisons. I don't worry about whether things are topical; I see my role as more to write about things that other people don't write about.

How should journalists communicate science in lay terms without sacrificing scientific accuracy?

There is not a one line answer to that. One important thing is to have a high opinion of your audience; not everything has to be dumbed-down. Sports coverage is technical, and there for people who are interested in sport. I think it's OK for science coverage to be like that sometimes too.

There are a lot of people - technically I'd refer to them as morons - who hear you suggest that, and fantasise you're suggesting there should never be any accessible material. Obviously that's foolish. What you need is diversity.

Your 'Bad Science' career has naturally been built upon exposing rogue science, but can you highlight an example of science in the public arena which you feel is well-communicated and as a result has enhanced public understanding of the topic?

I think the closer a piece of science reporting gets to something relevant to people's everyday lives, the more likely it is to be reported misleadingly: gender relations, health, personal psychology, or whatever. In general, the really abstract, pure science things tend to be reported straight.

Do you see yourself as more of a media personality or a doctor these days?

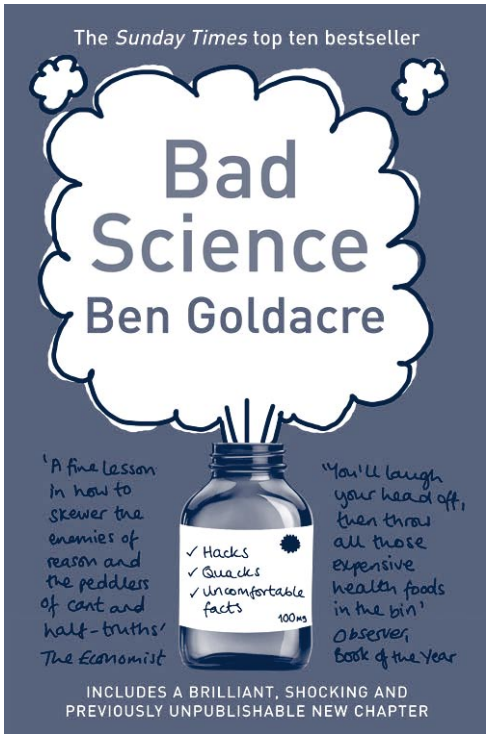
God, neither. Just like we say, "a person with diabetes" rather than, "a diabetic", I don't think it's helpful to label anyone by a role. It's actually something you have to be really careful about: once you get known for writing and broadcasting about things, people start to ask you on to radio and telly to talk about everything under the sun. I think it's important to resist that: you can see people who haven't, and I'm sorry to say they're not a hugely admirable spectacle.

How would you like to see communication of science with the public improved?

The most important thing is to get academics doing more unmediated direct public engagement. Start a blog, write a post about an interesting presentation, get someone to make a 5 minute video of you rambling on about your favourite paper out this month (by someone else, it feels weird talking about your own...)

If you have a story to tell to the public, put it out there yourself.

Ben Goldacre's book Bad Science is widely available, ISBN-10: 000728487X; his website can be found at: badscience.net



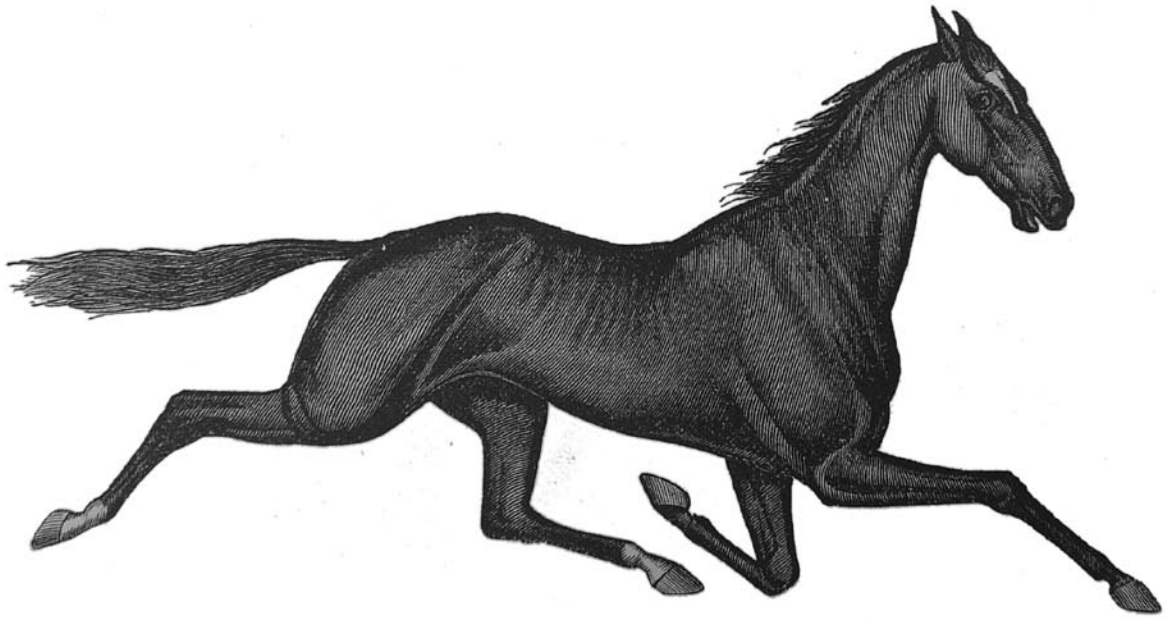
Ben Goldacre explains 'bad science' through public talks (above left) as well as via his best-selling book (above right), work that the BNA acknowledged by presenting him with the prize for public understanding (above, with Trevor Robbins, David Nutt and Richard Morris)

THE LEGEND OF THE BLACK HORSE

OR HOW THE BNA CONTRIBUTED TO THE BIRTH OF NEUROSCIENCE OVER A PINT IN A LONDON PUB

Joelle M. Abi-Rached, Anne Cooke and Steven Rose

Joelle Abi-Rached[1], a History of Science PhD student at Harvard, and Steven Rose, well-known researcher, broadcaster, author, political activist and one of the founding fathers of the BNA, recount how its birth marked a key moment in time for neuroscience worldwide



Free love, the moon landing, and the assassination of John F. Kennedy all mark the 1960s as a decade of change. And significant change was also afoot in the long history of brain science for, in the 1960s, a new type of interdisciplinary science gained an official name: neuroscience.

Neuroscience first saw the day of light under the name of the 'Neurosciences Research Program' or NRP. Founded in 1962 by American biophysicist Francis O. Schmitt, the NRP was predecessor to the American Society for Neuroscience, the world's largest organisation dedicated to neuroscience today.

In Britain, meanwhile, the first organisation that could lay claim to being dedicated to neuroscience was the Brain Research Association (BRA) formally founded in London in 1968. Although not, yet, neuroscience by name, the BRA shared the ethos of the American NRP, namely to promote multidisciplinarity and collaboration across the brain sciences.

Yet the BRA came from very humble beginnings. It started as an eclectic group of like-minded scientists – not yet neuroscientists – who would gather at the Black Horse pub in Rathbone Place, London, to discuss topics that cut across different disciplines in brain science (see box).

During the mid-1960s this 'London Black Horse Group' actively promoted neuroscience in the UK, organizing conferences and workshops, acting as a lobby group, promoting new courses, degrees, centres and chairs in the neurosciences and gradually engaging in the ethical and social implications emerging from this new field of research.

It wasn't until three decades later, in 1996, that BRA became the British Neuroscience Association. The linguistic mutation from 'brain' to 'neuroscience' is an illuminating moment in the history of the BNA (and brain research more broadly) for it reflects the rise of neuroscience in both scientific and popular imaginations. Indeed the new century, on the cusp of which this mutation took place, was heralded as 'the century of neuroscience'.[2]

And now? Fifteen years on, the BNA is again making significant change. Outwardly this can be seen in the new logo. As for more... come to Harrogate 2011 to find out!

1 Joelle has written the much fuller, fascinating account: From brain to neuro: the BRA and the making of British neuroscience, 1965-1996 in the Journal of the History of the Neurosciences. jabi@fas.harvard.edu

2 Kandel, E.R. 1999. Biology and the future of psychoanalysis: a new intellectual framework for psychiatry revisited. Am J Psychiatry 156(4): 505-24; Jacob, F. 1998. Of Flies, Mice and Men Cambridge, Mass, Harvard University Press.

It was back in the dark ages of the mid 1960s. The word neuroscience was almost unheard of – we were neurochemists, neurophysiologists, neuroanatomists, scattered through the various departments of the London colleges. We were well used to the technical seminars in our own specialist departments, each on a highly specific microdetail of some brain process, structure or molecule. But somehow the grander picture – the reason why we had chosen to study brains and not livers or toenails – was lacking.

A group of us – some half dozen postdocs and young lecturers - decided we could do something better. Between us we assembled a mailing list of all the brain scientists and departments in the London area and called a meeting to plan a London-wide seminar series. The idea would be that we would choose a broad topic such as memory, or pain and invite three or four speakers from different disciplines to approach it each from their own perspective. There were to be two rules; eschew technical jargon so that disciplinary divides could be bridged; and no professors or heads of department so we would not feel intimidated.

If I remember rightly the first meeting was held in a lecture theatre in UCL, where it was immediately apparent that we needed a third rule – to meet in a more convivial place. We chose a meeting room in a pub in Rathbone Place just off Oxford Street, with beer on tap, and the meetings grew wings and flew.

Soon similar groups took off in other university cities, and from the London discussion group we became the BRA. Our informality was only marginally affected when the much lamented Pat Wall joined us, just back from the US in protest against the Vietnam war and the controller of a small grant intended to foster communication amongst neuroscientists.

Of course we became more established, though we fobbed off an attempt to turn us into a subsidiary of the International Brain Research Organisation. But we knew we had finally become respectable when a group of younger women published a spoof article in New Scientist proposing a rival outfit to the BRA, with the acronym JOCKSTRAP.

In due course the young postdocs and lecturers became professors in their turn, and in even due-er course grew old and retired.

Our legacy is the BNA. Santé!

FOUNDERS OF THE BLACK HORSE GROUP

Steven Rose
John Lagnado
John Dobbing (1922-99)
Robert Balázs

LATER JOINED BY:
Chris R. Evans
Patrick (Pat) Wall

Top right: the BNA logo old (l) and new (r)

Right: The Black Horse pub in Rathbone Place, London, where the seeds of BNA were sown.

COGNITIVE RETAIL

Francis McGlone

Having recently returned to academia from a job in industry, Francis McGlone describes how those wishing to pursue their own passions in basic brain research can do so - with impact – by working alongside industry.

The company I worked for was in the Fast Moving Consumer Goods (FMCG) sector, a term used to describe consumer products that are used day-to-day by most of the ~6.8 billion Homo sapiens on our planet. It had a visionary approach to R&D in that it separated a portion of its global R&D budget (~£30M per annum) away from the direct control of the business, allocating it instead to grow new fields of research. As such, it provided a fantastic opportunity to 'think big and think long'.

Previously, I had been senior neuroscientist at the Pain Research Institute in Liverpool, where basic scientists worked alongside clinicians to understand chronic neuropathic pain. Pain research demands a multidisciplinary approach, from molecular neurobiology all the way through to systems of belief; it is only by addressing mechanisms of sensation, perception and behaviour, neuronal signalling, synaptic plasticity, and integrative aspects of nervous system function that we can begin to understand the neuroscience behind it. This taught me the power of converging methodologies and interdisciplinarity. I didn't realise it at the time, but the experience I gained in Liverpool provided the modus operandi for how I went on to build a cognitive neuroscience group in an FMCG company.

After leaving Liverpool it took a few months, and many hours playing patience on my PC, to discover the *raison d'etre* for my existence in this strange environment of industry research. My eureka moment was to bring an interdisciplinary, systems-approach to studying the ubiquitous human consuming behaviours that lie at the heart of an FMCG company - *grooming, feeding and foraging (shopping)*. As I saw it, these neurosensory, perceptual, cognitive and affective processes underpinned and sustained the company's global business.

I reasoned that the products people purchase (forage for) to groom with and to feed with are not selected solely on the basis of their functional properties, but because of their rewarding properties – they are both wanted and liked! Traditionally, the company had tried to measure 'liking' by way of focus groups, consumer panels, questionnaires, market research etc. To my mind, this was archaic, flawed and largely pointless. What was needed was evidence-based ways of understanding why people like/dislike the things they purchase. My focus therefore shifted from understanding the mechanisms of pain, to those of pleasure.

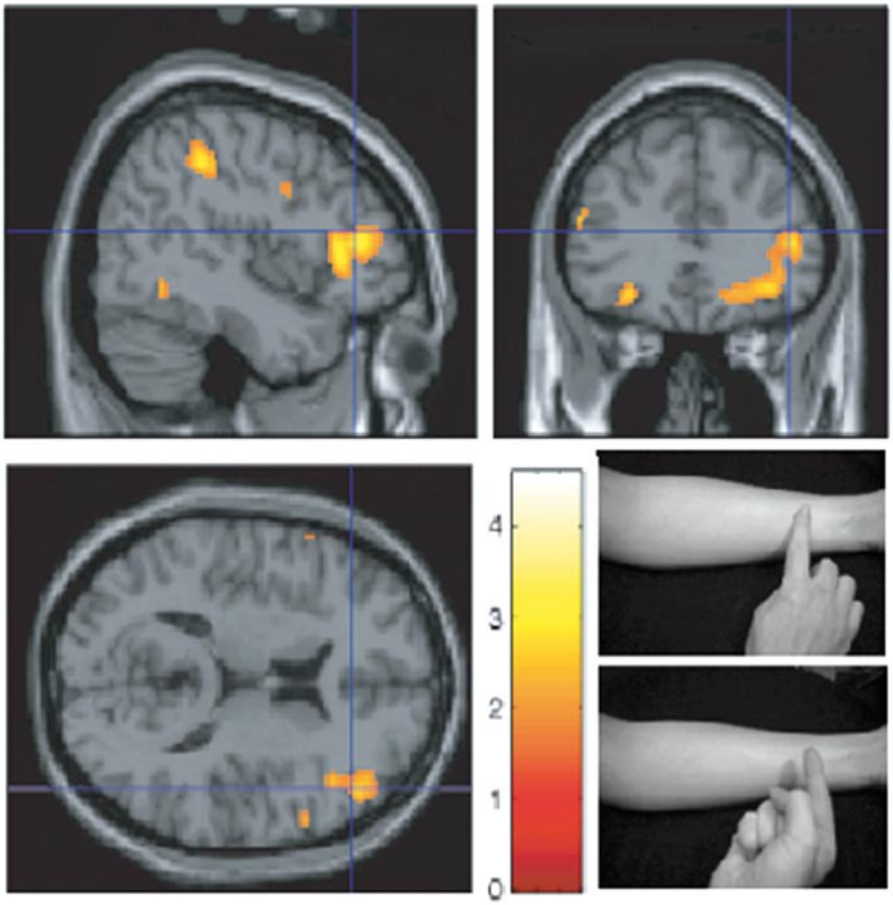
Building a new science-base required establishing, and funding, a global network of academic research collaborations so that high calibre science could address the complex neurobiological and behavioural drivers of the aforementioned behaviours. This reliance on 'orchestrating' across disciplines in brain and behavioural sciences in pursuit of a common goal further reinforced my experience of, and belief in, the power of interdisciplinarity and convergence.

An example of how this model operated is research we carried out into mechanisms of positive skin sensations – the surface where grooming products are applied. Sense of touch (touch, temperature, pain/itch) is now recognised as important in affective, affiliative and social aspects of social communication. Through research funded thanks to grooming products, we provided a significant scientific contribution to understanding social communication; we studied the taxonomy of cutaneous c-fibres, characterising a population that are not nociceptors or puriceptors, but respond optimally to low force and velocity (stroking/caressing) stimulation, inducing a state of pleasure - hedonoceptors. They code for the pleasant aspects of affiliative and social touch – the reason grooming is pleasurable…

Much of this research required the skills of academic institutions (and there are many more examples of how we as neuroscientists have transferable knowledge for industry). Nurturing links with industry in this way can provide much needed research funding that has a 'double-impact' – we, as academics, get to do original research, and industry gets to innovate new products.

My task was to find why people consume products even if they don't know why they like them – they just do. By assessing cognitive behaviour underlying the joys of retail therapy I found my research not only helped understand consumers, but also understand the brain.

THERAPY



The cartoon above shows how neuroscience can be used to design products that people really like by understanding the underlying brain and behavioural processes, from initial product selection, to final use. Artwork by Nick Anderson

PET imaging (left) shows the difference in brain activation between the sight of the arm being touched by an experimenter's finger,vs the sight of the arm not being touched (in that the experimenter's finger was moved, inverted, and 1 cm above the image of the arm, as shown in photo). (See McCabe,Rolls,and McGlone. SCAN (2008) 3, 97–108)

How did you celebrate Brain Awareness Week 2011?

Neuroscientists from Bristol Neuroscience used swimming hats and model brains, plus excellent facilities in the new *All about us* exhibition at science centre At-Bristol, to describe how different parts of our brain do different things.

Send your photos to:
BNA-editor@bristol.ac.uk
for inclusion in the next edition of the Bulletin.

THE BRAINS OF BABES

HOW A CHILD'S BRAIN DEVELOPS A SENSE OF SELF

Robin Ince and Bruce Hood

When stand-up, television, radio and theatre star Robin Ince (Mock the Week, The Office, The Infinite Monkey Cage, amongst many others) - became a father, he found himself entranced; what astonishing transformations take place in a baby's brain to create a sense of self, personality, free will? Here Robin's thoughts are followed by those of Professor Bruce Hood, expert in cognitive development, and equally captivated by the amazing human brain

'Real human brain from At-Bristol's All About Us exhibition.'

Just as I started mulling over the medulla oblongata, hippocampus and corpus collosum in my skull a suitable experimental subject became available: my son.

Robin Ince

After some years of exuberantly frittering away my life in the arts, or at least the lowly version of them that is embodied by TV and comedy clubs, I became excited by science again. Initially it was the science of outer space; the wonders of the cosmos, pulsars, black holes and dark matter. After reading Carl Sagan's *Dragons of Eden*, I became inward looking. I started wondering about our brains. It seemed strange to me that, having been conscious for the majority of my life I was only just beginning to think about consciousness.

Just as I started mulling over the medulla oblongata, hippocampus and corpus collosum in my skull a suitable experimental subject became available: my son. I think the early part of the twentieth century had enough children having fear of fluffy animals instilled in them by intrigued psychologists and my wife wasn't too keen on me manufacturing a fearsome wire mesh version of her, so I've made do with the joy of watching his mind develop without experimental intrusion or control group.

I am always astonished by parents who shout at their children as if their brains are fully developed with altruism and empathy when they've only just realised the reflection in the mirror is them. They seem like a Las Vegas magician believing he can teach a tiger love and respect and are then surprised when it tries to eat them.

As he grows I wonder how his inner monologue is babbling. How much dialogue remains in his skull and what comes out of his mouth? When did our planning and plot hatching spend most of its time inside? If I am upset when he says, *"I don't like you"*, I soon realise that he is

THE BRAINS OF BABES *CONTINUED*

just at the honest stage of existence. As we grow older, we let our feelings fester inside our head, attempting to rid ourselves of ill-feeling with aggressive gardening or the kicking of an inanimate object.

I worry about when self-consciousness teeters into an embarrassed self-awareness and knowledge of shame that can hamper you for the rest of your life. Does blushing come with empathy? At two and a half he can sit in the middle of a room on his potty, surrounded by family members, and eat crisps while enjoying Numberjacks, this reckless gregariousness will go with a blush.

I wonder if it would it be an improvement to be a lowly beast, hard-wired to fight for survival, without reason or self-awareness? Does a lowlier mind take away the pain of existence?

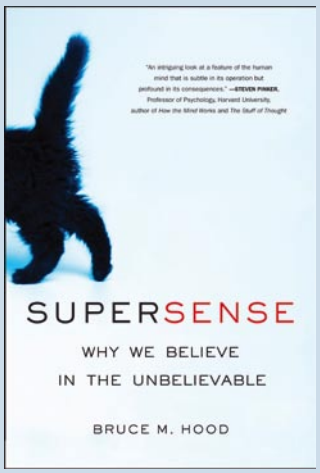
Parents experience a joy when they see their child looking in a mirror and realising for the first time that it is seeing its own reflection. For sometime the mirror is a plaything, but when does the child see its reflection and no longer laugh at it, but instead see every possible imperfection and sag?

I ask myself what difference my interaction with my son makes. The old Jesuit maxim of the first seven years of experience creating the adult, though perhaps not exact, holds some truth. In the world of comedy, I know enough people whose early childhood experiences have scarred them enough to spend the rest of their lives showing off to a load of strangers who they hope will like or even love them. Will teaching him to recognise Charles Darwin and Tycho Brahe when he was two years old lead to him having psychosomatic stomach aches or having an intense wish to have a gold nose (astronomer Tycho Brahe lost his original nose in a duel)?

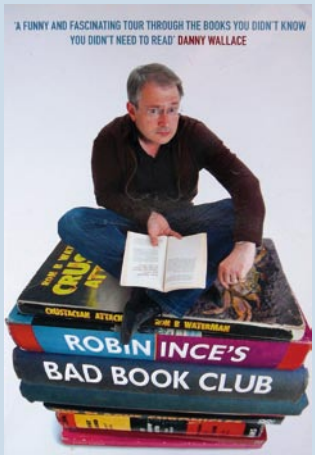
Should I excuse some of his more hideous behaviour because I have decided that free will is an illusion after scant reading of Benjamin Libet? At what age is it correct to bring up with your child the possibility of free will being an illusion, is it about the same time you bring up many worlds theory and inform him that he is just one self of a staggering many living in a multitude of universes that are slightly different? In one of these universes his father decided not to bring up free will being an illusion, but we can't be sure what the outcome was.

Perhaps I'll just wait until his fifth birthday to explain, with a précis of Frances Crick, that he's just a bundle of neurons and then we'll take it from there.

Bruce (left) and Robin at *The Amazing Meeting,* London 2010.



Bruce Hood is director of the Bristol Cognitive Development Centre and the author of *SuperSense: From superstition to religion – the brain science of belief* and the forthcoming *The Self Illusion: How the developing brain creates the 'you' inside your head.*



You can catch Robin on his Bad Book Club Tour, extended to the end of April, and the Uncaged Monkeys National Tour 2011, when the 'finest names in science broadcasting… talk of dark matter, black holes, Bonobo apes, the big bang and anything else they can cram into two hours.' - see robinince.com.

Bruce Hood

Where does the self come from? I have been pondering that question for some time and trying to consider the answer from a developmental cognitive neuroscience perspective. Of all the different animals on this little blue dot of a planet, humans are the one species that spend the longest proportion of their lives as children dependent on adults. This long period of child rearing enables us to transmit information from one generation to the next but ultimately, I believe, to provide the social environment where we begin to construct the self.

At the neuronal level, two processes work to shape the developing brain.

We used to describe young children as solitary little scientists testing out the world around them, but the past 30 years of research have shown that children are more like apprentices, eager to learn from others. This new pedagogical stance to understanding cognitive development considers how learning is best achieved in a social context.

Much of this social learning is facilitated by mechanisms that optimize the amount of attention young children pay to adults and vice versa. At the neuronal level, two complimentary processes are at work to shape the developing brain. The first is a constructive process that expands the connectivity and communication between networks of neurons providing the potential scaffolding for experience to impact on our nervous system. The second is a destructive pruning process that cleaves away those connections that are not reinforced by excitation. In this way, experience sculpts the architecture of the brain in a neuronal "use it, or lose it" struggle.

Of all animals, humans spend the longest proportion of life as children dependent on adults.

A recent account highlights the role of a class of spindle neurons, Von Economo neurons.

One recent account of social learning highlights the role of a special class of spindle neurons, called Von Economo neurons. Spindle neurons consist of a very large bipolar neuron that is found only in the frontoinsular and anterior cingulate cortex and may provide the interconnection between brain regions that are activated by social learning. Spindle neurons are thought to work by keeping track of social experiences, leading to a rapid appreciation of similar situations in the future. They provide the basis of social learning as part of a mirroring system when we watch and copy others.

So far, humans seem to have the biggest population of spindle neurons located in the frontoinsular and anterior cingulate cortex areas but they have also been found in species that are particularly social, including all the great apes, as well as whales and dolphins – species that also spend relatively prolonged periods rearing their young.

In humans, it may be no coincidence that the density of spindle neurons increases from infancy to reach adult levels somewhere around the fourth birthday, a time when most child development experts agree that there is noticeable change in social skills. Our "self" may be substantiated in a developing neural architecture of the brain, but it is one that is dependent on an environment of other brains to survive.

TRIPLE GODDESS OF THE NIGHT

Anna Ger and Dmitri Ger

Despite being banned in the 1960s, open-minded scientists always saw the potential of using psychoactive compounds in neuroscience research. One of them, Alexandr Shulgin, inspired Anna and Dmitri to carry out the work described to ***Bulletin*** *readers below.*

What do we know about the application of psychoactive drugs in modern neuroscience? We believe that their potential is being overlooked. Partly, this is historic; psychoactive substances such as 5-HT receptor agonists (see glossary) stopped in the 1960's after the US government announced that the nation was becoming addicted to LSD. Now, however, there is increasing interest in applying such substances to treat anxiety and depression. And we should not underestimate the potential benefit of using them in neuroscience research, too.

To make chemical synthesis more interesting, sophisticated and accessible, and help people see the beauty of chemistry art, we have linked synthesis of a new compound with Greek mythology.

Selene, *Hecate* and *Artemida* are, in Greek mythology, goddesses of The Moon. *Selene* is the bright side while *Hecate* is the dark, chthonic side. Together, they are a complete whole - The Moon - but they are different sides of the same coin, antagonistic in nature.

While researching homologues of 2,5-Dimetoxy-4-methylphenylisopropylamine (DOM) Shulgin drew interesting analogies. There are nineteen hydrogen atoms in DOM. Nine hydrogen atoms are uniquely identifiable: they have strict spatial position in the molecule. The remaining ten atoms appear to be 'duplicates' of the unique nine (fig 1).

Shulgin decided to prove the uniqueness of each of the nine hydrogen positions by substituting each hydrogen for a methyl group in turn. As a result, nine new compounds were produced, which Shulgin then baptised with ten classical women's names:

1 1-(2,5-Dimethoxy-4-methylphenyl)-2-aminobutane – **Ariadne**

2 N-Methyl-1-(2,5-Dimethoxy-4-methylphenyl)-2-aminopropane – **Beatrice**

3 1-(2,5-Dimethoxy-4-methylphenyl)-2-amino-2-methylpropane – **Charmian**

4. threo-1-(2,5-Dimethoxy-4-methylphenyl)-1-methyl-2-aminopropane - **Daphne**

5 erythro-1-(2,5-Dimethoxy-4-methylphenyl)- 1-methyl 2-aminopropane – **Elvira**

6 1-(2-Ethoxy-4-methyl-5-methoxyphenyl)-2-aminopropane – **Florence**

7 1-(2,5-Dimethoxy-3,4-dimethylphenyl)-2-aminopropane – **Ganesha**

8 1-(2,5-Dimethoxy-4-ethylphenyl)-2-aminopropane – **Hecate**

9 1-(5-Ethoxy-4-methyl-2-methoxyphenyl)-2-aminopropane – **Iris**

10 1-(2,5-Dimethoxy-4,6-dimethylphenyl)-2-aminopropane - **Juno**

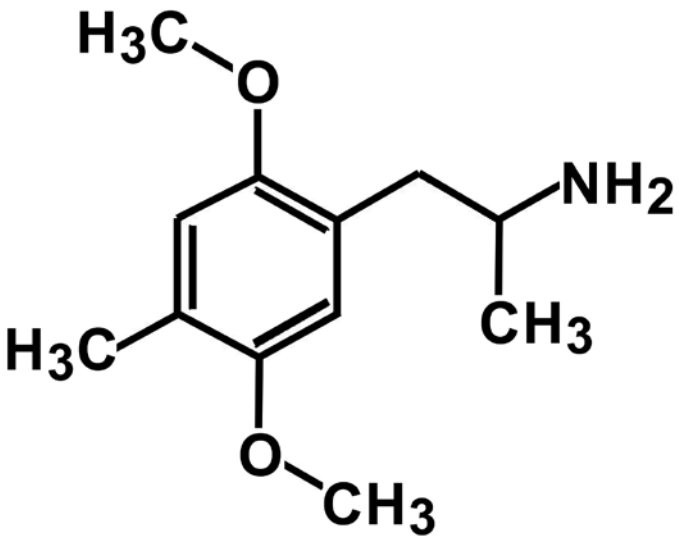


Figure 1: 2,5-Dimetoxy-4-methylphenylisopropylamine (DOM)

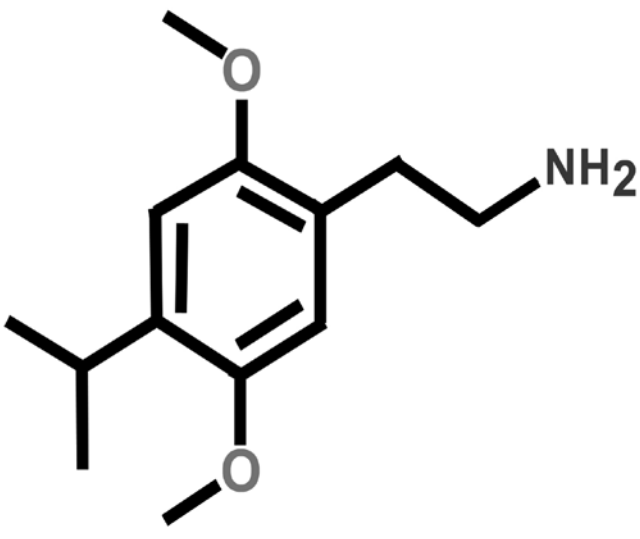


Figure 2: Jelena

Hecate, the Greco-Roman goddess of the dark side of the moon, was often depicted as a three-faced figure and was associated with many things including protector of medicine and drug design.

GLOSSARY

Serotonin: CNS neurotransmitter Involved in mood and sleep regulation

Agonist: chemical which mimics endogenous substances (e.g. neurotransmitters), acts on receptors and triggers intracellular responses

5-HT: 5-hydroxitryptamine (another name for serotonin)

LSD: Lysergic acid diethylamide, psychoactive substance known as 'acid'

Alexandr Shulgin: American chemist and pharmacologist, author of 'TIHKAL', 'PIHKAL'.

Homologue: chemical compound belonging to specific series of compounds that usually differ by just 1 unit (usually CH2)

Isomer: chemical substance with the same chemical formula but different orientation of atoms

TRIPLE GODDESS OF THE NIGHT
CONTINUED

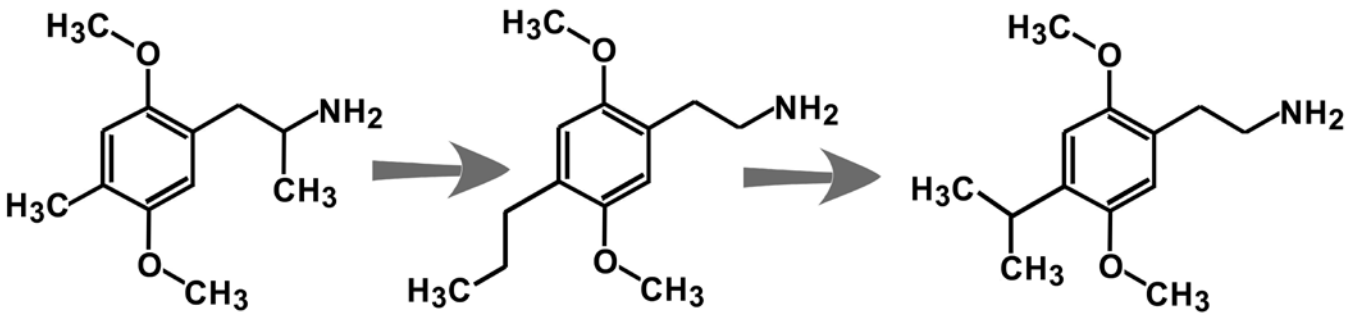


Figure 3: Hecate to Selene: and from Selene to Jelena

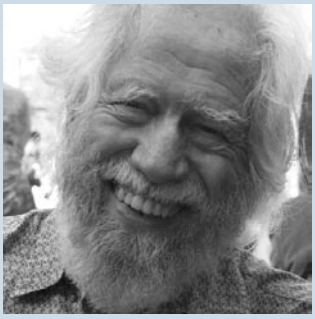
But why are there ten compounds, and therefore ladies, when there are only *nine* unique hydrogens?

Our suggestion is that Shulgin's approach is not strictly scientific, but also creative. Ten compounds were produced because he put one substance in form of two optical forms of isomers: *Daphne-Elvira*. Probably he did it to keep beauty and balance, choosing to ignore that almost all these compounds (except *Charmian*) might be paired by optical isomers (doing so would be chaotic, not the "ten classical ladies" he aspired to create).

The real list, therefore, includes only nine compounds: **Ariadne, Beatrice, Charmian, Daphne, Elvira, Florence, Ganesha, Hecate, Iris.**

We decided it was time to re-establish the balance, and use our own methods to bring a tenth lady back to the group.

Our resultant new compound has an isopropyl 'tail' on the fourth position, making 1-(2,5-Dimethoxy-4-isopropylphenyl)-2-aminoethane. This new tenth lady also happens to be structural isomer of all other nine ladies. Our tenth lady has never been mentioned anywhere as it never previously existed. We cannot keep our compound without a name. We got rid of Juno, and it will be logical to use J, so let us call it *Jelena* (fig 2).



Jon Hanna

This work is dedicated to Alexandr Shulgin on the occasion of his 85th birthday.

Back to mythology. If *Selene* and *Hecate* are two antipodes of the Moon we could apply this to the chemistry and find an antipode of the *Hecate* molecule (Shulgin's eighth lady). For this purpose let's remove the methyl group from *Hecate*, the propyl 'tail', and place it on the opposite side: on the ethyl 'tail'. As a result we have a compound which was mentioned in Shulgin's "PIHKAL" as 2C-P. It would be logical to call 2C-P *Selene* as it is chemical analogue and contrast to Hecate.

In some sources *Jelena* is mentioned as the root of the name *Selene*, therefore *Jelena* is *Selene's* derivative. Let's apply some shamanism and turn *Selene's* 4-propyl 'tail' into 4-isopropyl *Jelena's* 'tail' - the new molecule is produced (Fig 3).

Try looking at psychoactive substances from another perspective; people perceived psychedelics as absolute evil but, by looking from a different point of view, they are now discovering the intrinsic usefulness and beauty of these substances. Hecate was always treated as a dark cursing goddess. Look closer and you will see the beauty of *Selene* and mystery of *Jelena* too.

It is worth mentioning that our work was also guided by *Hecate*; as protectress of medicine and drug design her presence is a benign blessing for much of today's neuroscience research.

With thanks to Oleg Golubev for assistance with chemical structures in figs 1-3.

MENTAL WORKOUT

Jemma Ransom

Pounding away in the gym, Jemma Ransom found herself pondering on exercise and the brain. Why do we get an 'exercise high'? Does physical fitness keep our brain healthy too?

Mike Baird

In the midst of Christmas over-indulgence I expect many of us considered what New Year resolutions we would set for 2011. I was one such person, and my chosen goal was fitness. So it was that I found myself at 6:30am, in the dark cold of a January morning, with gym membership card in hand and new training shoes in tow, bounding energetically towards the nearest exercise bike.

To my surprise, I was not the only one to be found working out at such an unreasonable hour; several aspiring Linford Christies were limbering up on neighbouring treadmills. So what is it that keeps more seasoned fitness enthusiasts as keen as new-comers like me? What keeps motivation high throughout the year?

The mood enhancing effects of exercise have long been reported anecdotally; the so-called 'exercise high' is by no means a new phenomenon. How do these effects of exercise relate to what goes on in the brain? Could a better understanding of the link between physical fitness and the brain have therapeutic value?

The most robust change that occurs in the brains of physically active individuals is in an increase in the volume of the hippocampus, a region associated with learning and memory. Recent imaging studies have found a positive association between the volume of the hippocampus and aerobic fitness. In elderly subjects, higher fitness levels were found to correspond to larger hippocampal volumes. Furthermore, in these individuals, hippocampal volume also correlated with greater spatial memory performance compared to individuals with lower fitness levels[1]. A similar effect was found amongst a cohort of preadolescent children, suggesting that exercise is of benefit to learning and memory across the human life span[2]. Results from human brain imaging studies have been backed up

MENTAL WORKOUT *CONTINUED*

unequivocally in rodent models. Wheel-running, a paradigm considered to mimic voluntary exercise in humans, increases cell survival and neurogenesis in the dentate gyrus region of the hippocampus[3].

Given the effect on the structure and function of the hippocampus, many researchers have asked whether exercise may have therapeutic potential for depression and Alzheimer's disease, conditions in which the hippocampus atrophies as part of the pathological process. Here the evidence is more controversial.

Several authors have found mild positive effects of exercise in clinically depressed populations[4 5] . In the elderly, a positive effect comparable to that achieved with antidepressant treatment has been observed in group exercise classes[6]. However the physiological mechanisms by which these effects occur, and the type and 'dose' of exercise required, are unknown.

It is widely reported that people who are more active in early and mid-life are less likely to develop dementia in old age. Moreover, physical activity in the elderly is associated with a reduced rate of cognitive decline[7]. Elderly individuals who engage in physical activity have lower levels of Alzheimer's disease biomarkers, including tau protein and ß-amyloid, in their cerebrospinal fluid[8]. Additionally, in a transgenic mouse model, treadmill running was found to alleviate learning and memory decline, an effect paralleled by an enhancement in long term potentiation[9]. It is likely that aerobic exercise throughout life reduces the risk of developing dementia in old-age, and guidelines given by the National Institute for Clinical Excellence (NICE) recommend physical activity as a parallel intervention in Alzheimer's disease.

Exercise has benefits for the whole body, and whilst its therapeutic potential in psychological and neurodegenerative diseases remains controversial, it is clear that physical fitness has a positive effect on our brains in both improving our mood, and enhancing learning and memory.

So, as I rejoin my fellow athletes in the gym tomorrow morning, I can rest assured that the early start to my day is well worth the effort.

1 Erickson K.I.,et al. (2009) Hippocampus. 19: 1030–1039

2 Chaddock L., et al. (2010) Brain Research. 1358: 172-183

3 Clark P.J., et al. (2011) Genes, Brain, and Behaviour

4 Mead G.E., et al. (2010) The Cochrane Collaboration. Issue 1

5 Sjösten N., Kivelä S.L. (2006) International journal of Geriatric Psychiatry. 21: 410-418

6 Blumenthal J.A., et al. (2007) Psychosomatic Medicine. 69: 587-596

7 Lautenschlager NT et al. (2008) JAMA. 300:1027–1037

8 Liang K.Y. et al. (2010) Annals of Neurology. 68: 311-318

9 Hui-li Liu, et al. (2010) Behavioural Brain Research

University of Bristol

PMS, PROZAC, AND CONSPIRACIES

Hanno Koppel

Amongst the 'moody blues' discussed at BNA's symposium at the British Science Festival 2010 (see p 38) , pre-menstrual syndrome - or PMS - and its treatment with Prozac stirred up strong opinions in national press. Could popping a pill spell the end for 'that time of the month'?

Thelma Lovick speaking at the BNA's 'Moody Blues' event at the British Science Festival in Birmingham

When a report proposing a biological mechanism behind pre-menstrual syndrome (PMS) and its treatment with Prozac was published by Dr Thelma Lovick[1] and her team at the University of Birmingham, it caused a commotion in the press.

Why the controversy?

Perhaps the quote by Tim Kendall, Deputy Director of Research at the Royal College of Psychiatrists, goes some way towards an explanation; his comment that, *"PMS makes a lot of women quite miserable…"*[2] implies it is merely a trifling, female concern, not worthy of serious research. Secondly, with the proposal to treat it with Prozac, the universal panacea[3] for our time, it is understandable (though probably not acceptable) why some relegate Lovick's work to addressing trivial complaints of the worried well.

Actually, PMS is not trivial. It does not make you 'quite miserable' nor is it confined to 'a lot' of people. Millions suffer from PMS, often in debilitating and even frightening ways, and anything that may reduce the causes is worthy of serious consideration.

The symptoms of PMS seem to arise when levels of a steroid, allopregnanolone (ALLO), drop. This is because ALLO is involved in inhibiting the activity of emotion circuitry. Levels of ALLO fall premenstrually, and so, in the absence of its inhibiting effects, emotions - especially anger, aggression and irritability - rise.

The effects of fluoxetine (the active ingredient of Prozac) on ALLO levels have been known for some time[4]. What Lovick and her team report[5] is that in their rat model for PMS, low levels of fluoxetine (a tenth that used to treat depression), administered for a very short time, reversed the signs of anxiety, increased pain and heightened sensitivity shown by rats in their equivalent of the premenstrual stage.

Professor Nikolas Rose, a sociologist at the London School of Economics, believes that the dose levels of Prozac used in this way, *"sits badly with what is known of the mode of action of these drugs,"*[6] and Dr Kendall is concerned that women who choose to self-medicate with fluoxetine are likely to suffer from its side-effects; sexual dysfunction, lowered libido, impotence, poor sleep anxiety and appetite loss. Moreover fluoxetine, particularly used by people under the age of thirty, has been reported as triggering suicidal thoughts and self-harm[7].

However, Dr Kendall's concerns do not relate to the low dose and very short-term use of fluoxetine for the treatment of PMS as suggested by Lovick, and self-medication is not a common problem with prescription medications.

A conundrum that does not seem to have been explored is the effects of the higher, antidepressant, dose of fluoxetine on PMS; after all, there will be a very large number of women in the population who already take fluoxetine for depression. It would be interesting to see if this group has less PMS than a similar group not taking the antidepressant – although, as the dose and regime are different, there may be no connection.

PMS, PROZAC, AND CONSPIRACIES

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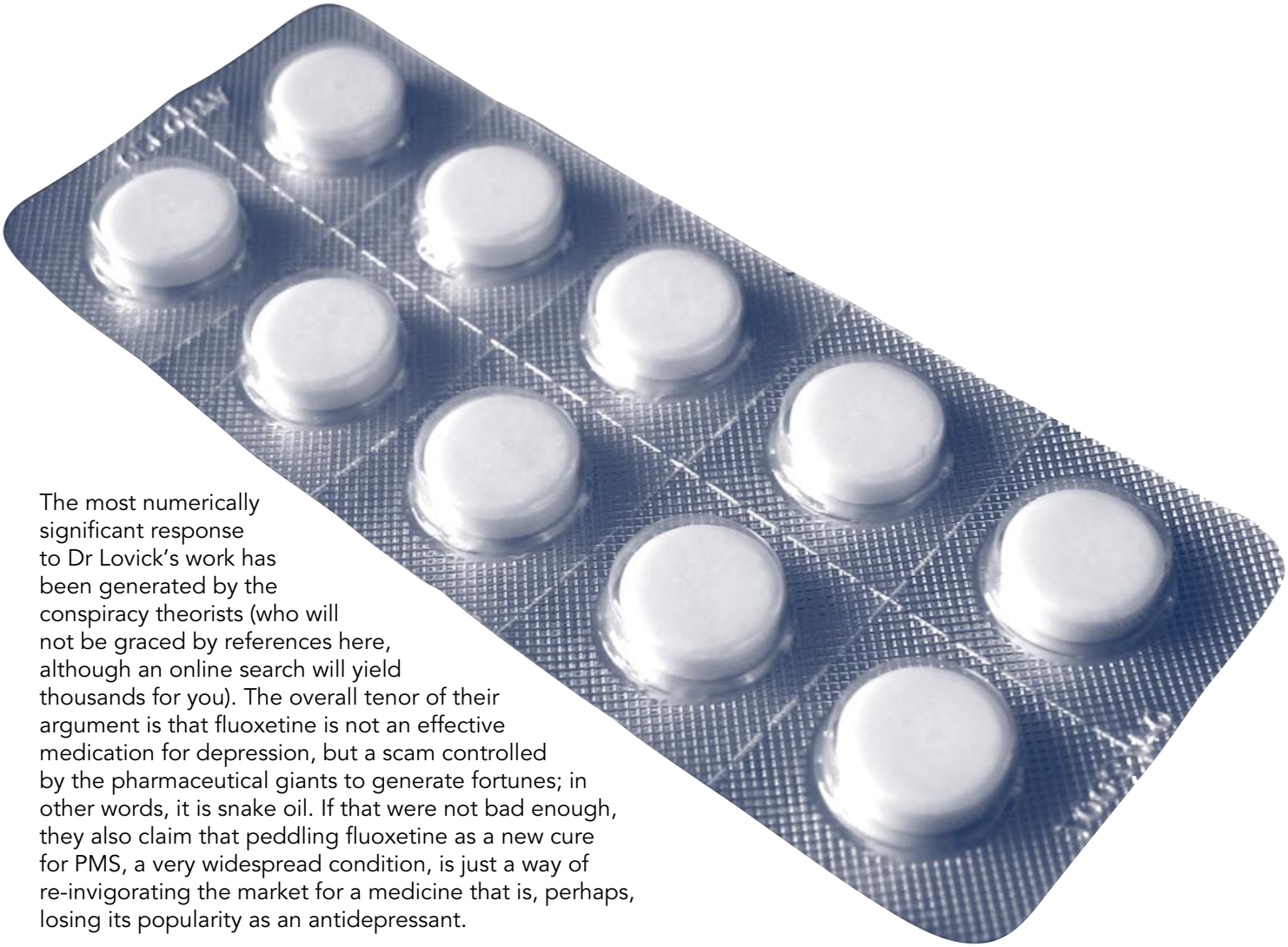


The most numerically significant response to Dr Lovick's work has been generated by the conspiracy theorists (who will not be graced by references here, although an online search will yield thousands for you). The overall tenor of their argument is that fluoxetine is not an effective medication for depression, but a scam controlled by the pharmaceutical giants to generate fortunes; in other words, it is snake oil. If that were not bad enough, they also claim that peddling fluoxetine as a new cure for PMS, a very widespread condition, is just a way of re-invigorating the market for a medicine that is, perhaps, losing its popularity as an antidepressant.

Yes. Quite. And I am Constance Spry, and you have been reading my article on "Macassar and anti-macassar" in "Women's Own".

1 birmingham.ac.uk/news/latest/2010/09/17sept-PMS.aspx

2 The Guardian, 17 September 2010

3 Elizabeth Wurtzel, Quartet Books, 1996, ISBN-10: 0704380080, ISBN-13: 978-0704380080

4 Pinna G, Costa E, and Guidotti, A. PNAS 101 6222-6225 (2004)

5 birmingham.ac.uk/news/latest/2010/09/17sept-PMS.aspx

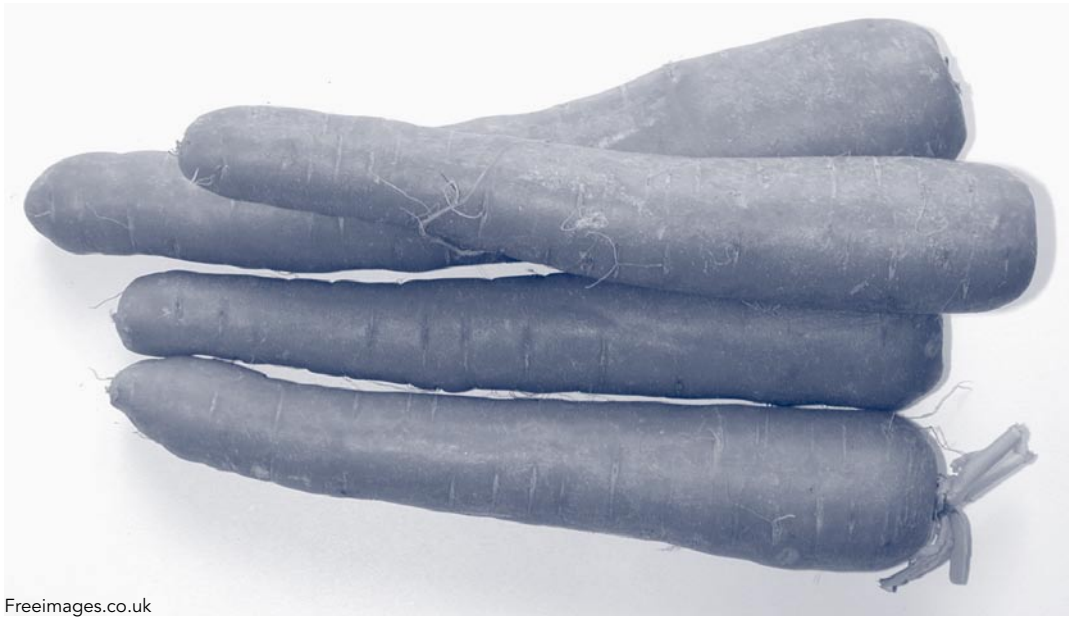
6 britishscienceassociation.org/web/News/FestivalNews/_TheendofPMS.htm

7 bnf.org/bnf/bnf/current/3294.htm

FROM CARROT TO CLINIC:

VITAMIN A IN LEARNING, MEMORY, AND DEPRESSION

Jemma Ransom



Freeimages.co.uk

Vitamin A is the dietary precursor of retinoic acid (RA), a powerful morphogen

RA is important in embryonic brain development, and in adult neurogenesis in regions including the hippocampus and hypothalamus

RA may play a role in psychiatric disease, e.g. depression, where reduced hippocampal neurogenesis is observed

What links a polar bear to the humble carrot?

Early explorer Sir Douglas Mawson discovered the answer to catastrophic effect during his 1911 Antarctic expedition. Unlike Scott, who raced to the South Pole, Mawson set out with his colleagues Xavier Mertz and Belgrave Ninnis to explore the Antarctic in a scientific and methodical way.

Three hundred miles from base camp, disaster: Ninnis fell to his death through an ice covered crevasse, taking all the team's food with him. With no rations left Mawson decided to race back using the remaining sled. In order to sustain them back to safety their only option was to eat the huskies that collapsed from exhaustion.

However, just days into their journey, the pair became profoundly ill. Mertz, in particular, suffered delusions and bouts of severe depression until he fell into a coma and died. Mawson also suffered, but made it back to camp.

So what mysterious illness killed Mertz? Many authors have argued that both Mawson and Mertz suffered vitamin A poisoning. Animals at the top of the food chain such as huskies and polar bears concentrate high levels of this vitamin in the liver, more than enough to kill a human.

Not only does this story highlight the dangers of vitamin A poisoning, it also gives an intriguing insight into its function in the brain. Recent work in our lab has shed light on its role in a region termed the hippocampus. This structure is located in the centre of the human brain and is believed to be vital for learning. The hippocampus shrinks in volume during depression, and lesions to this area render individuals unable to form new memories. A similar shrinkage is observed when retinoic acid, a metabolite of vitamin A, is applied, suggesting that the hippocampus is capable of responding to vitamin A signalling, and hinting at a role in adult neurogenesis (the birth of new neurons), a process peculiar to this region.

Excitingly, recent research indicates that a lack of retinoic acid may play a role in Alzheimer's disease. This debilitating condition, characterised by memory loss and cognitive impairment, is associated with senile plaque formation in neurons. Cell culture experiments have suggested that retinoic acid may reduce the formation of these plaques. It is hoped therefore that new treatments based on vitamin A will be clinically relevant to Alzheimer's disease.

We are all taught as children that vitamins are essential for good health. Whilst this is obviously the case, too much of a good thing is nearly as bad as too little.

BLUFFER'S GUIDE TO...

NEUROSCIENCE PODCASTS

Una Fitzgerald

Who knew that the daily commute could be so interesting?! So I discovered when, late in 2009, I hooked up my new iPod to the car speakers, browsed iTunes, and tuned into the vast range of neuroscience-related podcasts out there on the net.

I soon stumbled across the superb *Brain Science*, hosted by Ginger Campbell, MD. Ginger is an emergency doctor who, as a hobby, has put together a great series of over seventy podcasts, for *'everyone who has a brain'*. Each one lasts sixty minutes and may consist of an in-depth interview with a neuroscientist or a detailed discussion of a neuroscience topic. The excellent thing about Ginger's podcasts is that transcripts for each episode are downloadable from the *Brain Science Podcast (BSP)* website and links are provided to twenty other sites on neuroscience.

Nature's *Neuropod* series is one of Ginger's recommended links. *Neuropod* episodes last forty minutes and are hosted by the very talented Kerri Smith. Rather than focussing on a single theme, these monthly podcasts feature around four of the latest research findings in neuroscience and, helpfully, they are 'enhanced' so that listeners can easily skip to topics of interest. Well worth a listen.

Then there is *Neurapod*, supported by healthcare company Teeva Neuroscience. Clinically oriented, the series focuses on major neurodegenerative disorders including multiple sclerosis, Parkinson's and Alzheimer's disease.

Another worth a mention is *Neuroscene*, hosted by Stephen Hernon, which covers a vast range of fascinating topics.

The striking thing about all of these podcasts is the sheer volume of information they contain, communicated by researchers whose passion and commitment is both impressive and inspiring. I have returned to favourite episodes repeatedly and information I've gleaned has been incorporated into some of my lectures.

When stuck in traffic on the school run, or negotiating pot-holed bog roads in the west of Ireland, these podcasts are a great way to pass the time!

RECOMMENDED LISTENING:

BRAIN SCIENCE PODCAST
Episode 71: summary of themes covered during BSP's 4th year, along with personal reflections from Ginger

Episode 28: Dr Edward Taub about his revolutionary approach to stroke rehabilitation (constraint induced movement therapy)

Episode 68: fascinating discussion following publication of *'The Myth of Alzheimer's: What you aren't being told about today's most dreaded diagnosis'* (Whitehouse and George, 2008)

NATURE NEUROPOD
Oct 2010: research on the blood-brain barrier, controlling images with your thoughts, Parkinson's pathways, and cochlear implants

NEURAPOD
12 Sept 2008: Scott Zamvil (California) explains the role of T and B cells in multiple sclerosis, and how different treatments affect these cells

NEUROSCENE
1 Nov 2010: interview with Karen Wager-Smith about her work on the pathophysiology of depression and how it may be related to an inflammatory response in the brain

BLUFFER'S GUIDE TO...

TRANSCRANIAL MAGNETIC STIMULATION

Emma Ross and Rosie Twomey

Transcranial magnetic stimulation (TMS) is a sophisticated, non-invasive method of activating the cerebral cortex of human brain. The first modern TMS system was established in 1985 by Professor Anthony Barker in Sheffield[1] and its use has since been explored in a diverse range of experimental research and clinical applications. Being relatively risk-free[2] and painless, it has major advantages over direct electrical stimulation.

In TMS, the brain is activated by rapidly changing magnetic fields over the intended site of stimulation (Fig 1). The magnetic fields are produced by passing a current through a coil held lightly on the scalp. This induces a weak electrical current in the brain, which can temporarily excite or inhibit cortical areas and allow the study of brain function.

Depending on the purpose, TMS can be applied either in single or double pulses, or in repetitive trains of pulses at a given frequency (rTMS).

An example of using single pulse stimulation is activating primary motor cortex to produce a muscle twitch with an associated excitatory electromyography response - a motor evoked potential (MEP). The site for eliciting a twitch in a specific muscle is found by changing the coil position on the scalp and observing the resulting MEP. Corticospinal neurons projecting to muscles in the body are represented at specific sites across the motor cortex (the well-known motor homunculus, Fig 2) helping investigators optimise coil placement and subsequent neuromuscular assessment.

Single pulse TMS has been used to study damaged pathways between brain and muscle, e.g. those manifest in multiple sclerosis, spinal cord injuries and motor neuron disease. Characteristics of the response, such as MEP amplitude or latency (the time elapsed between the stimulus and the resultant MEP), allow s pathway integrity to be assessed. In addition, this technique has allowed quantification of a specific component of fatigue concerned with a sub-optimal output from the motor cortex; supraspinal fatigue[3].

Repetitive TMS can achieve sustained modulation of cortical activity. This represents a tool with therapeutic potential. rTMS was approved by the FDA[4] in 2008 as a treatment for major depression, and recent research also has examined its use in stroke patients[5] and various neurological disorders such as Parkinson's disease[6] and epilepsy[7] with promising results.

Future research with TMS will no-doubt provide valuable advances in many aspects of neuroscience and, it is hoped, further ways to alleviate disease.

1 Barker, A.T., Jalinous, R., & Freeston, I.L. (1985).Lancet, 1: 1106–1107

2 Wassermann, E.M. (1998). Electroen Clinical Neuro, 108: 1–16

3 Gandevia, S.C., et al. (1996). J Physiol, 490(2): 529-536

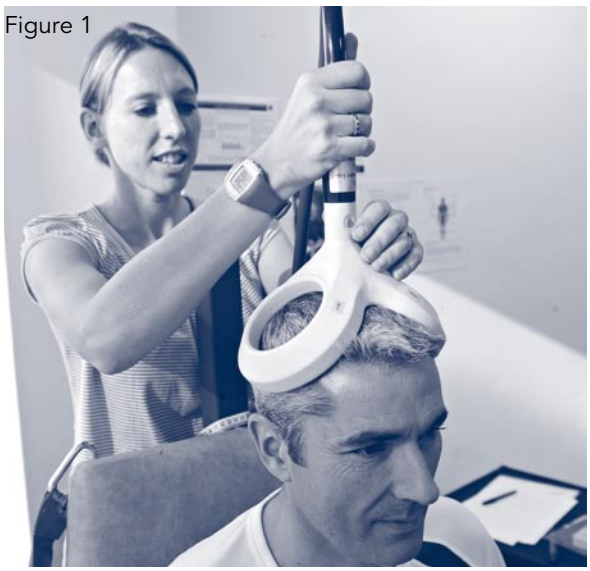
4 U.S. Food and Drug Administration

5 Khedr, E.M., et al. (2010) Acta Neurol Scan, 121, 30-37

6 Chen, R. (2010). Mov Disord, 25(14): 2311-2317.

7 Baea, E.H., et al. (2011). Epilepsy Behav. 20(2):355-9.

Figure 1



Anne Cooke

Figure 2

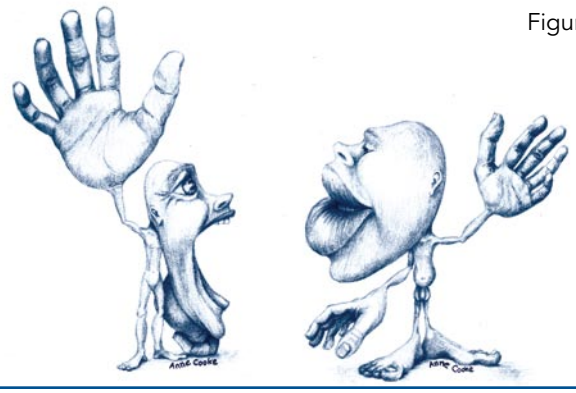


Figure 1. Transcranial magnetic stimulation of the motor cortex in action!

Figure 2. Artist's representation of the brain's 'motor homunculus' (left) where each area of motor cortex corresponds to a specific part of the body, with the size of cortical area directly proportional to the complexity of the associated body part's movements. This can be mapped with TMS, enabling subsequent targeted stimulation of specific muscles. An equivalent 'sensory homunlucus' is found in the somatosensory cortex (right) where the amount of of cortex reflects nerve fibre density in the associated region of the body.

MEETING REPORTS
TEARS, FEARS AND CREATIVITY:

Anne Cooke reports on the British Science Festival at Aston University, 17 September 2010

As Dolly Parton once put it, *"Those not afflicted with it are affected by it; [the] PMS blues..."* and PMS - or premenstrual tension - was just one of many emotions at *Bliss or blues; rapture or rage,* the BNA session at the 2010 British Science Festival.

Highs and lows are part of life, but what creates emotions? Why do people suffer depression? Is there such a thing as mid-life crisis?

Happiness at work; an oxymoronic statement to some, but a research topic for Andrew Oswald who studies mood at societal level. Plotting a population's lifecourse of happiness, for instance, shows a characteristic inverted curve - bad news for those in their thirties, who have 20+ years in the doldrums before increased happiness in old age. Teenagers aren't immune to low mood however, as discussed by KAH Mirza, who examined factors including stress, cannabis, and genetics.

Whether 'her hormones make her feel like this' was addressed by Thelma Lovick. Yes, they do; Thelma's research shows that sustained low progesterone associated with that time of the month alters neurotransmitters in part of the 'emotional brain', the amygdala. Could PMS therefore be counteracted pharmacologically with Prozac? A world free of PMS? Would we recognise it?

Whilst the amygdala is emotional, the prefrontal cortex reasons whether the emotion is appropriate or not. In contrast to counteracting mood with pharmacology, Carien van Reekum uses brain imaging to see how treatments such as cognitive behavioural therapy might allow your 'pragmatic precortex' to be harnessed instead.

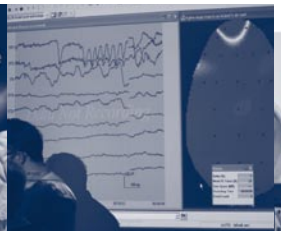
For someone talking about anxiety, Daniel Freeman seemed to have a remarkably un-anxious audience. Deftly manipulating levels of anxiety, relief and laughter helped illustrate how anxious thinking can exacerbate fears and create paranoia.

With such passionate speakers, plus Lizzie Burns' emotional workshop 'Out of our Heads', festival-goers no doubt felt filled with feelings. One of them certainly felt satisfied, *"this bit was my favourite of the festival - all week!"*

THE MOODY BLUES OF NEUROSCIENCE

DO YOU HEAR WHAT I HEAR?

Alison Brindle, Ifat Yasin and Karen Walshe run unique, collaborative event between UCL Neuroscience and the British Library, 11th October 2010



A feast of auditory trickery awaited 250+ visitors at a stimulating and interactive evening of science, music and fun at the British Library, the first collaborative venture between UCL neuroscientists, the British Library, and the charity Deafness Research UK.

An energetic and humorous lecture, co-presented by Stuart Rosen and Ifat Yasin (both UCL), Tobin May (Deafness Research UK), and Rebecca Smith (Orchestra of the City), described how the brain interprets sound, using auditory illusions including a live Bach performance and an expletive-laced episode of *The Clangers!*

Audience members had the chance to mingle with UCL neuroscientists and 'play' with a variety of auditory interactive experiments. Some tested their ears using speech-based illusions, some watched a live brain electroencephalography demo whilst listening to Congo drumming, and others modified their voices electronically to hear how they sounded if a different sex, age or weight. Glamorous retro group, *The Harmonettes*, performed for the audience, being joined, at one point, by an impromptu beat-boxer!

This successful partnership enabled members of the public to question neuroscientists directly about their research. With people queuing round the block for tickets there's certainly an appetite for science that's both engaging and fun.

MEETING REPORTS

THE BRISTOL-CARDIFF NEUROSCIENCE COLLABORATION YOUNG NEUROSCIENTISTS' DAY

Suzi Gage reports on the third BCNC-YND, 4th November 2010

David Nutt with the YND10 Organising Committee

Once again over 200 early career neuroscientists from across the UK converged on Bristol as the Bristol-Cardiff Neuroscience Collaboration (BCNC) – a joint initiative of Bristol Neuroscience and the Cardiff Neuroscience and Mental Health Research Institute - put on another fabulous event.

The day was bookended with talks by invited speakers. First, Dr Jonathan Evans and Mark Stanford (one of his patients) gave a fascinating insight into bipolar disorder. But the day's highlight was the final, plenary lecture given by Professor David Nutt - as he put it, *"from science to medicine, alcohol to hard drugs, and from politics to the popular press"*.

Although Professor Nutt began by talking about his early research on the GABA receptor, it wasn't long before politics, and his recent high-profile sacking from the Governmental Drug Advisory Board, was mentioned. That same week he had published a paper in *Lancet* controversially showing that alcohol and tobacco are more dangerous than almost all illegal drugs, when considering harm caused by the drug to both the individual and to others.

Occasionally righteously indignant, Nutt is not one to be downbeat or maudlin, giving reason to be optimistic rather than simply giving up in frustration. It was inspiring to see Professor Nutt talk, and hopefully the room full of the neuroscientists of the future can learn from his experiences.

The rest of the day's program included poster sessions, research talks, breakout sessions on specific areas of neuroscience and workshops offering interactive advice on pursuing academic careers, alternative careers, or public engagement. The evening gave a chance to carry on conversations with conviviality with sit-down dinner, professional caricaturist, cash bar, and fun pub quiz.

All in all an amazing day for all delegates, who will reap the benefits as they make their first, early steps into their careers.

Supported by: British Neuroscience Association; BCNC; Bristol School of Experimental Psychology; Harvard Apparatus; Bristol Research and Enterprise Development (RED); Tocris bioscience; Cardiff MRC Centre for Neuropsychiatric Genetics and Genomics; QIAGEN; Bristol Faculty of Medical and Veterinary Sciences; British Pharmacological Society; Cardiff Graduate Centre; Digitimer; New England Biolabs; Severnside Alliance for Translational Research (SARTRE) and Ascent Scientific

T'IS THE SEASON TO BE SOCIABLE

Katherine Button at the BNA Christmas Symposium, 15th December 2010

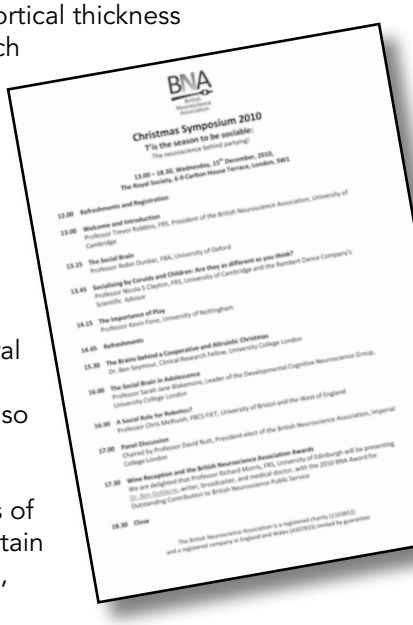
On a cold December afternoon three hundred neuroscientists, clinicians and journalists gathered in the grandeur of the Royal Society to grapple with the neuroscience of sociality. From the evolutionary origins of the 'social brain' through to designing robots capable of pseudo-human interaction the BNA 2010 Christmas Symposium proved to be a sociably entertaining affair.

Humans are inherently social. We live in mind-bogglingly complex societies, and our globe-spanning communication technologies are testament to our drive to stay socially connected. But what is it to be social? Well it seems a prerequisite is the ability to mentalise (that is to take the perspective of another, also known as Theory of Mind; ToM). In these changing economic times with politicians attempting to 'nudge' us towards behaviours fit for a 'Big Society' the fascinating insights provided by social cognitive neuroscience have perhaps never been so timely.

Professor Robin Dunbar got things underway with a cross-species look at the relationship between encephalisation and the size of a species' social network. A proponent of the 'gossip theory of evolution' Dunbar made a convincing case for the huge computational demand of social functions, such as ToM, in driving neocortex evolution. Forming and maintaining complex social relationships, it seems, requires extensive brain power and even us humans with our chart topping neocortex/bodymass ratio are limited in the number of acquaintances (150 according to Dunbar's famous number)we can cope with in our social networks.

Comparative studies provide evolutionary insights into the social brain but they also tell us something of the nature of our sociality. In a series of elegant behavioural studies Nicola Clayton demonstrated the mentalising ability of corvids and the striking parallels with humans. Corvids are social birds which like to cache food. Nicky Clayton's team at Cambridge noticed that this caching behaviour was dependent upon whether or not it was conducted in the presence of others. If fellow corvids were present, the caching bird would come back later to move the stored food. Intriguingly, this re-caching behaviour was only observed in those birds with a history of stealing. The moral of the story: it takes a thief to suspect a thief! Something to bear in mind the next time accusations of stolen staplers circulate the office...

From a developmental view, we know disrupted social functioning is related to poor mental health. Kevin Fone's work showed that rearing rats in social isolation leads to disordered cognitive and social functioning, potentially by disrupting dopaminergic function. Sarah Jane Blakemore then continued the developmental theme examining the neural correlates of social brain development during human adolescence. We all know the teenager stereotype: spotty, socially awkward and excruciatingly self-conscious. Well it seems this stereotype has some basis in neuroscience. Changes in cortical thickness to areas of the social brain, such as the medial prefrontal cortex, are still occurring well into the teenage years and functional brain imaging suggest that during social cognition tasks activity in this region decreases between adolescence and adulthood.


BNA

Christmas Symposium 2010

'T'is the season to be sociable:'

As well as elucidating the neural correlates of individual social stereotypes, neuroscience is also shedding light on wider social phenomena such as housing 'bubbles' and economic cycles of 'boom and bust'. In this uncertain economic and political climate, Ben Seymour's insights into decision neuroscience seemed particularly timely. The science behind market trends now supports what we've known anecdotally for some time; we want what everyone else wants, and the more they want

T'IS THE SEASON TO BE SOCIABLE

CONTINUED

it the more we want it irrespective of whether it's the best choice for us or not! Bad news for first time buyers, but as noted by Seymour, perhaps worse news for patient-led treatment choice in the NHS? As politicians increasingly turn to social science for inspiration of how to influence our behaviour through public policy the discipline of decision neuroscience seems set to flourish over the coming decade.

From explaining current social trends to a vision of social care in the future, Chris Melhuish fascinated the audience with work from his Bristol Robotic Laboratory. Melhuish's vision is to develop humanoid robots capable of safe robot-human interaction to help meet societies rapidly growing demands for social care. To this end the need to understand the communication of shared goals, perception and understanding of intention, social cognition, and active and passive compliance will no doubt offer fascinating insights into how these processes operate in humans.

The session culminated with a speaker-panel discussion opened to the floor. My overwhelming impression was just how incredibly driven by our social brains we are. Our ability to mentalise is so well developed that we infer mental states on pretty much anything, evident in Blakemore's widely used ToM task, where two triangles jittering on a computer screen are typically perceived as excited. By the age of 5 years normally developing humans perform at ceiling on virtually any measure of theory of mind available and adults regularly operate at 4th or 5th order ToM (that is , I know that Sue knows, that Jack knows that Jeff knows, that Ben knows ...).

Yet one question from the floor got me thinking about all this seemingly unfathomable complexity. Perhaps mentalising and sociality seems so complex because we observe them in humans at their complex extreme. But perhaps, like the weather, great complexity emerges from the interaction of relatively simple processes. As Melhuish noted the rich and diverse social organisation of ants arises from incredibly simple neural machinery and simple stimulus-response rules. His work in developing robotic ants suggests the difficulty is in identifying the rules. The cross-talk between neuro- and robotics scientists seems a tantalisingly exciting avenue of research well placed to address some of the key issues of sociality.

The day finished with a wine reception, during which Dr. **Ben Goldacre**, the award-winning writer, broadcaster, and medical doctor, received the **2010 BNA Award for Increasing the Public Understanding of Science.** The Award was presented by **Professor R G M Morris**, FRS. Royal Society/Wolfson Professor of Neuroscience, Centre for Cognitive and Neural Systems, and MRC Centre for Cognitive Ageing and Cognitive Epidemiology, The University of Edinburgh.

FUNCTION AND ORGANISATION OF THE PEDUNCULOPONTINE NUCLEUS

Guarantors of BRAIN

Juan Mena-Segovia reports on BNA-sponsored symposium, 7th December 2010

The symposium, *'Function and organisation of the pedunculopontine nucleus (PPN): from animal studies to therapeutic interventions in humans'* gathered together, for the first time, some of the leading scientists in PPN research. Held in Oxford, presentations ranged from the anatomy and function of the PPN, to the impairment of PPN activity during neurodegenerative diseases and the therapeutic interventions to restore normal function.

The PPN, a brainstem structure that is highly interconnected with many other neuronal systems in the brain, is involved in the regulation of wakefulness and arousal, reward, locomotion and posture, but the cellular substrates underlying these diverse functions remains largely unknown. During day one, the complex neuronal organisation of the PPN was discussed, including the heterogeneity of its cell types and the functional compartmentalisation of the nucleus. Most of the second day was dedicated to the involvement of the PPN in Parkinson's disease (PD), including changes in activity of neurons that occur in models of PD, the use of deep brain stimulation of the PPN for treatment of PD, and recordings obtained from the deep brain stimulation electrodes in patients.

This symposium represented an unprecedented opportunity for interaction between basic and clinical PPN researchers and has paved the way for future interactions.

UNIVERSITY OF OXFORD

MRC Medical Research Council

BOOK REVIEWS

DELUSIONS OF GENDER Cordelia Fine

ISBN 978-184831-220-3

Reviewed by Kaz Pasiecznik

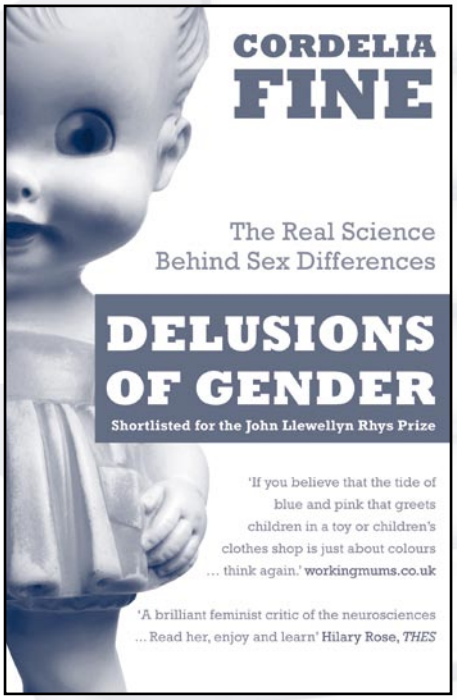
Cordelia Fine's first book, the highly acclaimed *A Mind of Its Own*, had as a general theme the foundation-shaking notion that you hitherto haven't had nearly as much control over your opinions as you thought. In *Delusions of Gender*, she turns this scholarly bulldozer on scientific claims of inherent differences between female and male cognitive abilities.

Fine examines, in scrupulous detail, many published studies claiming to have found physical differences between male and female brains, and presents a strong case challenging each of them. In contrast to other pop-neuroscience books, her format is not to begin with a 'Psychology 101' chapter, but instead to explain methodologies and concepts (for example, statistical p values, and stereotype threat) when they crop up in her discussion. This refreshing approach makes *Delusions of Gender* accessible to the much wider audience merited by a book this hard-hitting.

Fine's discussion is about much more than just neuroscientific studies of gender differences – for starters, it contains an excellent introduction to the scientific method in general. The style is reminiscent of Ben Goldacre's *Bad Science*; at times sardonic, at others fantastically funny. Perhaps mindful of preaching only to the converted, Fine cleverly presents most of her vast quantity of evidence in a humbler, non-directive manner, allowing the reader to come to their own mind-opening conclusions. *Delusions of Gender* also touches on major contemporary areas of debate within cognition and brain science, such as the validity of imaging techniques to map cognitive functions in the brain, and the extent to which the brain is hard- vs. soft-wired.

As well as neuroscience and psychology, this book would not be out of place in social science and culture studies libraries. Fine digs deep for the roots of gender stereotypes and oppressive inequality, quoting texts from 1900 onwards. A sprinkling of primary sources of sexism against women is enough to remind the reader why the message is so important.

Delusions of Gender looks not only at the cultural history of gender bias, but also its influence on the developmental process of the impressionable human, from foetus to teenager. From children's book characters to tick-boxes on forms (which nearly always list 'Male' first), it is surprising how insidious and pervasive gender stereotyping can be. Fine's notion of "half-changed minds" describes how egalitarianism has won only the battle against explicit bias, leaving unchallenged the darker force of implicit prejudice – opinions you may deny having, yet which are robustly inherited by your children.



Fine's discussion is for those with an ability to reason for themselves rather than be told the answers; you might like to consider having a cup of coffee to hand whilst reading. With what must be almost a quarter of the book taken up by footnotes and the lengthy bibliography, this isn't a text to be wolfed down in a weekend. But, once you've nibbled your way to the end, prepare to be a relative expert on the subject, and to consider dressing your son in pink and naming your daughter John.

Fine herself notes that it's hard to convince anyone that there is much new to say about gender, but she has met that challenge, bringing the paradigm shift of Germaine Greer's *The Female Eunuch* to the scientifically-minded audience of the 21st century. Not for the scientifically or politically faint-hearted, this important message is nonetheless delivered in an accessible and enjoyable way.

SPECIAL OFFER FOR BNA MEMBERS

Delusions of Gender (ISBN 978-184831-220-3) by Dr Cordelia Fine is available, in paperback, for just £6.99 (RRP £8.99) + FREE P&P (UK only) by calling TBS on 01206 255800 and quoting Delusions of Gender offer.

DIARY

12 - 13 APRIL
The Social Brain - Evolution, development, psychopathology and future directions

MRC Cognition and Brain Sciences Unit, Cambridge.

Small and interactive workshop on social neuroscience, making translational and theoretical connections between human brainimaging, comparative research, and neuropsychiatric disorders.

tinyurl.com/cn-socialbrain

12 - 15 APRIL
Wiring the Brain: Making Connections

Powerscourt, Co. Wicklow, Ireland

Explore how brain connectivity is established, what happens to circuit and network functions when underlying processes go wrong, and how this can lead to disease.

wiringthebrain.com

17 - 20 APRIL
The 21st British Neuroscience Association Meeting

Harrogate

See you there!

18 - 21 MAY
nAChRs 2011

Wellcome Trust Conference Centre, Cambridge

Covers the spectrum of nicotinic acetylcholine receptor research, from molecular, cellular and genetic aspects to behavioural studies.

tinyurl.com/wt-nachrs

19 - 22 MAY
Cortical development: Stem cells to neuronal circuits

Chania, Crete, Greece

International meeting covering neural stem cells, neurogenesis, neuronal migration and differentiation, circuit formation, and cortical disorders

corticaldevelopment.org

3 - 5 JULY
British Society for Neuroendocrinology Annual Meeting

Downing College, Cambridge, UK

This year's meeting welcomes the joint participation of the Turkish Neuroendocrine Society

neuroendo.org.uk

4 - 7 JULY
The Third Annual Summer School in Brain Disorder Research

MRC Centre for Neuropsychiatric Genetics and Genomics, Cardiff University

Lectures, interactive sessions and informal discussion on a range of approaches to studying brain disorders, and opportunities available to pursue a career in research.

tinyurl.com/braindisorders

4 - 7 JULY
11th ESNI Course - European School of Neuroimmunology

University of Glasgow

An eclectic view of cutting edge neuroimmunological research, showing how new techniques provide insights into disease. For postgrads and postdocs.

tinyurl.com/esni11

Answers for the Nodes on p48. *Look sharp: RELAX, CONCENTRATE, FOCUS, SLOW DOWN, ORGANISE, WRITE, REPEAT, VISUALISE, ASSOCIATE. Why do reptiles have such good memories? Because they have turtle recall.* **Anatomical Antics:** *Occipital horn*

13 - 15 JULY
The 2011 Bristol Magnetic Resonance Summer School

University of Bristol

MR techniques and applications in research; open to researchers, clinical fellows and consultants, from medical imaging, neurology, radiology, cardiology, neuroscience, physics & engineering.

brmr.psy.bris.ac.uk/index.php

18 - 20 JULY
Human Brain Anatomy Course (3-day)

Department of Anatomy, University College London

Suitable for undergraduate / postgraduate students in medicine and biomedical sciences, neuroscience and psychology. Includes dissecting room sessions.

neurocourses.com

5 - 6 SEPTEMBER
Cambridge Neural Stem Cell Symposium

St John's College, Cambridge

Jointly hosted by Cambridge Neuroscience and the Cambridge Stem Cell Initiative to highlight recent advances in this field, encourage collaboration, and enthuse young scientists working in this area.

tinyurl.com/cn-stemcells

10 - 13 SEPTEMBER
15th EFNS Congress, Exploring Breakthroughs in Neurology.

Budapest, Hungary

Join over 5,000 colleagues for presentations, the latest research, current clinical practices and treatments, up to 24 hours of CME credits, focused workshops, and teaching courses.

tinyurl.com/cn-stemcells

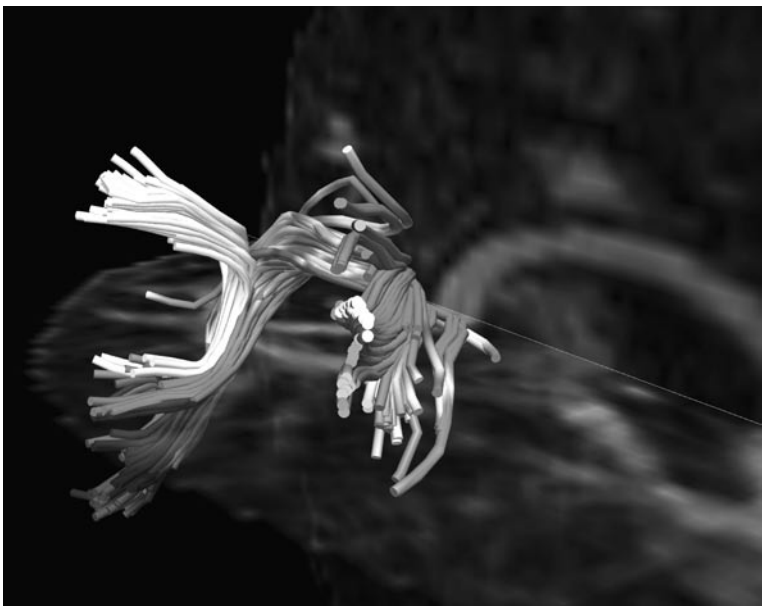
THE GALLERY:

the gallery

SHARING AND ENJOYING THE WIDE AND VARIED TALENTS OF BRITISH NEUROSCIENCE.

Quoc Vuong, from Newcastle's Institute of Neuroscience, describes this issue's Gallery:

"Diffusion tensor imaging is used to visualise white matter fibre tracts connecting different regions of the brain. This image shows the arcuate fasciculus, a tract that plays a role in speech and communication. Being able to visualize tracts in three dimensions provides insights into brain networks, a key part of my research."



Calling all closet artists, designers, poets, and any other BNA members with any sort of talent for a 2D-medium hidden in the creativity centres of their brain; The Gallery awaits your submissions. Any topic email BNA-editor@bristol.ac.uk

What artistic talents are being kept in the closet in BNA? Gallery submissions welcome: any topic, any medium

THE TIMES
CHELTENHAM FESTIVALS

SCIENCE 11

in association with Pfizer

CELEBRATING 10 FESTIVALS

7 - 12 JUNE 2011

ALTERNATIVE WAYS OF THINKING: EXPLORING THE AUTISTIC MIND
Autistic minds are indeed unique
- but are they impaired?

THE MATRIX: REALITY OR FICTION?
Are brain-machine interfaces movie fiction or science fact?

SCHIZOPHRENIA
What is it like to live with schizophrenia?

YOUR AGEING BRAIN
Why do older brains seem to work more slowly and less efficiently?

THE SHIVER
A performance and discussion on the psychology and physiology behind why we shiver.

VEGETATIVE STATE
Do some vegetative bodies harbour conscious minds?

YOUNG MINDS
Why do young people think and feel the way they do?

BRAIN SCAN: LIVE
Watch live images of the brain via link to an MRI scanner.

MAPPING THE MIND
How do 100 billion brain cells hold a lifetime of experiences?

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MARK LYTHGOE
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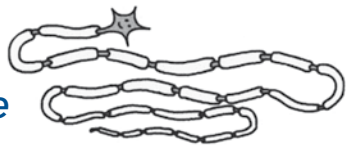
Jonathan Webb recently interrupted a DPhil (Oxford) to work at London's Science Media Centre. He also acts, sings, runs a website and podcast (nerd-alert.net) *JWebb@ri.ac.uk*

Ifat Yasin is a Senior Lecturer in auditory psychophysics at UCL Ear Institute and was the scientific lead for the UCL-British Library event described in Meeting Reports.

Quoc Vuong, from Newcastle's Institute of Neuroscience, uses psychophysics, computer graphics, computer vision, eye tracking and functional brain imaging to study visual cognition

The Node: taking a break in the myelin of life



IgNobel Neuroscience

Twenty years strong this year, the IgNobels mark 'achievements that first make people LAUGH, and then make them THINK.' The wooden spoon of science, or an honour greater than the Nobels themselves? You decide…

COGNITION (2008): Slime molds can solve puzzles. (Nakagaki et al. *Intelligence: Maze-Solving by an Amoeboid Organism* - Nature, 407: 470)

*AUDITION / PERCEPTION (2008): Modifying the sound of a crisp influences the cruncher's perception of freshness. (Zampini and Spence *The Role of Auditory Cues in Modulating the Perceived Crispness and Staleness of Potato Chips* - J Sensory Studies 19, 347-63)

LANGUAGE (2007): Rats can't tell the difference between someone speaking Japanese backwards and someone speaking Dutch backwards. Sometimes. (Toro et al. *Effects of Backward Speech and Speaker Variability in Language Discrimination by Rats* - J Exp Psychol [Anim Behav]: 31, no. 1, 95-100)

*ELECTROPHYSIOLOGY (2006): Monitoring brain cell activity in a locust while it watches highlights from Star Wars. (Rind and Simmons *Orthopteran DCMD Neuron: A Reevaluation of Responses to Moving Objects* - J Neurophysiol 68, no. 5, 1654-66)

*LEARNING AND NEUROPLASTICITY (2003): Brains of London taxi drivers are more highly developed than those of fellow citizens. (Maguire et al. *Navigation-Related Structural Change In the Hippocampi of Taxi Drivers* – PNAS 97, no.8, 4398-403)

GUSTATION (1997): People's brainwave patterns whilst chewing different flavours of gum. (T. Yagyu, et al. *Chewing gum flavor affects measures of global complexity of multichannel EEG* - Neuropsychobiology 35, 46-50)

ADDICTION (1996): Nicotine is absolutely definitely one hundred per cent not addictive. (Senior executives of U.S. Tobacco, Liggett Group, American Tobacco Company, and Brown and Williamson Tobacco Co., as testified to the U.S. Congress)

COGNITION (1995): One-sided nostril breathing and cognitive prowess (Buebel, Shannahoff-Khalsa and Boyle *The Effects of Unilateral Forced Nostril Breathing on Cognition* - Int J Neurosci 57, 239-2)

Why not submit a nomination? Email marca@chem2.harvard.edu

improbable.com/ig

*UK winners.

Anatomical Antics:
What bit of the brain does this figure allude to? p46
AC

Look Sharp

These jumbled words are skills to help keep your memory sharp. Once solved, unscramble highlighted letters to answer: "Why do reptiles have such good memories?"
"Because they have ☐☐☐☐☐☐■☐☐☐☐☐☐"

XEARL	☐☐☐☐☐	*RENNECATCOT*	☐☐☐☐☐☐☐☐☐☐☐
COSFU	☐☐☐☐☐	*LSWO NOWD*	☐☐☐☐■☐☐☐
NAOSIGRE	☐☐☐☐☐☐☐☐	*WITRE*	☐☐☐☐☐
PETREA	☐☐☐☐☐☐	*IUSAVISLE*	☐☐☐☐☐☐☐☐☐
ICESTAASO	☐☐☐☐☐☐☐☐☐		

The Dana Foundation has free Brain Awareness tips and material, such as this puzzle, free to download at dana.org/brainweek - Logon next year and use for your own BAW events.

Brain Bites

Rod photoreceptors in the human eye can respond to a single candle viewed from one mile away.

Single axons extend the entire length of a giraffe's neck; 4.5m from top to toe.

Schizophrenic patients use as much brain to perform simple tasks, as controls do for complex ones.

A sodium pump transports 200 Na^+ and 130 K^+ ions per second. A small neuron has 1million pumps.

We tend to look top right when picturing a 3D object, top left when recalling a word or phrase.

Electroconvulsive therapy, or ECT, was first used to treat mental illness in 1755.

Itching results from histamine, released from white blood cells, binding to nerve endings in the skin.

Babies do not develop full ability to taste saltiness until 6 months in age.

Answers on page 44.

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