



The Official Quarterly Newsletter of
the European Brain Council

EBCnews

Start tracking alcohol
intake by grams
across Europe says
David Nutt



A DOG CALLED ENDAL

*How a dog restored
one man's emotions
after brain injury*



HONORARY LIFETIME MEMBERSHIP

Former European Parliament
President Jerzy Buzek at the EBC

Nomenclature change for psychiatry

Horizon 2020 tackles brain diseases

Patient Research Network launched

Deep brain stimulation in early
Parkinson's disease

New drugs for brain
diseases blocked by
regulatory system

Dear Colleagues

We are delighted to announce the launch of *EBC News*, which is the official quarterly newsletter of the European Brain Council (EBC). The Council coordinates the interests of European organisations in neurology, neurosurgery, psychiatry, neuroscience, as well as patient organisations and industry. This official quarterly newsletter, *EBC News*, aims to communicate all the different elements of brain diseases including the science and challenges that our European society faces in the future.

Primarily, the publication will highlight the objectives of the EBC with the emphasis on the organisation's interest in changing the political and practical landscape for patients and other stakeholders.



The publication will be a valuable tool that can be utilised by EBC members to demonstrate the educational value of their activities, attracting support and increasing membership numbers. Throughout the year, the publication will also enable the EBC to further promote all

their projects and meetings, with particular focus on the Year of the Brain in Europe in 2014.

The news content will be designed with a focus on cutting-edge issues, medical advancements, ethics and societal values. Featuring a range of interviews, in-depth reports and issues, the newsletter will provide an opportunity to inform non-members and other interest groups of the work of the EBC. Just as importantly, *EBC News* will feature stories from patients about how their illnesses have changed their lives and how they have overcome some very serious conditions, as well as from carers- those unsung heroes who merit our huge gratitude for, at times, the difficult roles they play.

We hope that you will enjoy reading *EBC News* and ask that you contribute or suggest topics that you would like to see covered in future issues.

I look forward to hearing from you.

Mary Baker, MBE

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Answers That Matter.

Jerzy Buzek receives honorary membership of the EBC

Former European Parliament President, Professor Jerzy Buzek, received Honorary Lifetime Membership of the European Brain Council (EBC) in a ceremony held in Brussels in December 2012. Here, he shares his views on why Europe needs to take brain disorders very seriously.

Presenting the award, Dr. Mary Baker said that it recognised his outstanding contribution to the advancement of brain research in Europe and the quality of life of European citizens.

"The EBC feels honoured to welcome Jerzy Buzek as an honorary member of the EBC and for drawing attention to the importance of the brain during the Polish Presidency," said Mary.

During the Polish Presidency of the Council of the European Union (July-December 2011), Buzek personally supported the idea of including brain research and brain diseases prominently on the Polish presidential agenda.

Buzek explained that the Polish Presidency emphasised the need for continued interest in issues relating to the aging European population, with one proposed solution being to place greater focus on the prevention and control of diseases related to old age. However, he added it was important not to forget younger sufferers too.

"Concerned with the growing number of diagnosed brain disorders, Polish experts have decided to place the problem among their very top priorities," Buzek said. "This step should remain on the European agenda as it could notably contribute to the achievement of the health objectives set out in the strategy, Europe 2020."

Brain disorders vary from addictive affective or anxiety disorders and the range of these problems is extremely wide. They include brain tumours, childhood and adolescent disorders, dementia, eating disorders, epilepsy, migraine, Multiple Sclerosis, Parkinson's disease, person-

ality and sleep disorders, stroke or traumatic brain injury.

Buzek highlights the latest alarming statistics, saying that 127 million Europeans (27%) already suffer from different brain disorders. "There are ample grounds to estimate that due to the aging European population, this number will keep on growing, and brain disorders will pose a serious and growing burden on healthcare systems in Europe," he warned. "It is in the best interest of EU citizens to prepare for it now."

In practice, Buzek would like to see greater public awareness of risk factors for brain disorders, some of which are easily preventable. He notes that prioritisation of brain research would not only facilitate access to medical treatments, but could also lead to increased understanding and public awareness of brain diseases; thereby reducing the stigma, marginalisation, and social exclusion of patients.

Persisting with the research theme, Buzek, who is a former scientist in chemical engineering as well as a member of the Committee on Industry, Research and Energy in the European Parliament, pointed out that the human brain is the organ with the highest information density per unit volume and mass. "The process of thinking is in fact nothing but electricity and chemistry and can, and should, be further explored. There are too many unknowns regarding the capacity and limitations of the human brain."

"I very much believe that expanding our knowledge in these areas could play a key role in Europe's scientific progress," he concluded.



Jerzy Buzek receives honorary membership of the EBC from Mary Baker, MBE

"Brain disorders will pose a serious and growing burden on healthcare systems in Europe. It is in the best interest of the citizens to prepare for it now."

Jerzy Buzek

International collaboration to address new approach to psychiatric drug nomenclature

Psychiatry currently uses medications with names that reflect the indication rather than the mechanism of action. The colleges of neuropsychopharmacology seek a change to the nomenclature of these drugs.

Under the leadership of the European College of Neuropsychopharmacology (ECNP), agreement has been reached on proposing a change to the current psychopharmacological nomenclature of medications, that currently have names given over 50 years ago, to versions that more accurately express a medication's mechanism of action.

The ECNP and related colleges believe a change in nomenclature will help clinicians to select the best medication for a given patient, and minimise the confusion patients may experience when prescribed a drug with a different name compared to their identified diagnosis.

Joseph Zohar, is current President of the ECNP and Professor of Psychiatry at Tel Aviv University, Israel. He explained to *EBC News* that an update on nomenclature and medication for brain disorders was long overdue. "On the one hand, there is impressive progress in neuroscience, but on the other we are still using some names which were given around 50 years ago."

In order to bridge this gap, the ECNP has initiated specific taskforces composed of the four major neuropsychopharmacology colleges: the ECNP, the American College of Neuropsychopharmacology, the Asian College of Neuropsychopharmacology, and the International College of Neuropsychopharmacology.

Psychiatrists are currently updating the Diagnostic and Statistical Manual of Mental Disorders (DSM and ICD) system and in the next few months, a new version of DSM will be published. With these changes afoot, it is important to consider an appropriate update of medication's nomenclature.

Anti-psychotic drugs provide an example of why this is important. There are close to 150 medications commonly used in psychiatric disorders, and very few have a name that really expresses the mechanism. If a nomenclature that expresses the

"If a nomenclature that expresses the pharmacological mechanism of action is used then it is easier to use the medication more wisely,"

Joseph Zohar,
President of the ECNP

pharmacological mechanism of action is used then it is easier to use the medication more wisely.

For example, Zohar explained that many of the reasons for prescribing anti-psychotics are actually not for psychosis but for depression and anxiety and it needs to be recognised that the names and labels on these drugs can have far-reaching effects.

"Imagine a patient with anxiety seeing the term 'anti-psychotic' on the label. Understandably, they would wonder if their situation was worse than they had thought and possibly ask why they needed anti-psychotic drugs. Consequently, this affects adherence to the medication," he said.

Furthermore, current medication names fail to facilitate informed prescribing. "In hypertension, the classification of the medicine is based on the mechanism of action," Zohar pointed out. "If the treating doctor would like to augment the overall treatment then another drug with a different mechanism of action could be used. In this respect, the proposed nomenclature might help the physician to make an informed clinical decision."

He added that when considering categories of anti-depressants or anti-psychotics, often an anti-psychotic is not used to treat psychosis or an anti-depressant to treat depression. "Often an anti-depressant is used

to treat anxiety. It's not only that it confuses the patient but it confuses the physician."

Removing the stigma that can be attached to certain names is another significant reason for revising the nomenclature of medications in this field of medicine. "Using a name related to mechanism of action is preferable. Take for example a dopamine receptor blocker, which is the basic mechanism of an anti-psychotic. The drug has an effect on the specific dopamine receptor and restores normal functioning not only in psychosis [but other illnesses too], so it is better not to label this as anti-psychotic," Zohar stressed.

In a nutshell, Zohar said that prescribers need to think about underlying mechanisms of action for a drug not necessarily the indication, and consider the intervention which best interacts with that.

All the colleges agree that this is the way forward. On four different occasions, three in Europe and one in the US, Zohar and his colleagues have conducted a survey with over 1200 psychiatrists collating their thoughts on the existing system and the potential new system. "The vast majority agreed the current system is misleading, confusing and adding to stigma, and that it doesn't encourage the patient to adhere to the medication."

"They also agreed that the pharmacological driven system is required."

The pharmaceutical industry also believes this is a very important initiative. "We all need to think in a different dimension for psychiatric disorders," noted Zohar.

The next step is publication of a paper on the topic, expected in the near future in the *European Neuropsychopharmacology journal*.

The task force of the four colleges is now placing all medications under a template to facilitate renaming. "By the end of the year we expect that all the medications will be added into the template and that the major scientific publications will start using the new nomenclature," Zohar remarked.

Development of new brain treatments blocked by regulatory system

NEW TREATMENTS FOR BRAIN DISEASES TAKE YEARS TO SHOW EFFECTIVENESS IN TRIALS. HERE, DIRECTOR GENERAL OF THE EFPIA HIGHLIGHTS HOW A REVISION OF THE REGULATORY PROCESSES IS NEEDED TO ENCOURAGE INVESTMENT IN THE DEVELOPMENT OF BRAIN THERAPIES



“There’s a current obsession with very large trials to reach a certain significant value, but there is scope here for a more adaptive stepwise development.”

Richard Bergström

Existing regulatory and drug development frameworks fail to incorporate assessment measures for medicines that treat diseases with predominantly long-term outcomes, such as brain diseases. A rethink of the current drug development, regulatory and payer paradigms for therapies to treat these diseases is long overdue in this field of huge unmet need.

So goes the opinion of a leading figure on the European pharmaceutical landscape, Richard Bergström, Director General of the EFPIA (European Federation of Pharmaceutical Industries and Associations), based in Brussels. “The nature of these diseases is that the impact of interventions requires measurement over the long term, for example stroke recovery and prevention, and disease progression in dementia. These diseases all require longitudinal data collection over many years,” he pointed out.

Bergström wants to see a paradigm shift in the development and regulatory processes for such diseases, notably those of the brain. “There’s a current obsession with very large trials to reach a certain significant value, but there is scope here for a more adaptive stepwise development.”

The current regulatory paradigm requires a drug to stop or significantly slow disease progression. For dementia, such an endpoint would need to be demonstrated in clinical trials of at least 5-10 years duration to present a convincing case to regulators. Bergström finds the situation frustrating. “We have unmet medical need and basic science which is unfolding in an exciting way but at the same time there are fewer research projects actually developing medicines in the field of brain diseases due to regulatory issues which effectively discourage product development- many companies have left the area completely.”

Biomarkers could potentially help identify the most responsive patients for a treatment. But Bergström explained that even if a biomarker was used and it was proven that by blocking a certain target there would be an impact on dementia, regulators would still want to see evidence of impact on outcome not just a mechanistic response.

Bergström would like to see two key revisions to the development and regulatory process: the acceptance of a stepwise mechanism to determine patient response to a drug, and more

pragmatic trials with large numbers of real world patients. “These would be better suited to the drug development needs of treatments like those for brain diseases. Monitoring needs to be assessed step by step and a drug continued or withdrawn according to stepwise results,” he said.

This need to revise the regulatory process follows closely behind a recent marked acceleration in the level of basic scientific knowledge relating to certain diseases, in particular brain diseases. For example, maps of the brain, and an increasingly comprehensive knowledge of the genetic underpinnings of brain diseases. “We need to actually use these advances to develop medicines,” Bergström remarked.

“People familiar with drugs for many brain diseases know that many available medicines are crude and effectiveness is often sub-optimal,” Bergström pointed out. “In some cases, we have nothing effective at all, for example, in Alzheimer’s disease. Similarly, stroke management shows much room for improvement.”

Somehow another solution needs to be found. If the current framework underwent review, Bergström would like to see a process where regulators and payers renegotiated trial endpoints and frameworks with researchers and developers. “Perhaps requiring that safety is assured with a trial in a defined number of patients followed by a real life study in 20,000 people and monitored with mutually agreed endpoints,” he explained.

“Furthermore, developers would also need to seek reassurance that a potential new treatment would be reimbursed despite the existence of therapies that only treat the signs and symptoms and cost very little.”

He added that this would provide researchers, developers and companies with some predictability and reassurance that it is worth developing the product.

But, Bergström concluded by asking, who will invest to develop these medicines? He remarked that governments had contributed relatively little, and that there was a lack of shared understanding and responsibility for the prospects and scientific challenges. “We need to align stakeholders to address this need. When the new science is reported it all sounds good, there are headlines saying we will have a new medicine 10 years from now, but actually there is no workable framework to make this happen.”

House of Lords launch for Patient Research Network

JANUARY SAW THE LAUNCH OF THE PATIENT RESEARCH NETWORK, A JOINT RESEARCH AND TRAINING INITIATIVE BETWEEN LSE HEALTH AND THE EFNA.

Tea at the UK's House of Lords provided an entertaining backdrop for the launch of the Patient Research Network (PRN) in January this year. Stakeholders from across Europe and Canada attended to support the new network. Talks introducing the PRN were given by Dr Mary Baker MBE, President of the EBC; Earl Howe, Minister of Health; Dr Panos Kavanos from the London School of Economics, and the Baroness Julia Cumberlege CBE who hosted the event.

Baroness Cumberlege explained that the PRN was originally based on a joint initiative between LSE (London School of Economics) Health, which has taken the leading role, and the European Federation for Neurological Associations (EFNA). "This is a good combination because I think the healthiest and best children have two very caring parents," she pointed out in comparison.

The network aims to provide a sustained link between academic, policy-making, and patient communities; to promote the continued development of patient groups and organisations; and to research issues pertinent to access to healthcare and resource allocation. In view of the breadth of its responsibilities, the EBC, which represents a vast network of patients, doctors and scientists, and industrial partners has now picked up much of the responsibility that initially lay with the EFNS.

Earl Howe emphasised the importance of patients having a voice in planning, designing and delivering health services-

both their own and more widely, and that the PRN would provide an excellent platform for this purpose. Furthermore, he noted that services and healthcare interventions had to be informed by the highest quality evidence and that here too patients could play a major role. "Not just in trials but as active partners throughout the research process. Patients can help identify important questions about health and social care that research can answer."

Mary Baker provided the 60-strong gathering of stakeholders from across Europe and Canada with a potted history of the how the PRN came about.

In 2008, Mary initially met Panos Kanavos at a conference in Stockholm. A productive relationship blossomed and through collaborative patient workshops, they decided to develop an organisation to help patients become the centre of services and research. With the support of Sir Michael Rawlins, Dr Thomas Lonngren, Dr Richard Bergstrom and Professor Hans-Georg Eichler, they established a series of courses on health technology assessment



"Patients can help identify important questions about health and social care that research can answer."

Earl Howe, Health Minister.

(HTA), which brought patients with different illnesses together.

"We wanted to reduce the rivalry between neurology, oncology and all the other specialisms, and to really make patients one society struggling against what



FROM LEFT Mary Baker MBE, Baroness Julia Cumberlege and Panos Kanavos, LSE health

life was throwing at them,” remarked Mary.

Since the first HTA course in 2009, patients have learnt about the language of engagement, how to open a dialogue with the HTA authorities, why medicines cost so much, and how pharmaceutical companies talk to governments to set prices.

The success of these HTA courses laid the groundwork for the launch of the PRN. Mary wanted to take these patient-centric initiatives further and so the idea for the Network was born. She noted that they wanted a platform for patient-driven production of evidence amongst other ambitions. “I’ve often advocated that an early and accurate diagnosis is beneficial to the national health system. I’ve said it with great authority but without a scrap of evidence. It seemed to be self-evident, and I hope with the PRN, we will soon have that evidence,” Mary remarked.

She added that the wide-ranging research being conducted to address a host of healthcare issues related to policy and delivery required a constructive process, and this is where the PRN would come in. Mary also acknowledged the efforts of all the PRN trustees gathered and in particular Baroness Cumberlege, who had agreed to chair the Management Board. “For every car that races along the road you need petrol in the tank and in this respect, the pharmaceutical industry has been incredibly generous.”

The network will effectively be housed in the department of LSE Health, specifically within the Medical

“...working with patients and professionals is essential, taking into account patients’ thoughts on quality of life. It provides opportunity for research results to be studied and understood by various stakeholders including patients and this is where the PRN fits in.”

Panos Kanavos.

Technology and Research Group (MTRG). LSE Health is a multidisciplinary research centre focusing on health policy and health economics.

Kanavos is Programme Director of the MTRG, and he has already worked extensively with patient groups. The PRN should allow for stronger and more formal links with patient organisations that are able to contribute to LSE Health’s research agenda.

One such research project that could benefit from PRN involvement is Advanced HTA, a consortium that aims to strengthen methodological tools and practices in HTA assessment. It began in January this year and is funded by the European Commission 7th Framework Programme.

“In this context, working with patients and professionals is essential, taking into account patients’ thoughts on quality of life,” said Kanavos. “It provides opportunity for research results to be studied and understood by various stakeholders including patients and this is where the PRN fits in.”

“We will look at patient related outcomes such as how outcomes related to quality and policy have impact both generally and in terms of spending.”

Kanavos also stressed the requirement for improvement in health literacy, pointing out that an informed patient is a literate patient, who understands policy and research related to access to medicines and care. Producing training materials for the lay public with respect to improving health literacy and understanding of HTA issues will also be integral to PRN work.

From the perspective of LSE Health, two key PRN agenda items are directly related to their work: firstly, continuing training in HTA, access to care, financing healthcare and understanding how institutions work; and secondly, training in sensitive areas like healthcare negotiation. “If at the end of the day you want access to healthcare then this is the decision of the HTA authorities- NICE in the UK- or the healthcare provider.”

A number of research projects have already been identified. These include appropriateness in prescribing; the value of early diagnosis from a societal perspective for example in Parkinson’s disease; and HTA and performance-based agreements.

Doing it by numbers

Grams not units to help people track alcohol consumption could have significant health gains

A recent ECNP Consultation meeting concludes that measuring alcohol intake by grams rather than units would be more reliable. Greater emphasis on tracking intake by numbers would reap considerable health benefits.



DAVID NUTT

Alcohol consumption levels should be measured in grams rather than units, unifying measures of alcohol intake across Europe, say experts. Furthermore, it is thought that tracking daily drinking habits using the gram measure will help reduce consumption and provide considerable health benefits in people with alcohol-related illnesses.

The numbers speak for themselves, said Professor David Nutt, director of the Neuropsychopharmacology Unit in the Centre for Pharmacology and Therapeutics, Imperial College London. "The problem with units of alcohol is that they mean different things in different European countries. A gram is a gram wherever we are in the world," he told *EBC News*.

"People should know the correct amounts that they are drinking. The important health message here is that high levels of gram intake of alcohol are dangerous. Whatever you do to reduce intake, just like reducing your blood pressure, will benefit your health," he added, speaking after the 2013 Consultation meeting of the European College of Neuropsychopharmacology, held in March.

According to Nutt, the remarkable and terrifying thing about alcohol consumption is this: the relationship between intake and death is not linear but exponential. This means that as intake is reduced from a high level to a moderate level an individual achieves phenomenal gains in health.

"If a person drinks 100 grams of alcohol a day (approximately 12 units a day or a bottle of wine) then their lifetime risk of death due to alcohol-related injury is 16%. If a person drinks 50 grams a day, then their lifetime risk drops to 2%," he informed.

"Halving consumption reduces the harms eight times," Nutt pointed out. "This is a powerful gain in health outcomes from small reductions, so anything that reduces use is going to have major impacts in terms of health improvement."

Nutt provides examples of how tracking measures of consumption have proven beneficial in other disease areas. Counting calories and tracking consumption of certain foods is obviously a well-tried and tested means of weight loss. "With alcohol, we need to replace calories with grams. But it won't be easy. This is a health

education project, and would also involve labeling changes. However, it is easier to label with grams than units because this would provide uniformity across Europe."

Nutt highlighted that his approach was all about 'doing it by numbers'. By way of clarification, and as a result of recent expert discussions, he added that it had become increasingly clear that the most efficient way of dealing with alcohol-related problems is to reduce consumption - as measured by grams.

He reinforced the practical idea that tracking the

quantity of alcohol consumed was an essential tool with which to tackle alcohol-related illness. "We are seriously talking of getting rid of all the traditional ways of considering alcohol dependence, alcohol misuse, dangerous drinking, and the way forward is for every person to know how much they drink and redefine levels of harmful drinking."

By analogy, Nutt explained that when we treat high blood pressure, for example someone with a reading of 160/100, we often might not know the cause. "But we know that if we can lower the blood pressure then the burden of disease will fall," he said. "Likewise with alcohol, we need to

"...as intake is reduced from a high level to a moderate level an individual achieves phenomenal gains in health."

David Nutt,
Director of the
Neuropsychopharmacology
Unit, Imperial College
London

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reduce the number of grams of alcohol a person drinks on a weekly basis.”

On an individual level, controlling drinking and improving health involves management on a number of levels, said Nutt. Once the need to reduce alcohol consumption had been accepted then the first step to help individuals reduce intake is to have people record their drinking like they do their cholesterol or calorific intake. “It needs to be a number.”

“This requires careful tracking. People know their blood pressure, and alcohol consumption is as important to some people as blood pressure is to others. We have to know the numbers, he emphasised.

But Nutt added that there was also a need to develop better interventions. These need to be two-fold: a population approach and a clinical approach.

He elaborated that the population-level

“Europeans drink twice as much as people in other parts of the world. For men, the disability rate due to alcohol-related brain disease is 83 per 10,000 people. This compares to a disability rate of 29 per 10,000 people for drug use.”

David Nutt,
Imperial College
London

approach involved interventions to reduce consumption such as pricing and regulation, whilst clinical treatments and individual patient management were equally important. Tracking alcohol intake by the gram would require intervention at both levels. Public health measures would increase costs, reduce availability and educate, thereby reducing intake. Involvement at the level of the individual patient may require the use of devices to monitor intake for example Smart phone applications.

Evidence from Sweden strongly suggests that regulatory measures taking a population-based approach can be very effective. By way of comparison between populations of European countries, the Swedish government has a very different way of regulating alcohol to the British govern-

Alcohol-related illness by numbers

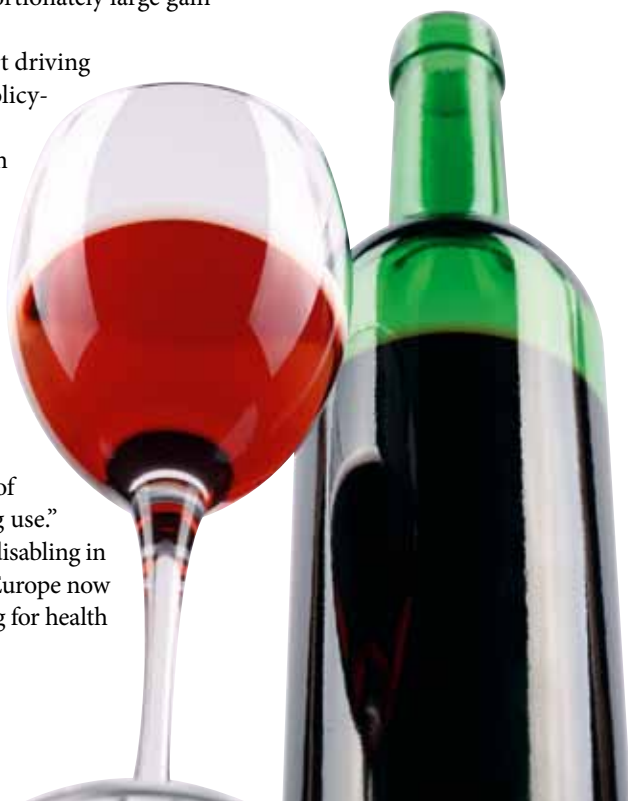
Dr. Jürgen Rehm from the Centre for Addiction and Mental Health, Toronto, Canada, is an epidemiologist who has information on the latest epidemiological figures relating to death rates due to alcohol addiction. Rehm provides the scientific data needed to inform policy makers of strategies to reduce alcohol-related harm. Here are some of his figures related to alcohol induced health burdens:

- In Europe, approximately 100,000–150,000 deaths per year are alcohol-related.
- Alcohol costs Europe between €50 billion and €120 billion per year in terms of health and social harm.
- In every European country, alcohol and tobacco separately are in the top five causes of ill health.
- Alcohol is one of the biggest killers in Europe:
 - in Eastern Europe, alcohol is the biggest killer, ahead of high blood pressure, and tobacco.
 - in Central Europe, alcohol is the fourth biggest killer, high body mass index is third, tobacco is second and high blood pressure is number one.
 - in Western Europe, tobacco is number one and alcohol is number five.
- A 2011 ECNP/EBC paper on the costs of brain disorders shows that:
 - for men, alcohol is the major cause of disability in men, more than unipolar depression. Also, in men, alcohol-related brain disorders now exceed any other brain disorders in terms of cost burden of disease.

ment. They impose greater constraints on access. “The average Swede drinks half the amount the average Brit drinks, but Sweden suffers one third of the alcohol harm per person that the UK does. This shows that in a population, regulating access does translate into a disproportionately large gain in health,” Nutt remarked.

Now is a good time to start driving these changes through the policy-making machine. The year 2014 is set to be the European Year of the Brain. “Addiction will be a big part of this campaign,” said Nutt. “Europeans drink twice as much as people in other parts of the world. For men, the disability rate due to alcohol-related brain disease is 83 per 10,000 people. This compares to a disability rate of 29 per 10,000 people for drug use.”

“Alcohol is three times as disabling in Europe as drugs. This is why Europe now needs to focus its campaigning for health improvement on alcohol.”



Brain Prize awarded to scientists for work on optogenetics



Six scientists have been awarded the €1 million Brain Prize for developing optogenetics, a method of selectively activating nerve cells in the brain.

The world's largest brain research prize, the Brain Prize, was awarded to four European and two American neuroscientists last month for the development of a method known as optogenetics that effectively turns certain neurons in the brain on and off with light.

Scientists Ernst Bamberg, Edward Boyden, Karl Deisseroth, Peter Hegemann, Gero Miesenböck and Georg Nagel received the € 1 million prize provided by the Grete Lundbeck European Brain Research Foundation for their extensive work that started back in 2002.

The Brain Prize is a personal prize awarded to one or more scientists who have distinguished themselves by an outstanding contribution to European neuroscience.

Professor Peter Hegemann was one of the Prize winners. He is a photobiologist or photobiophysicist from Humboldt-Universität in Berlin, Germany, and said he was totally surprised but honoured to receive the Brain Prize.

"I am delighted to receive the Prize with these colleagues and friends whom I have known for so many years," he said. "It is an overwhelming feeling to look retrospectively at the development of optogenetics from the early studies on the orientation of microalgae as *Chlamydomonas* in the late eighties until the application of the photoreceptor protein in transgenic animals or even in humans these days. He added that is was "just amazing."

Optogenetics actually goes way back to 1979,

when Nobel Laureate Francis Crick, one of the scientists who discovered the structure of DNA suggested that researchers should try and find a way of taking control over specific cells in the brain: nerve cells or neurons as they are called.

Scientists developed the optogenetic method to learn about the brain and how it functions, in this case, by studying the effect of stimulating specific types of neurons.

How they did it: the science behind the breakthrough Optogenetics began when German and Austrian researchers came across molecules capable of changing the activity of cells in response to light. They developed methods to use these molecules to control the activity of certain neurons.

In 1992, Hegemann and colleagues at the Max Planck Institute of Biochemistry in Martinsried, Germany, made the initial discovery that set a further chain of events and discoveries in motion. They found that a substance in the external membranes of algae, which is similar to the visual pigment called rhodopsin found in the human eye, was sensitive to blue light. In the presence of blue light, the substance causes a change in permeability of the membrane, allowing positively charged ions, including calcium, to enter the cell causing it to move towards the light.

In 2002-2003, Hegemann, then at the University of Regensburg, with Georg Nagel and Ernst Bamberg of the Max Planck Institute of Biophysics in Frankfurt, Germany, further investigated the properties of the algal substance and determined the mechanism of action that was triggered upon illumination. Effectively, a channel within the rhodopsin-like substance changed shape allowing positive ions to pass through. The scientists called the molecule channelrhodopsin.

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Colin Blakemore, Chairman of the Brain Prize Committee



Mary Baker, MBE, President of the EBC

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In 2003, Nagel, Bamberg, Hegemann and colleagues then described a genetic variant of channelrhodopsin (ChR2), which accelerated the activation of the associated channel. They then

Professor Colin Blakemore, director of the Institute of Philosophy's Centre for the Study of the Senses at the School of Advanced Study, University of London, was Chairman of the Selection Committee for the Brain Prize. He spoke at the prize giving in Copenhagen, Denmark.

"Denmark is famous for its detective stories. The Brain Prize for 2013 is awarded for a wonderful detective story without the murder: optogenetics," Blakemore remarked.

"Commenting on the significance of the research, he said that there was much focus on optogenetics to understand disorders of neural function and disorders of addiction and anxiety as well as the potential clinical application in areas such as the recovery of retinal function in people who are blind due to degeneration of their own photoreceptors. There is also potential application in pain, Parkinson's disease, epilepsy and various psychiatric disorders possibly replacing more invasive techniques."

added the gene for ChR2 onto neural cells to make them more responsive to light. When light was shone in the cells, it depolarised the neurons triggering nerve impulses. At this point it was clear that this might provide the key to turning on nerve cells with light.

In 2005, two scientists in Stanford, California, US, namely, Ed Boyden and Karl Deisseroth began to work with ChR2. What happened next earned them a seminal publication in the journal, *Nature Neuroscience*, the pinnacle of publication for researchers in this field. The scientists transferred the ChR2 gene into rat nerve cells and confirmed that brief flashes of light caused impulses in these cells. This piece of work provided the next essential piece of the jigsaw- light activation of ChR2 in mammalian cells.

A turning point At this point, the momentum was building and Boyden, Bamberg, Nagel and Deisseroth began to work together to develop optogenetic methods for silencing, as well as exciting neurons. This meant two different genes needed to be transferred into a nerve cell enabling the neuron to be activated and deactivated depending on the colour of the light used. Through other more complicated genetic techniques, the group managed to activate and deactivate specific types of nerve cells, in very localised points in the brain.



Mary Baker, President EBC; Colin Blakemore, Chairman of the Selection Committee; Kim Krogsgaard, Director of the Foundation; Nils Axelsen, Chairman of the Board, and Ulrik Gether, Department of Neuroscience and Pharmacology, Copenhagen University.

Back in 2002, another group led by the Austrian neuroscientist, Gero Miesenböck, had also been making progress with a different strategy for the optical activation of neurons. This involved three different molecules, including true rhodopsin from the eye of the fruit fly, *Drosophila*. They followed this work with another optogenetic technique in 2005, which also turned on nerve cells in fruit flies and showed that their flying behaviour could be changed by shining a light on them. This was the first demonstration of optogenetic activation in an animal.

Optogenetic-based medicine In recent years, optogenetics has been used to study the way in which nerve circuits control functions such as learning, arousal, tactile and visual sensation, breathing, and movement. Current work is now focusing on the use of optogenetic methods to understand disorders of neural circuits, for instance in addiction and anxiety.

The potential medical applications are also exciting, with possibilities including the restoration of some vision after age-related degeneration of the retina. Combined with fibre-optic probes, optogenetic methods might also offer an alternative to deep brain stimulation with metal electrodes for treatment of Parkinson's disease, intractable pain, depression and other psychiatric disorders.

The optogenetic method has already received

wide acclaim. In 2010, it won 'Method of the Year' across all fields of science by the leading journal *Nature Methods*, and 'Breakthrough of the Decade' by the journal *Science*.

The Brain Prize Award Ceremony will be held at the Black Diamond, Copenhagen on May 2, 2013.

Dr Mary Baker, President of the EBC, also spoke at the Brain Prize announcement. "All of us are on life's journey. A journey we are prepared for by our parents, schooling, spiritual beliefs and the people we meet along the way. But nothing prepares anyone for a diagnosis of a severe brain disease. When you listen to these people they tell you it is a watershed in their lives. They speak of before they were diagnosed and after they were diagnosed. They have lost control of their lives and I don't think any of us understand what this is until we have lost it.

"These people need maps to understand their disease and you people are giving it to them," she said, addressing the scientists and other stakeholders in brain research gathered.

"Neuroscientists, clinicians, surgeons, industry, and politicians: you have given them hope. I'd like to add my congratulations to all that you are doing, and finally to reflect on an African saying: "alone you travel faster, together you travel further."



Interview: Máire Geoghegan-Quinn European Commissioner

Europe is pulling together in turbulent economic times, raising the profile of mental health research with events such as the European Month of the Brain, and fostering collaboration between industry and institutions.

28 May. The latter is organised jointly with Ireland's Health Research Board, on behalf of the Irish Presidency of the Council. These two conferences will be very important in the context of Horizon 2020 and I strongly encourage stakeholders to participate to them.

In an interview with *EBC News*, European Commissioner for Research, Innovation and Science, Máire Geoghegan-Quinn spoke of the plans for the European Month of the Brain, as well as discussing the shift towards a more integrated and collaborative attitude that she hopes will lead to greater innovation and progress in brain research.

The Month of the Brain in May 2013 is sure to be a fantastic showcase of up and coming research and policy issues. What events can we expect?

The European Month of the Brain will

provide a framework to raise awareness of brain research and healthcare issues. It is an umbrella initiative, open to any stakeholders who want to organise a specific event. Each stakeholder is free to decide which actions it wishes to undertake, e.g. workshops, exhibitions, brain days, school-targeted activities, open days at institutes or labs, and/or press activities.

The Commission is organising two conferences: 'European Brain Research: Successes and Next Challenges' in Brussels on 14 May, and 'Healthy Brain: Healthy Europe – A new horizon for brain research and healthcare in Europe' in Dublin on 27-

What are the key priorities in brain research that will be highlighted by the Month of the Brain?

Through our initiatives we want to: showcase EU-supported achievements in the area of brain research and healthcare; outline foresight research and policy lines in this area; mobilise Member States and Associated Countries to better coordinate and optimise resources allocated to brain research and healthcare; and raise awareness among the public, including lifting taboos associated with mental health issues. Research issues will specifically be addressed at our conference in Brussels, while



the Dublin conference will provide policy recommendations for brain research and healthcare.

What I think is key to promoting public awareness and healthcare integration is to have the different stakeholders talking to each other. This is exactly what is emphasised during the different events organised under the European Month of the Brain.

Regarding the upcoming budget, Horizon 2020, what is the proposed relative proportion of the whole research budget that will be dedicated to brain science? Similarly, what are the relative priorities in topics within the scope of brain research, with regard to both basic and applied science?

The Commission proposed an ambitious budget for Horizon 2020 of €80 billion. The final budget, its structure and breakdown, will depend on the results of discussions between the European Parliament and the

European Council, which are still ongoing.

We proposed a substantial budget increase for frontier research via the 'Excellent Science' pillar (in particular the European Research Council), where brain research can definitely find a place. The pillars on 'Industrial Leadership' and 'Societal Challenge' will address more translational and/or industrial research. In particular, the challenge on 'Health, demographic change and well-being' will address improving diagnosis, understanding and treating diseases, or promoting integrated care, all areas fully relevant for brain research.

What, in your mind, are some of the key ingredients that provide an environment of creativity and innovation in health science?

One way we are fostering innovation is through the Innovative Medicines Initiative (IMI), a public-private partnership between the European Federation of Pharmaceutical Industries Associations

(EFPIA) and the European Commission. The objectives of IMI are to support pre-competitive research and modernise drug development by establishing joint initiatives between industry, academia, Small and Medium Enterprises (SMEs), patient organisations, as well as regulatory agencies. For example, the PROTECT project is coordinated by the European Medicines Agency (EMA). It aims at explaining discrepancies between the reported outcomes from pharmaco-epidemiology studies by studying combinations of drugs and adverse events in several databases.

How can the relationship between higher education (HE), science research and industry be bettered – not just in terms of working together for a single goal, but also in terms of improving knowledge sharing and freedom of data upon which further research can be developed?

One way is for pharmaceutical companies, within the framework of IMI, to make data available from former clinical trials. For example, in the area of schizophrenia, the NEWMEDS project established a database bringing together data of 23,401 anonymised patients from 67 trials on 11 compounds in over 25 countries. This will lead to the better design of future clinical trials and will decrease exposure of patients to experimental medications.

Another approach is through initiatives like the International Initiative for Traumatic Brain Injury Research (InTBIR) between the EU, the US (National Institute of Neurological Disorders and Stroke) and Canada (Canadian Institute of Health Research). This is a global effort to coordinate and harmonise clinical research activities across the full spectrum of TBI injuries with the long-term goal of improving outcomes. Among other activities, it will create a TBI patient registry by building common databases and linking them through an accessible, user-friendly interface for both entry and data search.

In what ways can the EU utilise its new-found extended diversity of nations of recent years to help improve our understanding of brain diseases?



Back from the brink **Traumatic brain injury, empathy and a dog called Endal**

In 1991, Allen Parton's life changed forever. At 32 years old he suffered extensive brain damage in a car accident whilst serving in the Royal Navy during the Gulf War. After 3 years in hospital and rehabilitation, Parton was wheelchair-bound, unable to speak, and had no recollection of his marriage or children. He returned home to his supportive wife and family, but remained dependant on them for his day to day needs. He felt isolated and depressed, even

suicidal. But seven years after the accident, a chance encounter with a trainee assistance dog called Endal restored Parton's will to live. The enduring partnership they developed helped Parton rebuild his life, and taught him how to feel happy – and sad – again.

"My life was like a jigsaw-puzzle thrown into the wind. Endal brought back pieces day by day," Parton explained. "Yes, there will always be large parts missing, but Endal helped make sense of what remains."

Although remarkable, Parton is not unique. In the UK alone, half a million people live with long term disabilities resulting from traumatic brain injury (TBI) caused by an impact, tumour or haemorrhage. In many cases, the damage seems minor or localised, but its impact on brain function can be diffuse and the psychological effects far reaching.

One in four people with a brain injury experience 'hidden symptoms' that affect their behaviour and personality, alongside cognitive problems affecting memory, attention and concentration. The underlying cause is damage to the frontal lobe of the brain where these traits are controlled. If damage extends to the insular cortex and temporal lobe, individuals find

themselves unable to express emotions, and fail to react to them in others.

Altered personalities and behaviours can make it difficult for those affected to concentrate, socialise and follow simple routines, excluding them from regular employment and normal social settings. And personal relationships can be severely affected, even when the injured person is well enough to work; disrupting the very support network they depend on.

“It’s not until about four years after the accident that partners realise that the person they once knew is not coming back,” explained Professor Roger Wood, Consultant Clinical Neuropsychologist at the University of Swansea, UK, who believes it is the injured person’s reduced ability to empathise that is responsible for the high levels of relationship breakdown that follow traumatic brain injuries.

Wood has carried out a number of questionnaire based studies of TBI patients and their partners and found that a high proportion of patients score poorly on measures of empathy, irrespective of any cognitive impairment. He has also found that almost two thirds of people with TBI exhibit a trait called alexithymia that affects one in ten of the general population. People with alexithymia have problems with emotional awareness, social attachment and relating to others. When upset, they say ‘I feel unwell’, rather than ‘I feel sad’. And, as well as having difficulty identifying and describing their own emotions, they struggle to distinguish and appreciate emotions in others, making them appear unempathetic.

For Parton, Endal appeared just in time. His relationships with his wife and children were failing and he had hit rock bottom. Endal was able to offer both physical and emotional support, 24 hours a day. He fetched and carried for Parton and escorted him everywhere, even calling help when Parton was knocked out of his wheelchair by a car. But it was Endal’s assistant with Parton’s hidden disabilities that really helped Parton turn his life around.

“Because my memory lasts only a couple of days, people I meet one day are forgotten the next. But now people come up and say, ‘how is Endal today?’” The cue is enough for Parton to know he has met the person before and allows him to relax in their company. “This opening up of communications with people helped me to get talking again,” he explained, and “not worrying about what I have forgotten means I can get

on and enjoy today.”

Parton also credits Endal with saving his marriage, so much so that the dog became the token best ‘man’ when Parton and his wife, Sandra, renewed their wedding vows nine years after the accident. Speaking at the time, Parton said, “I have grown to love the same woman twice. I want to have memories of seeing my wife walking up the aisle. I have no memories of the first time it happened.”

Dogs can play an important role in improving psychological well-being and for many years have been used therapeutically to help people with psychological disorders, providing both physical and emotional support. They can help boost self-esteem, facilitate social interaction and help people manage stressful situations, reducing anxiety. But Wood believes that identifying problems with emotional attachment as soon as possible after brain injury and introducing treatments such as cognitive behavioural therapy, to improve self perception and awareness of other people’s needs, is the key to preventing relationship breakdown.

“Animals can be very therapeutic in chronic psychological conditions, but for a person to function in society they need to make the big step to relating to people. In my opinion, an assistance dog does not replace the need for supportive family relationships,” Wood asserted.

But for Parton, forming an unconditional bond with a dog has undoubtedly helped his recovery. In 2009 he founded a charity ‘Hounds for Heroes’, which trains assistance dogs for injured ex-servicemen and women. He has co-written a book of his story with his wife Sandra that is currently being made into a film.

And although Endal died in 2009, and his capable successor EJ took up the baton of caring for Parton, Endal’s death allowed Parton to fit another piece back into the puzzle of his life. He cried for the first time in 20 years. ‘When Endal died, he gave me one last gift– the gift of sadness,’ Parton said.





Update on the Horizon 2020 research budget

The Horizon 2020 budget represents not only a call to tackle the big problems of the brain that we face over the next seven years, but it will also be an important source of jobs and technological development that will serve to bolster scientific innovation.

Twenty-six hours after commencing perhaps the most burdensome negotiations between heads of state and governments, a consensus was reached for the EU budget for the period 2014 to 2020. The budget for the next EU research framework programme, Horizon 2020, was agreed at €70.9 billion. The successor of the incumbent Framework Programme 7 (FP7), which ends on 31 December this year, Horizon 2020 will serve out over the next seven years.

Although the research budget was initially proposed in late November by the European Commission (EC) at €80 billion, cuts were widely expected – although not lauded – and indeed they formed part of broader restrictions that have limited the total EU budget to €908 billion over the next seven year period, as part of austerity measures to deal with the global financial crisis. Even so, the sum being allocated to Horizon 2020 is a stark leap from the previous FP7 budget, which was a meagre €55 billion. But this figure is not necessarily to be balked at; because the largest segment of FP7's budget, €10.8 billion, was deferred until its final year of 2013, the new budget falling slightly foul of maintaining this rate annually. But this is not entirely the end of the budget story, as it will still have to pass through the European Parliament, and it is expected that consensus will not be easily reached there either. Speaking after the budget agreement, the European Research, Innovation and Science Commissioner Máire Geoghegan-Quinn said she would continue to call for a bigger research budget as part of ensuing discussions with the European Parliament.

Serving to reflect a more inclusive, pan-European approach to both fundamental and applied research, Horizon 2020 is the financial instrument that will implement the Innovation Union, the flagship Europe 2020 initiative that will strive to secure global competitiveness for Europe. Allocated one of the greatest proportions of this round's budget, Innovation Europe is thought by many to be the key to emerging swiftly from a recession that seems to be dragging its heels. At a meeting of key MEPs on Horizon 2020 in November, Belgian parliamentary member and rapporteur Philippe Lamberts noted that in a crisis big companies such as IBM favour cuts in many departments, but not research and development. "I even witnessed companies that were increasing this spending in a crisis," he said. "Do we believe that we Europeans are spending such a lot of money on research and innovation that we can afford to cut it back in a downturn? On the contrary, when you look at it from a competitiveness perspective, isn't now the moment where we need to step up our efforts in research and innovation?"

In this sense, the intention for Horizon 2020 is to foster collaboration between authorities, research companies and universities in a way that will promote job creation and require less bureaucratic tapdancing, with more concerted research to tackle the vast problems in health, wellbeing, environment, technology and economy that we will face into the coming decades.

The first calls for Horizon 2020 research proposals will take place in January 2014, and brain health priorities are sure to emerge in the coming months, with an emphasis on basic research that will drive innovations downstream. Indeed, societal challenges, of which brain health forms a subcategory, takes the largest slice of the Horizon 2020 budgetary pie. The ageing population presents a clear future burden, with dementia and stroke perhaps impart-

ing the greatest impact on healthcare, and of course mental health disorders also have an enormous effect upon wellbeing and productivity. Technologies such as MRI and other diagnostic tools will also improve early intervention in diseases such as Alzheimer's.

Although still shaping its agenda for the coming years, Horizon 2020 has launched a call for expression of interest in order to create a set of advisory groups, made up of scientific experts, that will work to cover the urgent objectives for the coming budgetary period. Following the call, Máire Geoghegan-Quinn said, "Our aim is to reach the broadest range of experts who will help us to

deliver innovative ideas, sustainable growth and new jobs. Introducing this transparent and inclusive call for Horizon 2020 means we are reaching out to the entire European research and innovation community. I would in particular like to encourage women and individuals with the right expertise but who have not been involved in the past to show their interest." The Copen-

hagen Research Forum, which published research ideas from a meeting of over 600 European researchers, emphasised that basic, translational and clinical research form the foundation for the European health system, and that biomedical technologies will be highly instrumental in tackling today's health challenges.

The budget proposal, it is hoped, will achieve great things in brain research via the collaborative partnerships that have the facilities and the expertise to design larger, more tightly controlled studies that will provide real answers and solutions to some of the biggest problems of mental health and age-related brain issues that we face. In addition, these measures hope to win back the intellectual resources that have, over the past several years, been taking their expertise elsewhere. With two-thirds of ERC grant-holders in neuroscience gaining post-doctoral experience in the US, there is an urgency to attract back the leading researchers that have fled Europe in the past.



Brain injury: treat the patient not the case



James Piercy's remarkable recovery from brain injury after a serious road accident illustrates how there is no one-size-fits-all approach to patient management.

“WHEN YOU’VE SEEN ONE BRAIN INJURY, YOU’VE SEEN ONE BRAIN INJURY,”

a wise neurologist once said. Why one patient becomes seriously debilitated whilst another makes a remarkable recovery after what initially appears to be a similar severity of brain damage is unknown.

Luck, resources, expertise and a patient's own level of intelligence prior to injury may all play a part. James Piercy, 41-year-old survivor of a serious car crash in which he sustained multiple injuries including severe head injury and brain damage provides a case in point.

His accident happened just over two years ago and doctors are amazed at how well he has and continues to recover. So well in fact, that Piercy is currently touring science festivals around the country telling his incredible story – a real-life tale of tragedy tempered by a remarkable recovery.

“It’s wonderful to be here, really it is, it is wonderful just to be,” he exclaims in greeting to his audience in a pub theatre in West London. “Two years ago I nearly lost the chance to say these words to you.”

Sunday 30 January 2011 started out as an ordinary day, with an ordinary family and an ordinary car journey for Piercy, his wife, Catherine, and three young children. But

in a moment, his world changed completely. At midday, a nail punctured the tyre of his red Citroen Berlingo on a Norfolk road, it lost control and collided with a tree at around 50mph. Tragically, his wife died but his three children survived relatively unscathed. Piercy sustained serious brain injury as well as less severe damage to spleen, ribs, lung, kidneys and internal bleeding.

But it is his recovery from brain injury that astounds the medics. On balance, Piercy believes he was very lucky. Generally, patients over 40 have worse outcomes than younger patients. Piercy was 39 at the time of his accident. According to published figures, his chance of death within two weeks of the accident was 14%, and his risk of unfavourable outcomes including death, persistent vegetative state, or major disability at six months was 50%.

The first source of help at the scene of the accident, nine minutes after the crash, was a policeman who “held my head together with his hands until an ambulance arrived”, explained Piercy. Then at 12.30pm the East Anglian Air Ambulance turned up. “This is the one of the few air ambulances in the country which has a doctor on board. This meant I could be intubated and sedated to induce coma.”

Paramedics assessed the severity of Piercy's injuries using the Glasgow Coma Score, which provides a measure of response and reaction. Working on a scale of 3 to 15, where 3 is in coma or dead to 15 that is alive and well, Piercy obtained an uncer-

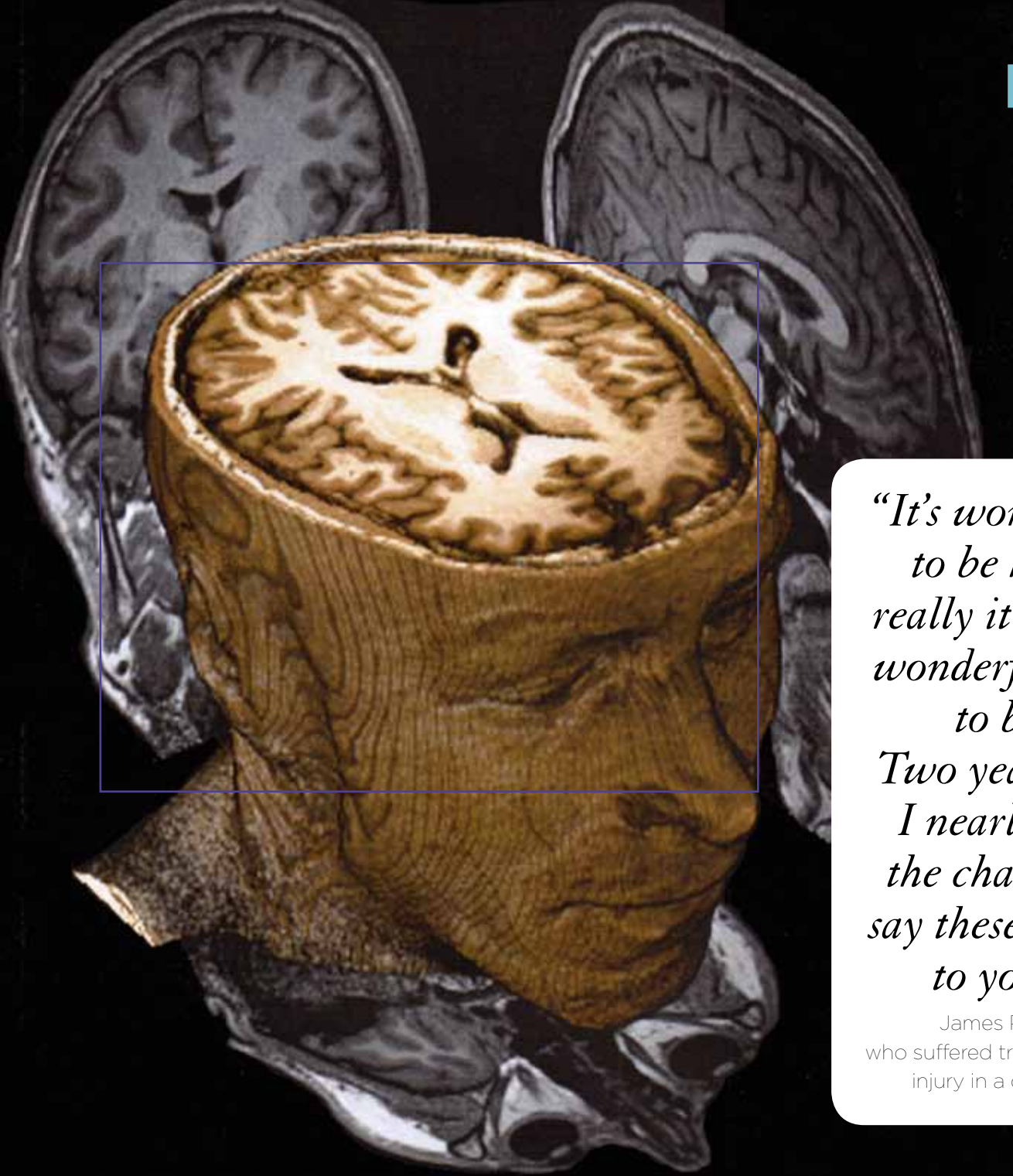
tain score of between 3 and 5.

He was then flown to Addenbrookes Hospital in Cambridge, which was deliberately chosen for its first class reputation in neurology. “If you get a bang on the head this is where you want to go,” advises Piercy. Within three hours of the accident, Piercy underwent a Computed Tomography (CT) scan. CT uses X-rays that spin around the patient's body to produce a detail image of the area under investigation, in Piercy's case his head injuries. This usually takes up to a couple of minutes, but some of the most advanced machines can scan in under 10 seconds. They provide essential information to aid diagnosis and prognosis.

Notably, and speaking as a patient who is very satisfied with his management, Piercy points out that better tools, for example availability of advanced scanners, to improve prognosis are needed more widely. “But this is a very hard need to fill. There's a need to improve just what and how reliably information can be given to families of patients.”

It was immediately obvious that James had a large primary brain injury on the right side of his head, he fractured his skull and eye socket which damaged the oculomotor nerve and trapped the inferior rectus muscle that together control contraction and dilation of the pupil, and movement of the eyelid. The damage prevents Piercy's right pupil from responding to light intensity, and limits movement of his eyeball.

Surgery has helped, but not



*“It’s wonderful
to be here,
really it is, it is
wonderful just
to be.*

*Two years ago
I nearly lost
the chance to
say these words
to you.”*

James Piercy,
who suffered traumatic brain
injury in a car crash

completely, and Piercy has permanent double vision. Initially he had problems with depth perception but with coping mechanisms this has improved over time. Walking too has presented its own set of challenges. The brain damage has affected his sense of proprioception – the self-awareness of one’s body leading to unsteady walking, although this has also improved extensively over time as Piercy’s brain has adapted.

Magnetic resonance imaging (MRI) also showed Piercy experienced bruising and bleeding on the brain. More specifically, he suffered a brain injury known as coup contre-

coup, where the brain collides with the inside of the skull and in his case, caused a diffuse axonal injury to the left hemisphere. Many of the billions of connections within the brain become disconnected during brain injury, as the brain moves inside the head and the grey and white matter shear past each other. “In my accident, my head stopped but my brain continued to move inside it, forward and back,” Piercy explains.

Piercy also sustained injuries to the left hemisphere, with a number of relatively small lesions, visible on MRI. His weakened proprioception on the right hand side of his body

suggests problems with the left-hand side of the brain. Interestingly, the damage to the left hemisphere, although visually less noticeable than the large primary lesion, has had a greater impact on Piercy’s functioning.

“This is partly because I’m right-handed, so the left hand side of my brain is dominant and injury here has a larger effect,” he points out.

Unfortunately repairing such brain injuries is futile, so Piercy did not receive any treatment for his primary injuries at all. Head injuries require the patient and treating clinician to

Continued on page 22

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watch and wait. If it worsens then an appropriate intervention will help prevent more damage.

"There is nothing to be done other than to prevent secondary injuries. If a blood clot or similar secondary problem occurs that can be removed or treated."

One way to monitor and prevent further damage to the brain is to insert a subarachnoid bolt placed through the skull into the brain to measure activity at the surface and in the subarachnoid cavity. This device



James Piercy in the East Anglian Air Ambulance that helped to save his life

was used to measure Piercy's brain's sugar levels, by-products, oxygenation of the blood and intracranial pressure. "Between 5-15 is normal. My intracranial pressure measured 26 at one point. This incurs secondary risks including bursting of vessels, bleeds and clots and pressures on the brain, which can potentially damage a wider area."

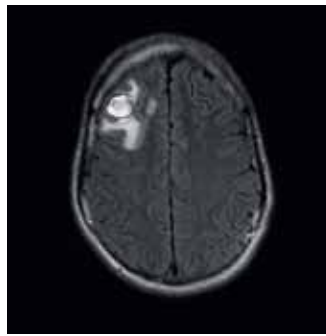
The other major effect of Piercy's brain damage was his post-traumatic amnesia (PTA), which is an inability to store memories after brain injury. This contrasts with the less common retrograde amnesia, relating to an inability to recall memories formed before the injury. "PTA is like a child who yanks the cable out of your computer so that any recent changes are unchanged," Piercy explains.

PTA provides an assessment measure of longer-term outcome. Testing involves answering a series of questions such as what is your name,

which month is it and what time is it? During testing two weeks after the accident, Piercy was also asked which year it was and who was on the throne, to which he answered 1999 and King Charles II. Piercy had PTA for just over three weeks, which along with results of the questioning led to a rating of severe. Compared to his remarkable awareness and functioning now, two years later "this is one reason why my consultant believes my recovery is phenomenal," Piercy says.

Some head injuries precipitate psychiatric problems. Fortunately, Piercy seems to have been spared in this respect. Motor impairment and fatigue are also very common in these patients, with functional MRI showing that patients with brain injury use many more areas of the brain to complete a single task than a person without brain injury, therefore tiring more rapidly. After a long day, Piercy can tire very quickly and this is evident by his speech becoming barely understandable.

He illustrated this by showing a video of himself reading Shakespeare when tired. "I want to highlight that



Brain scan of Piercy's head showing a large bleed and contusion in the frontal lobe on the right side

although my speech was confused, I could read and understand Shakespeare. Too many people treat brain injured patients as being unintelligent but they are not. This is an important message."

As time passed during his two-month stay in hospital and later as an outpatient, Piercy often surprised medics with his abilities. He has no complaints about his treatment, but he observes that some of his remarkably good results on later testing might be due to him not quite fitting the 'standard model'. "Each patient needs to be treated as an individual patient and not just a case. Maybe I'm not 'normal' but I suspect nobody is really average, and the lack of any baseline can make patient assessment through tools and tests a bit unreliable. I think it would help to learn a lot through understanding them as a person before and after the brain injury."

In addition to his day job as Science Communicator for Science Made Simple Ltd (East), Piercy is touring the UK giving talks on his brain injury. More information can be found at James Piercy's blog <http://whatsgoingoninthishead.wordpress.com/>. The Wellcome Trust is supporting the entire project.

James Piercy will be speaking at the BNA2013: Festival of Neuroscience, London in April.



First ever neuroscience festival for the general public as well as scientists

This April will see the first neuroscience festival aimed at the lay public run alongside the annual scientific conference. BNA2013: Festival of Neuroscience runs from April 7–10

Reflecting a growing fascination with the science of the brain amongst the general public, the British Neuroscience Association (BNA) is holding its very first neuroscience festival featuring a specific programme aimed at the lay public in London this April. The public events will run in parallel with the core scientific programme for researchers in the field of neuroscience.

BNA2013: Festival of Neuroscience, is the first of its kind- there has never been a neuroscience conference with an additional public programme before. "It's unique," said Elaine Snell, who is the Chief Operating Officer for the BNA. "The UK's neuroscience research is strong so we want to raise the profile of British neuroscience and neurology to reflect this," she added in an interview with *EBC News*.

The concept of holding an interdisciplinary meeting with events for the general public emerged over two years ago, generating a partnership of 18 other learned societies and organisations with an interest in brain research. The concept of a festival captured the imagination of the neuroscience community as well as corporations, charities, the pharmaceutical industry and policy makers.

One of Europe's leading arts venues, the Barbican, in Central London, will host the festival which has already registered 1500 people from 30 different countries. A number of renowned scientists are due to present at the scientific sessions including David Attwell, Jodrell Professor of Physiology, University College London, who will discuss the CNS and the brain's white matter, and Anders Björklund Professor of Histology, Lund University, Sweden who will talk about stem cell therapy for Parkinson's disease. Symposia and workshops will

total 56 in number, with 240 speakers and over 900 abstracts. As well as the scientific sessions, there will be an extensive trade exhibition.

The festival has actually inspired a whole season at the Barbican, which



Elaine Snell, BNA Chief Operating Officer

together with the Wellcome Trust, is producing 'Wonder: Art and Science on the Brain'. The Wonder season will feature films, music, theatre, talks and participation, and a wealth of hands-on experiments for visitors of all ages.

Amongst the big names promised to make an appearance in the festival's public programme are comedian Ruby Wax who will talk about her depression and the research it has inspired, mathematician Marcus du Sautoy and DJ James Holden who will explore consciousness through an audiovisual spectacular. There will be a theatrical recreation of a 19th century Parisian debating salon, performances, demonstrations, films and even a competition called 'I'm a neuroscientist – get me out of here,' where the audience pit their questions against a panel of brain scientists, and the best answer wins.

Immediately after the BNA2013: Festival of Neuroscience, a separate Neuroscience Summit will be held at the Royal Society, also in London, and will host discussion relating to neuroscience strategy in the UK. "It is aimed at bringing together leaders who can influence policy and generate new initiatives for research into, and treatment for, disorders of the brain," said Snell.

The BNA, which is the largest organisation covering all aspects of neuroscience wishes to capitalise on the strength of British neuroscience and represent it more effectively nationally and internationally. "Career opportunities for young neuroscientists are definitely a priority. Certainly we want more discussion and action on neuroscience policy, communications and education," Snell pointed out.

Another key aim of the BNA is to encourage more effective collaboration between disciplines, which is recognised as a limiting factor to the pace of research. "We'd like to help engineers, physicists, pharmacologists, neurologists and neuroscientists seek each other out," Snell said.

She added that one way of accelerating research was to recognise the role of other disciplines to create the broad mass of skills to solve particular problems such as dementia. Finally, but far from least, the social, legal and ethical consequences of brain research feature highly on the BNA's agenda. "With advances in the science, ordinary people, scientists and politicians have to work out how best to apply new knowledge of the brain."

The BNA festival is being held in London on 7–10 April 2013.

For more information, see www.bna2013.com/207040 and www.barbican.org.uk/wonder

More clarity needed in communicating benefit-risk data to patients

EXPERTS AGREE THAT ACTION AT THE EUROPEAN LEVEL IS NEEDED TO HELP PATIENTS NAVIGATE THROUGH THE FLOOD OF MEDICINES' DATA NOW AVAILABLE ENSURING THAT PATIENT HEALTHCARE DECISIONS ARE BASED ON THE BEST INFORMATION AVAILABLE.

The pharmaceutical industry, regulatory authorities and physicians need to consider more effective methods of communicating highly complex information on medicines to patients. This would aim to ensure benefits and risks are clearly understood, and to guard against the flood of medicines data that is entering the public domain due to new transparency laws, according to experts. They also note that more action is needed on a European level to help meet this need.

In a series of meetings held at London's Royal Society over the past three years, representatives from regulatory authorities, pharmaceutical companies, patient organisations and academia discussed the communication of pharmaceutical benefit-risk information to the public. The meetings were triggered by the recognition that society's requirements for healthcare related information are changing, and that patients are better informed about their conditions and available treatments than ever before.

Of note, these discussions identified that patients need to be more involved with their healthcare decisions and have access to readily available and trustworthy information that is both accurate and easy to comprehend.

Göran Hermerén, Professor of Medical Ethics at the Faculty of Medicine, Lund University, Sweden, co-chaired the working group with Dr. Mary Baker, President of the EBC. He said that

patient autonomy or decision-making shared with relatives was becoming increasingly important. But he pointed out that, "this presupposes existence of information that is relevant to their needs, that is understandable, trustworthy and easily accessible.

Also, the information needs of patient relatives should not be forgotten."

Regarding healthcare decisions, he highlighted that there remained a question over who should decide if the risks in a particular case were worth taking in view of uncertain benefits, especially when the drug trials were conducted in different study populations to that of the patient.

Today's healthcare environment uses vastly more data than ever before including electronic medical records, legal compliance needs, and EU Directives that are creating a data overload and over-complicating communication about medicines. In particular, the language of clinical medicine, pharmaceutical development and safety reporting is highly technical and inaccessible to many patients, and precipitates a requirement to explore alternative forms of

patient communication.

But translating highly technical information into a form digestible and helpful to the average member of the public requires an understanding of the nature of information, including an explanation of the concept of benefit versus risk inherent in tak-

"The need for trust can hardly be exaggerated. Ideally, information should be available from more than one source, but national portals providing trustworthy information would be better than just letting patients search the Internet, which has no quality control in place."

Göran Hermerén,
Professor of Medical Ethics
at the Faculty of Medicine,
Lund University, Sweden



Göran Hermerén,
Lund University,
Sweden

ing medicines. Patients need this information in order to be able participate in decisions about their own healthcare.

In the near future, this need for improved communication of information to patients will become ever greater with the increasing volumes of medicines information that is about to hit the public domain as a result of new legislation.

Recent pressure to make the European Medicines Agency's (EMA) procedures more transparent included improving accessibility to original data, the rapporteurs' initial reports, as well as discussions between the Committee for Human Medicinal Products and the pharmaceutical industry.

Reflecting on the increased volume of data becoming available, Hermerén pointed out that he believed too much information would create confusion. "The difficult challenge is not finding information but selecting what is relevant and trustworthy."

One conclusion from the Royal Society meetings is that the move towards data transparency must be complemented by other improvements in pharmaceutical education, communication, and monitoring of patients' access and use of medicines.

The group also called for moves on policy related to medicines communication and that a workable statement of intentions relating to improving communication passes through the European Parliament. In particular, regarding increased transparency and data availability, Hermerén concluded: "It is very important to have a dialogue with the European Parliament on what could be done to minimise the bad effects of the 'data dump' mentioned earlier and to optimize the good effects."

"The difficult challenge is not finding information but selecting what is relevant and trustworthy."

Göran Hermerén,
Professor of Medical Ethics
at the Faculty of Medicine,
Lund University, Sweden

Expert opinion

Göran Hermerén, Professor of Medical Ethics, explains how the communication of medicines information to patients needs to change.

"Investments need to be made at different levels, but in particular they should benefit society at large and in particular the health of European citizens. But first we need to know more about what different patient groups want, and we need to explore this through case studies and pilot projects," said Hermerén.

"Trust is clearly a prerequisite for communication. Ideally, information should be available from more than one source, but national portals providing trustworthy information would be better than just letting patients search the Internet, which has no quality control in place. It is essential to involve institutions and agencies with high credibility like EMA and IMI [Innovative Medicines Initiative] at an early stage."

"Improved communication between doctors and patients is a better way to deal with this problem. This may require some education of both parties. The methodological challenges involved in translating complex information to accurate and patient-friendly communication should not be underestimated, and these challenges need to be addressed."

EFNS and ENS make progress with formation of the European Academy of Neurology

European Academy of Neurology on target for 2014 launch as the ENS and EFNS join forces to unite European neurologists

The year 2014 promises to be a landmark one for European neurologists: the merger of the European Neurological Society (ENS) and the European Federation of Neurological Societies (EFNS) will unite neurologists in a new organisation called the European Academy of Neurology (EAN). Currently talks are underway between the existing societies to finalise the arrangements to ensure that the new EAN is created by mid 2014, with an inaugural conference scheduled for 2015.

After years of attempting to bridge the gap between ENS and EFNS, the disparate organisations are finally coming together, thanks to the initiative and strong friendship between the past president of the EFNS, Professor Jacques De Reuck, and Secretary General of ENS, Professor Gustave Moonen.

Richard Hughes, Emeritus Professor of Neurology at King's College London and President of the EFNS remarked that, "the two organisations had a different ethos, and inevitably divided the loyalties of European neurologists, diluted efforts to develop European collaborations and either made it arduous to attend two annual congresses or difficult to know which to attend."

Although similar in name, the infrastructure of each society differs markedly. Hughes provided some insight: "The ENS was founded by a small group of senior neurologists [in 1986] and was informal. Individual members joined on a paid subscription basis and without the bureaucracy inevitable in a federation." In contrast, the EFNS was founded slightly later [in 1991] as a federation in which delegates are appointed by their national societies. The structure is more formal and bureaucratic with a larger management committee elected by the Council of delegates and bound by quite complex bylaws. "Although the two organisations have similar aims, their development was quite different and



EFNS EUROPEAN FEDERATION OF NEUROLOGICAL SOCIETIES



their underlying structures remain different," Hughes pointed out.

Looking ahead, Hughes is optimistic about the joint venture and has high hopes for the new Academy. "I would like to remove duplication of effort, and see increased support for junior neurologists and neurologists in Eastern Europe and Africa" he commented. The new combined congress should hold greater appeal for pharmaceutical companies, be of higher quality and attract larger audiences. "We are hoping that this will encourage European neurologists to present their best material first to the EAN rather than across the Atlantic" he added. Hughes also hopes that American neurologists will want to come to present their latest scientific findings at the EAN annual congress.

In 2014 the EFNS and ENS will hold a joint congress in Istanbul where they expect to attract more than 7000 neurologists from all over the world. At this congress, the EAN will hold its first general assembly consisting of 45 individual members (from the former ENS) and 45 national delegates. The assembly will elect the Board of the new EAN. "The transition task force

making the arrangements for the new EAN have stated that they will not stand for election and I will also not stand," Hughes remarked.

Candidates for the Presidency of the EAN must not have held senior office in either organisation. "In this way the EAN will get off to a fresh start without any undue influence from either of the previous organisations," said Hughes. This meeting will officially mark the dissolution of the EFNS and ENS and the creation of the EAN.

The coming together of the two organisations has also raised the issue of which publishers will be responsible for producing the European Journal of Neurology, which currently belongs to the EFNS but will become the official publication of the EAN. To date, no publishers have been appointed; instead a bidding process for potential publishers will take place.

The EAN Head Office will be in Vienna, Austria with subsidiary offices in Basel and Brussels. The year 2015 will welcome the first congress of the EAN, hosted in Berlin. The second and third EAN Congresses will follow in Copenhagen in 2016 and in Amsterdam in 2017.

A potted history of the ENS and EFNS

The ENS was founded by a small group of senior neurologists in 1986, as based on the initiative of Gérard Said, Anita Harding and P.K. Thomas. The ENS focuses on individual membership within Europe, with the aim to provide continuing education in the neurology field; present original work and offer a support network, such as grants and internships to junior neurologists.

EFNS was founded in Vienna, Austria in 1991. The role of the EFNS is to provide European neurologists with support and training and to provide political representation for European neurology. Forty-five European national neurological societies are registered members of the EFNS, and represent more than 19,000 European neurologists.

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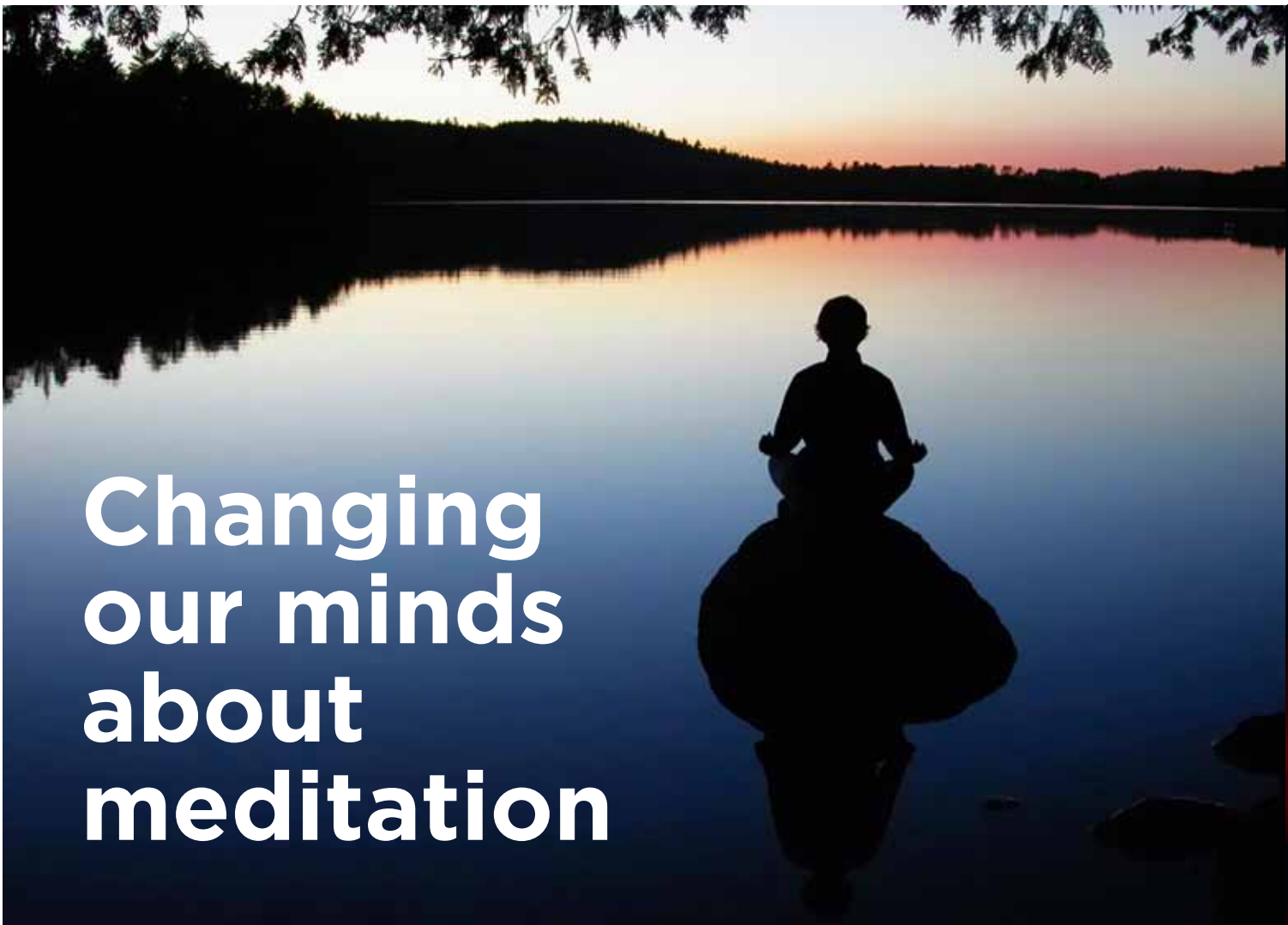
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Changing our minds about meditation

The connection between mind and brain has not always straddled the border of philosophy and neuroscience comfortably. In an interview with the BBC, the Dalai Lama expressed his understanding of the relevance of working hard to keep our minds as well as our bodies healthy, something that has been mirrored in recent years in the field of brain research, revealing the ties that bind modern neuroscience and eastern philosophical ideas of the mind and brain being fundamentally interdependent.

In western culture, matters of mind are quite often segregated from the physical machinations of the brain, because we still don't understand how our brain functions to make us conscious – how perception emerges from the brain. Mind, in the philosophical realm, is tackled in a very philosophical way by cognitive science experts such as Daniel Dennett and Richard Dawkins, who attempt to answer some of the questions that we aren't yet able to through experiment.

With an interest in the physical basis of mind,

“Like religion, scientists investigate about nature of mind itself.”

The Dalai Lama

the Dalai Lama is a great proponent of the positive changes that occur with an awareness about how our minds work and how we behave. “It is very important – necessary – some knowledge about mind, and about different emotions, then how to deal with these,” he said. “In our daily lives, we don't much pay attention to mind, although we daily experience that mind. Like religion, scientists investigate about nature of mind itself, in order to reduce anger – then we deal with causes and conditions of anger. Similarly, with peace of mind, we try to measure the basis of peace of mind. Once we find the causes, ones that gains strength, then peace of mind will automatically come.”

While to brain experts this might seem a little over-simplistic an answer to issues of brain health, the physical basis of the mind is unquestionable. “Physical action, mental action – whether becomes positive, useful, harmful, or harmless – ultimately depends on the mind,” said the Dalai Lama, and indeed the field of neuroscience is undergoing something of a renaissance in this respect, with researchers identifying the underpin-



“Now already some scientists found that through training of mind some changes take place through investigation. Some people, who for many years have received meditation training, have shown changes. From the physical level, even one or two weeks of short training of mind – blood pressure, reduced; stress, are also reduced.”

The Dalai Lama

nings of the meditating brain. “Now already some scientists found that through training of mind some changes take place through investigation. Some people, who for many years have received some meditation training, have shown changes. From the physical level, even one week or two week short training of mind – blood pressure, reduced; stress, also reduced. Their mind became more calm, so have their relationships with their companions, becoming much more peaceful.”

Meditation, the attention-based self inquiry by the quelling of its fluctuation, is an area of growing scientific interest, having been linked with physical alterations in the brain as well as positive psychological outcomes. Such physical changes take place in the brain whenever we experience something new, and these changes can be negative as well as positive. This fundamental dynamic feature of the brain is termed plasticity, and it is the basis of learning and memory, as well as rehabilitation from injuries such as stroke. New experience promotes the formation of new synaptic connections in the brain, and can induce an increase in brain cell proliferation.

An accumulation of evidence suggests that meditation is associated with many positive physical and psychological outcomes. Meditators generally possess greater attentional control, and this has been demonstrated in functional imaging studies revealing that the higher regions of the brain

involved in self-regulation of behaviour are more active during meditation. Other studies have shown that the cerebral cortex in meditators is larger and thicker, and more interconnected, than in those that don't meditate. Meditation and yoga have been used to reduce blood pressure and heart rate in conditions such as hypertension and atrial fibrillation, and it is even being investigated in controlling addictive cravings in smokers and in treating mental illnesses such as depression.

Forming an interpretation from what we observe as neuroscientists in terms of how and why brain changes come about through meditation is not trivial. For the Dalai Lama, the mind is a non-physical entity that we can learn to have better control over with time and practice. “Mind – no form, no physical thing,” he said. “Usually we have too much stress: seeing, hearing, touching smelling... so mind – you can't see it. You can't touch mind. With form, you can take measurements, but mind is formless. Our sensorial consciousness is dominant, generally. The essential nature of consciousness is somehow covered by these sensorial experiences. So therefore, first we deliberately try to stop these past and future visions and memories, then completely ignore sensorial experience. At that moment, you feel sort of empty...remain there, consciously, then gradually, you get some kind of feeling of clear water. Different things reflect. It's pure, nothing. That way you can get some knowledge and some experience of mind.”

Stimulating times in Parkinson's research

ADVANCES IN DEEP BRAIN STIMULATION HAVE PROMPTED RESEARCHERS TO ASK WHETHER THE PROCEDURE SHOULD BE PERFORMED EARLIER ON IN THE COURSE OF PARKINSON'S DISEASE

Deep brain stimulation (DBS), the surgical procedure involving the implantation of a brain pacemaker, is usually reserved as a last resort clinical treatment for those Parkinson's disease (PD) sufferers whose response to levodopa, one of the main drugs used to treat Parkinson's symptoms, is hampered by motor fluctuations and dyskinesia. However, we may start to see its use

on. "Patients improve, and remain improved, but for smaller bits of the day," said Schuepbach. "So the typical candidate for DBS is the patient who really responds well to levodopa in principle, but is disturbed by the non-continuous beneficial effect of the drug. DBS imitates the effect of levodopa, with the great advantage that it is continuous, and this effect remains over time."

Younger patients generally fare

better from invasive surgical procedures such as DBS implantation. This formed part of the rationale for investigating its viability and safety for patients that were seven years on from their PD diagnosis,

rather than 10 to 20, as Schuepbach said: "Because DBS is invasive, it has been used as a last resort treatment. When we have operated on patients, in general they have had 10, 12, 15, and sometimes 20 years of PD. We became aware that maybe this treatment should be suggested earlier, not as a last resort, but as an alternative to medications that are actually not entirely satisfactory."

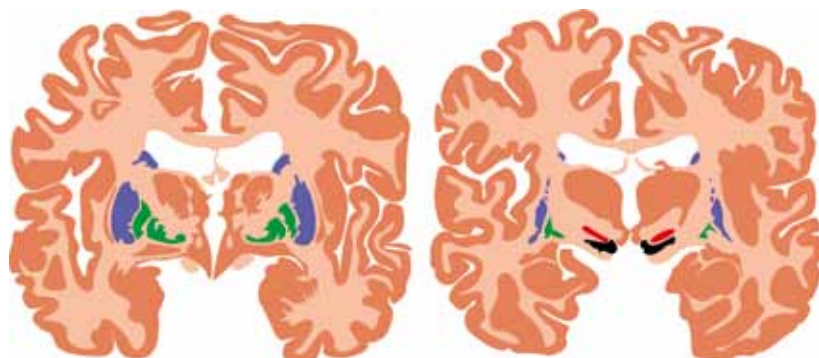
While DBS is currently employed as a last resort, currently the candidate population is generally older can often exclude them from being eligible for the treatment. Schuepbach emphasised that, beyond the first signs of

motor complication, secondary PD symptoms may emerge that respond to neither levodopa nor DBS in this age group. "So there is a time window when stimulation can be applied," he said. "If you intervene surgically much earlier, the population that might benefit is much bigger. Once levodopa is not entirely satisfactory any more, surgery is a possibility that should be at least suggested to the patient."

The EARLYSTIM study makes a strong case for earlier intervention in certain cases with DBS specifically in the subthalamic region of the brain. It has also opened doors for further research into different PD patient groups.

While praising the rigorously designed study, Gardoni noted its limitation to the 11% of patients that are diagnosed before 60 years of age: "In my opinion, the patients enrolled in this study do not represent most PD patients. All the patients were 60 years of age or younger at the time of surgery, in good general health, without dementia, and with a good response to levodopa. It would be interesting to see another study with older patients to confirm the very nice data obtained in the present study," he said.

Aware of the need to study the population over 60, Schuepbach said: "The role of DBS is clearly confirmed for advanced disease, but it is not so clear for early disease in elderly, and especially the exact roles of pallidal stimulation [within the globus pallidus, adjacent to the subthalamic nucleus of the brain] and subthalamic stimulation. I think this is a field that needs more research."



Sections through the brain showing target areas of deep brain stimulation: subthalamic nuclei (red) and globus pallidus region (green). Source: Wikimedia (creative commons licence).



Michael Schuepbach

earlier on in the course of the disease, when only mild motor complications are the predominant symptom.

Dr Michael Schuepbach from the University Pierre and Marie Curie, Paris, France, principal co-author of the EARLYSTIM study spoke to *EBC News*. The EARLYSTIM study shows that the benefits are significant for younger patients. "The threshold for suggesting DBS has lowered, both in terms of time and of severity of motor complications," he said.

Levodopa alleviates motor dysfunction well at first, but has the curious effect of working for decreasing intervals as time goes

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Tackling the threat to clinical and research MRI

Alliance for MRI are working to amend a directive restricting the use of MRI in the workplace, because of its potentially detrimental effect on clinical and research MRI.

Formed in 2007 in response to the implementation of the EU Physical Agents Directive (EMF), Alliance for MRI is a coalition of European Parliamentarians, patient groups, leading European scientists and the medical community. Dr Steve Keevil, a leading member of Alliance for MRI, explained the impact of the directive on MRI (magnetic resonance imaging) practice and the current state of the lobbying and negotiations.

The EMF Directive (2004/40/EC) was originally proposed to protect workers from over-exposure to electromagnetic fields, including those arising from MRI scanners. "It applies to all occupational sectors," said Keevil. "The impact on MRI was initially overlooked."

This unfortunate oversight has threatened the normal clinical and research use of MRI, because the restrictions imposed by the EMF Directive would not allow research and clinical practise as it stands to continue. But how can the exemption be justified? "The exposure limits set in the directive are well below the levels at which physiological effects occur," said Keevil, explaining that the large safety margin put in place by the EMF directive is designed to account for equipment with a highly varying and unpredictable electromagnetic field. "MRI, by contrast, has highly predictable and controlled EMF outputs," he said.

With international regulations for MRI safety already existing in the IEC standard (60601-2-33), the MRI community would be unnecessarily stifled by the EMF directive. The impact on clinical and research practice would be disastrous, as Keevil described: "It would prohibit, for example, MRI-guided surgery, forbid nurses from remaining with patients during a scanning procedure, and thus deny Europe's patients access to this much needed technology. In fact, any activity requiring staff members standing close to the scanner during imaging (e.g. caring for a sick or anaesthetised patient, interventional MRI, or some types of research), or even walking at a normal speed close to a scanner

on-field, would become illegal."

The current thresholds outlined in the IEC safety standard for MRI are based on rigorous studies of both the physiological and health effects of MRI. "On the whole, the effects that have been shown or predicted to occur are 'deterministic': that is to say they occur above a particular exposure threshold. As long as that threshold is not exceeded there is no risk," said Keevil.

While there is no evidence of long-term health effects of MRI, there are studies taking place in the Netherlands and UK that hope to address this uncertainty. "The MRI community supports these efforts, since obviously it is in our interests to know if there is some hitherto unidentified adverse effect," said Keevil. "However, any such effect would have to be very small as it has not come to light yet, despite the fact that hundreds of millions of

MRI scans have been performed."

Due to the efforts of Alliance for MRI, the European Commission published a proposal in 2011 revising the existing EMF Directive to include a derogation for MRI. Prolonged discussions within the European Parliament and Council have ensued, delaying the Directive's implementation for more than five years. In October 2012, the Cypriot Council Presidency adopted the harmonisation of the existing IEC safety standard with the Medical Devices Directive.

In December 2012, the leading Employment and Social Affairs Committee (EMPL) endorsed the MRI derogation in its adoption of a draft report on the revised Directive on exposure to electromagnetic fields (2004/40/EC).

"The Alliance for MRI views the vote as a positive development, which shows that a majority of the Employment Committee members recognise the importance of MRI for patients in Europe and are willing to take the necessary legislative steps to ensure that this technology will remain available to patients today and in the future," explained Keevil. "However, continued support of the Alliance for MRI is necessary, therefore it still important support the Alliance for MRI's efforts via contacting MEPs prior to the plenary votes."

The EP's plenary vote is likely to take place in June 2013.

The Alliance for MRI online petition gives supporters the possibility to endorse the Alliance for MRI position electronically. It can be found at: www.alliance-for-mri.org/cms/website.php?id=en/eu_affairs_research/alliance_for_mri.htm

"A majority of the Employment Committee members recognise the importance of MRI for patients in Europe and are willing to take the necessary legislative steps to ensure that this technology will remain available to patients today and in the future."

Steve Keevil, Alliance for MRI



Interview: Blaž Koritnik of the Slovenian *For The Brain* campaign

AS PART OF BROADER EFFORTS TO STRENGTHEN ADVOCACY IN NEUROSCIENCE SOCIETIES ACROSS EUROPE, SLOVENIA IS FORGING A PATH TO RAISE PUBLIC AWARENESS OF BRAIN HEALTH, AS WELL AS DRAWING TOGETHER THE COMMON GOALS OF NEUROSCIENCE STAKEHOLDERS TO EFFECT POLICY CHANGES.

Dr Blaž Koritnik, President of SiNAPSA (the Slovenian Neuroscience Association), spoke to *EBC News* about what the Slovenian Brain Council will achieve for future generations on both a local and European level.



Neuroscience is tackling some of the biggest health problems we face today. What is the state of the field at the moment in Slovenia?

We have had a lot of interest in recent years, from young students and PhD students to postdoctoral fellows and senior researchers. The interdisciplinary nature of the field is really what is attracting people to neuroscience research. On the other hand, we still lack major institutions devoted exclusively to brain research. This is one of our main goals, to try to unite at the level of institutions.

It was great to get the FENS-SfN (Federation of European Neuroscience and Society for Neuroscience) advocacy grant. It was a seed grant, but the whole effort of the International Brain Research Organisation, EBC, FENS and SfN in trying to put neuroscience advocacy upfront really helped us to join the effort and to develop our own ideas based on support from above. So we are looking forward to a future of collaboration and idea-sharing, both vertically from EBC to

local communities and horizontally between different countries.

What kinds of things are being put into place as part of the campaign to try and engage people with neuroscience?

Today we have managed to get the support of the President of the Republic of Slovenia, from the President

of the Slovenian Academy of Sciences and Arts, and from the rectors of two of the most important Slovenian universities. We have also reached a consensus among the members of the Slovenian Brain Council at the general assembly today on how to proceed with the action. All the member organisations have signed the Month of the Brain.

At the moment we have set up a few pilot projects, including raising funds for travel grants for young researchers and asking people to participate as volunteers in neuroscience research. We are trying to develop ideas within the next two months, to come up with specific goals during the European Month of the Brain this May. At the moment, this is still a work in progress.

The Slovenian Brain Day is coming up. Have you made any plans for that yet?

The first Slovenian Brain Day will hopefully take place next year, on the third Wednesday of March, in the middle of Brain Awareness Week. We will prepare activities related to neuroscience and brain advocacy – not just reaching the general public, but policymakers too.

In your manifesto, you mention calculating the financing required to meet the cost of brain disorders.

“We are looking forward to a future of collaboration and idea-sharing, both vertically from EBC to local communities and horizontally between different countries.”

Blaž Koritnik, President of SiNAPSA, Slovenia

Photos courtesy of Matej Kolaković



Blaž Koritnik

What is involved in that calculation?

The important starting point was the European study of the cost of brain disorders and the Slovenian study, which will be published this month. But we do not have very good estimates of research funding for specific fields of science, so one of the major goals is to try to establish the correct proportions within the total research funding. The other, more important goal, which is more difficult to achieve, is to increase the total research funding. I think that at

the worldwide level, it is very difficult to talk about actual numbers – how much we need to spend on neuroscience research – especially because investments into neuroscience research will mainly produce long-term results. These trends are clearly shown in the recent decision of the EU to fund the Human Brain Project.

Can better handling of the root causes and care issues associated with brain disorders tackle some of these health problems more effectively?

Big steps have been already made in cardiovascular and oncology fields trying to educate people how important it is to change their lifestyle and live healthily. It is actually the same story for the brain. It is really the same lifestyle measures that will help us to achieve both cardiovascular and brain health. I hope that we can liaise with other societies from the cardiovascular field, because we basically confront the same problems and are trying to find common solutions for them. Other organs affect how the brain works, and the brain affects how other organs work.

“I hope that we can liaise with other societies from the cardiovascular field, because we basically are standing in front of the same problems and are trying to find common solutions for these problems. Other organs are affecting how the brain works, and the brain is affecting how other organs work.”

Blaž Koritnik,

President of SiNAPSA, Slovenia

Photos courtesy of Matej Kolaković



Press conference launching the *For the Brain!* campaign. From left to right: Blaž Koritnik, president of SiNAPSA, Slovenian Neuroscience Association; Simon Brezovar, chair of the Brain Awareness Week project; Zvezdan Pirtošek, president of the Slovenian Brain Council; and Grega Repovš, coordinator of the *For the Brain!* campaign.

A detailed scanning electron micrograph of a neuron, showing a large, textured cell body (soma) with several long, branching processes (dendrites and axons) extending from it. The image is in grayscale, highlighting the intricate structure of the neural tissue.

Human Brain Project set to receive €1bn in funding

"[The HBP] addresses one of the most fundamental research challenges of our times and at the same time has the potential for radical impact on the way we store and use information."

Bernhard Eitel of Heidelberg University

THE HUMAN BRAIN PROJECT WINS €1BILLION FROM THE EUROPEAN COMMISSION TO ENHANCE UNDERSTANDING OF BRAIN DISEASES AND DISORDERS AS WELL AS DEVELOP NOVEL DIAGNOSTIC TOOLS, TECHNOLOGIES, AND COMPUTATIONAL METHODS

Late January saw the awarding of €1 billion by the European Commission for two large-scale scientific initiatives, the Human Brain Project (HBP) and studies into the novel material graphene. Part of the Future and Emerging Technologies (FET) competition, this is the largest and most expensive academic programme of its kind set up in Europe.

The HBP will be a revolution in brain analysis that will help us to understand the functional roles of different regions of the cerebral cortex, such as the language and visual cortices, as well as how different regions interact to produce sensations and perceptions. “What we want to do is build a CERN for the brain,” said HBP leader Professor Henry Markram, speaking to European Commission Vice President, Neelie Kroes. “It is critical to trigger a massive, globally collaborative, and very focussed effort at understanding the brain,” he said.

Coordinated by École Polytechnique Fédérale de Lausanne, Switzerland (EPFL), and involving over 80 research partners across Europe, the project will amass anatomical, functional, bioinformatics, psychological and diagnostic data from around the world. With such a complex array of data, supercomputer simulation is the only way that it can be understood and extrapolated, as Markram explained: “We need to piece together all the data and knowledge that has been accumulated over the past 200 years, and we need to bring it together – integrate it – so that we can move forward in a unified understanding of the brain. We anticipate that over the course of the next ten years, we will have a facility that can digest the data, put it together and construct models as accurately as we can describe biologically. We can also, through simulations, fill a lot of gaps. We have actually found that it is impossible to experimentally map every part of the brain. We have to use supercomputing simulation to complete that process.”

The FET programme, with its slogan ‘science beyond fiction’, aims to forge new means of addressing the major problems we face today in spheres as diverse as health, infrastructure, environment and data management, to create new technologies that will benefit society as well as kindling long-term economic growth.

The HBP will not only help us understand the mechanisms at play in a variety of diseases of the brain, but it will also be constructive in understanding the computational principles underlying brain function. Neurobiologist and Nobel Laureate Torsten Wiesel noted that the project will drive the development of increasingly powerful computers that will be of great help to science in general. “The research can also give rise to fundamen-



“What we want to do is build a CERN for the brain.”

HBP leader Professor Henry Markram.

tally new computer architectures modelled after the brain,” he proposed. “This cooperation should lead to new concepts and a deeper understanding of the brain, the most complex and intricate creation on earth.”

Cognition is something that we take for granted, and our brains achieve it with relatively little energy within a relatively small organ. Harnessing these neurosynaptic principles in order to emulate the way the brain works is a keen prospect in the computing world, with the possibility of making computers smaller, more flexible, and more efficient. “[The HBP] addresses one of the most fundamental research challenges of our times and at the same time has the potential for radical impact on the way we store and use information,” enthused Bernhard Eitel of Heidelberg University, Germany, one of the research partners of the HBP. “The new project will be an important pillar of research at our university.”

Early treatment for Alzheimer's sufferers may offer hope of improved outcomes

SPEAKING AT THE 2012 ALZHEIMER'S SOCIETY CONFERENCE IN 2012, UK PRIME MINISTER DAVID CAMERON SAID DEMENTIA NEEDED TO BE TREATED FOR THE NATIONAL CRISIS THAT IT WAS. SO HE LAUNCHED A CHALLENGE, WHICH AIMS FOR A 10% INCREASE IN THE NUMBER OF PATIENTS PARTICIPATING IN RESEARCH. MARTIN ROSSOR, CLINICAL PROFESSOR AT THE INSTITUTE OF NEUROLOGY, LONDON TELLS US HOW THIS CHALLENGE IS TAKING SHAPE.

Rossor sees dementia not only as a threat to patients but to a country's economy too. He strongly believes that, "brain health equals national wealth. I see dementia as similar to the challenge of global warming. The numbers are vast," Rossor remarked.

"It's estimated that the current cost globally for dementia is around 1% of the world's gross domestic product which is equivalent to the GDP of Turkey and, as we live longer, the numbers will increase."

In the UK, there are around 800,000 patients with dementia. According to figures from Alzheimer's Disease International (ADI), as of 2010, there are an estimated 35.6 million people with dementia worldwide. This number will nearly double every 20 years, to an estimated 65.7 million in 2030, and 115.4 million in 2050. Rossor pointed out that the cost associated with these patients is enormous and will increase. If you add in memory and cognitive prob-

lems in those not severe enough to be diagnosed with a dementia then the figures are bigger still.

Rossor is also the director of the National Institute of Health Research (NIHR) Dementias and Neurodegenerative Diseases Research Network (DeNDRoN) as well as director of the NIHR Queen Square Biomedical Research Unit in dementia at the National Institute of Health Research. These organisations are actively involved in efforts to meet the Prime Minister's challenge and at the European level, with the European Union Joint Programme – Neurodegenerative Disease Research (JPND).

Regarding the Prime Minister's Challenge, there are three key objectives: better clinical care which aims to ensure delivery of best practice; the creation of dementia friendly communities, effectively making our communities more tolerant of people with dementia; and increased research.

Rossor explained that whilst advances in understanding dementia at

the molecular level were important they had to go hand in hand with practical measures to improve patients' lives.

"There's a lot of work with businesses and city councils to make it easier for patients with cognitive impairment to get around," he said with reference to the community strand of the challenge. "How do managers in supermarkets, for example, train staff to be tolerant of people who may have difficulty with change or coping with shopping?"

With respect to the research aspect of the Prime Minister's challenge developing a method of patient recruitment called RAFT, which allows clinicians to approach patients with early dementia during consultation, asking them whether they wish to participate in research activity. "This list of consenting patients can then be interrogated by researchers and the individuals contacted about studies."

This differs from methods of patient recruitment where researchers identify names from primary care lists without prior patient contact



Martin Rossor

Clinical Professor at the Institute of Neurology, London

Director of the National Institute of Health Research (NIHR) Dementias and Neurodegenerative Diseases Research Network (DeNDRoN)

about the research study. Research has shown that if people are contacted after even a brief face-to-face consultation on the subject of involvement in research then they are more likely to respond positively to a later request to participate. "It's a very effective way of recruiting people and celebrates the partnership between doctors and patient in the research process," he pointed out. RAFT will be launched this summer in the UK.

In his role as professor of clinical neurology at UCL, Rossor is actively involved in research. Currently, one leading avenue of research is exploring what can be learnt from patients who have familial forms of dementia. Although it is rare, Alzheimer's disease can be inherited as an autosomal dominant disorder, and scientists have identified the gene mutations that can give rise to familial Alzheimer's.

"We've been conducting research in London, looking at individuals in families with disease gene mutations before the disease manifests and we

follow them to see how the disease starts," Rossor explained.

Recently, an international research partnership called Dominantly Inherited Alzheimer Network (DIAN) based at the University of Washington in the US has looked at this in more detail. DIAN aims to understand this rare form of Alzheimer's disease that is caused by a gene mutation, with the intention of finding clues to decode other dementias and developing dementia treatments.

Recent therapeutic research into tackling Alzheimer's disease has focused on giving people antibodies against the amyloid proteins that accumulate in the brain of patients with the disease. Recent studies including solanezumab have failed to meet the trial's primary endpoint.

But experts including Rossor, believe that spotting and treating the disease much earlier in its course might yield better results. "By the time patients have dementia, we know from looking at people with the familial

form that there are changes in the brain and spinal fluid 10-15 years before symptoms are seen so there is a window of therapeutic opportunity," said Rossor.

According to Rossor, familial Alzheimer's is only seen in the minority of patients however post mortems reveal that the brain of patients who had Alzheimer's look the same whether the patient had familial or sporadic disease. "So what can be learnt from the familial group can be applied to the more common form."

In response to the need to treat earlier in the disease course, is now beginning in patients who are at risk of carrying the gene where they are being given antibodies before they develop any symptom. "This is a dramatic change in approach to treating disease," Rossor remarks. "If one can demonstrate target engagement and efficacy in the premanifest group then it holds promise for larger scale trials in early pre-dementia Alzheimer's disease, ie those with only mild symptoms."

The future of antidepressants requires understanding at a molecular level

The antidepressant fluoxetine is poorly understood, but it helps plenty of patients nonetheless. In the future, understanding how different drugs work on the molecular level in different patients will be the key to more effective therapy.

Fluoxetine was first marketed in 1988, yet we are no closer to understanding how it works as a treatment for depression. However, this antidepressant still brings measurable benefits to patients. *EBC News* spoke to neuroscientist Dr. Sandrine Thuret from the Institute of Psychiatry, UK about how we are slowly understanding the complexities of depression on the molecular level.

Fluoxetine emerged in the pharmacological revolution during the 1980s and continues to ride the wave today. Like many other drugs, it originally underwent clinical trials as a treatment for something else entirely. When its trial for hypertension failed, it was eventually approved for treating major depression. Today, it is prescribed for a plethora of other health complaints including obsessive compulsive disorder, bulimia, panic disorder, and even alcohol dependence.

How fluoxetine works It is thought to work

by inhibiting the reabsorption of serotonin, which has long been touted as the 'happy chemical' of the brain. As a result, serotonin lingers in the synapse of nerve cells. These nerve cells are involved in things like mood, appetite, and sleep, and continues to trigger the firing of surrounding neurons. This is one of the ways that serotonin is thought to be involved in depression, although it is certainly not the only neurotransmitter involved in the complex condition. Symptoms, differing from patient to patient, belie something more intricate, as Thuret emphasised: "Depression has a broad spectrum of symptoms. It is difficult to pinpoint exactly what medication is helpful for a specific variety of symptoms. Maybe this is easier with molecular data."

Individualising therapy with biomarkers

There is no question that fluoxetine and other antidepressants have an effect on the brain's metabolism of serotonin and other neurotransmitters, although they may represent something of a lottery for sufferers of depression, as Thuret described: "People are prescribed antidepressants according to symptom. At the moment, there is no way to predict how the patient will respond.

So the doctor will prescribe one type of antidepressant that maybe sits best with the patient's symptoms, and then he will see from there." Despite the breakthrough of the Human Genome Project and technological advances in biomedical sciences, the complexity and dynamism of the brain's metabolism has meant progress has been slower than expected in distinguishing patients and diagnosing them more effectively.

"This is actually the research we are doing at the moment," Thuret said. "We are trying to find some markers that will tell us if this patient has a high level of this protein in the blood, that he is more likely to respond to this treatment, or that he will not respond to that treatment. But we don't have any biomarker yet."

Biomarkers, the various substances in the body that can be measured as hallmarks of health or disease, can help to understand how a patient changes during the course of depression and drug treatment. Progress might be slow, but results might be closer than we think. "We are definitely on the way to identifying biomarkers," said Thuret. "I think that's what needs to be done: to try to refine the treatment and understanding of patients, using biomarkers. I think that's what researchers are looking at right now."

BNA2013: Festival of Neuroscience

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There are many ways that you can be involved in this exciting event.

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A major commercial exhibition will take place during the Festival in Barbican Hall 2. Up to 80 companies are expected to exhibit and bookings have already been confirmed.

An exhibition prospectus is now available, please contact the BNA office (office@bna.org.uk) to request a copy or download from www.bna.org.uk/2013.

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As part of the public engagement programme, space in the main hall foyer will be made available to enable up to 25 not-for-profit organisations to have exhibition stands at a discounted rate. Scientists, carers, patients and members of the general public will be able to engage with the charity representatives.

An exhibition prospectus is now available, please contact the BNA office (office@bna.org.uk) to request a copy or download from www.bna.org.uk/2013.

Sponsorship

The BNA is encouraging organisations to sponsor symposia, plenary lectures, workshops and satellite sessions. Various packages are available, please contact the BNA office (office@bna.org.uk) or +44/0208 166 8713.

Registration

Online registration will open on the BNA website at the beginning of July 2012.

Early bird registration and abstract submission will be available until 31st December 2012.

For registration fees and abstract submission guidelines, please refer to the BNA website

www.bna.org.uk/festival2013

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- The Physiological Society
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Exploring and Celebrating Neuroscience

7th-10th April 2013

The Barbican Centre, London

www.bna.org.uk/festival2013

Calendar of Events

Month of the Brain

14 May 2013

Brussels, Belgium

27 - 28 May 2013

Dublin, Ireland

http://ec.europa.eu/research/conferences/2013/brain-month/index_en.cfm?pg=home

23rd Meeting of the ENS

June 8 - 11, 2013

Barcelona, Spain

www.congrex.ch/ens2013.html

2nd EBC Board Meeting

27th June 2013

(Closed Meeting)

2nd EBC

Industry Board Meeting

28th June 2013

(Invitation only)

GAMIAN-Europe Annual Educational Convention

"Mental Health and the Workplace"

September 19 -21 2013

Vilnius, Lithuania

World Congress of Neurology (EFNS/WFN)

September 21 - 26, 2013

Vienna, Austria

www2.kenes.com/WCN/CONGRESS/Pages/Welcome_Message.aspx

26th ECNP Congress

October 5-9, 2013

Barcelona, Spain

www.ecnp.eu/Congress2013/ECNP%20Congress.aspx

InnovaHealth Conference

Open Innovation for Health:

A strategy for 2020

11-13 October 2012

Larnaca, Cyprus

www.innovahealth.ws/index.php

3rd EBC Board Meeting and Annual General Assembly

(Closed Meeting)

17th October 2013

3rd EBC Industry Board

18 October 2013

EANS Annual Meeting 2013

November 11-13, 2013

Tel Aviv, Israel

www2.kenes.com/EANS2013/MEETING/Pages/Welcome.aspx

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Pushing pedals for Parkinson's disease

Ellie Deeming from Richmond, UK took on the challenge of raising £3,000 for charity – but ended up doubling it. She shared her fundraising experience with *EBC News*, following her eight day guided cycle ride across Vietnam and Cambodia for Parkinson's UK.

Parkinson's UK is a support and research charity that offers information and support to Parkinson's disease sufferers, campaigning for their better treatment, and providing the largest proportion of charitable funds for Parkinson's research in the UK. Fundraising plays a big role in all of this, not simply in generating money, but in raising awareness and fighting stigma too. Together with her teammates, Ellie, 21, whose mother has Parkinson's, completed the 500km journey that raised a staggering £110,000.

"I hadn't done much cycling before, but I wanted to try something new," she said. Having signed up a year in advance of the trip, she was able to adopt a gentle training curve. "I obviously knew how to ride a bike, so I just gradually built it up! I did that alongside swimming, running and yoga. I think you need to be relatively fit to do something like this because it makes the challenge more fun."

Far from there being any exclusion criteria for taking part in this event, the team's main aim was in keeping everybody together: this was about camaraderie, not competition. Ellie added, "I think anyone can do it if they put their mind to it; you don't have to be excessively fit. In my group, I was the youngest person, but the oldest was 66! There were also a few people with Parkinson's on the trip, and it was quite inspirational to be cycling with them. There was so much support for everyone in the group."

Vietnam and Cambodia, spanning many degrees of latitude, possess a var-



ied and exceptionally beautiful landscape with a varied climate. But, starting out in the plains of Ho Chi Minh City, with a relatively flat route to Siem Reap, the team experienced the harshest of the countries' weather. "When we went it wasn't too hot, but it does get very hot and humid. That is one of the more challenging parts of it – cycling all day in the sun is quite hard work!"

Getting together such a vast sum of donations is something that most people thinking about charity work would be baffled by.

"Actually when I first signed up, that was the thing I was most worried about, because it seemed so much at the time. You think you'll never be able to raise that amount. I set up a JustGiving page (www.justgiving.com) and I got a lot of support from people sponsoring me. That really motivates you, when you know that there are so many people encouraging you. I am a big fan of Bikram yoga, so I got sponsorship from my yoga group to do a 30-day challenge. Then I did other things – standing outside Waitrose with a collection tin, and I had a dinner party with some friends; they came and paid a certain amount and I cooked for them. I tried to do things that I would enjoy, that would make it a bit more fun."

This charitable effort is not the only thing that links cycling and Parkinson's disease, with rapid cadence cycling being developed as a Parkinson's intervention after showing evidence of improving the bradykinesia and tremor that characterise the disease. And while cycling may not have been her strongest suit, Ellie, a first year European Studies student at Royal Holloway University, London, has now joined the cycling club at her university. "I enjoyed cycling as training so much that it's become quite a big hobby of mine!"

"I was the youngest person, but the oldest was 66! There were also a few people with Parkinson's on the trip, and it was quite inspirational to be cycling with them. There was so much support for everyone in the group."

Ellie Deeming who cycled across Vietnam and Cambodia for Parkinson's UK