Bristol Neuroscience Newsletter

May / June 2015

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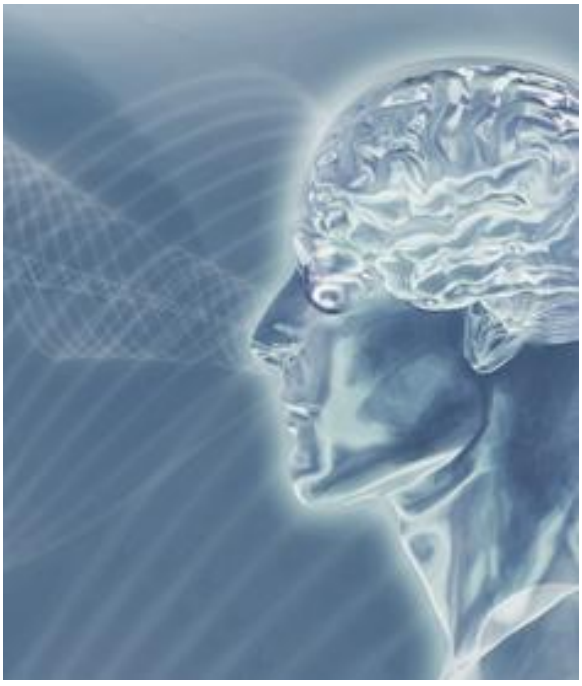
Inside this issue:

Bristol Neuroscience-

- Promotes interdisciplinary dialogue and research
- Identifies and supports new research opportunities
- enables the large local neuroscience community to make strategic plans for the future
- Has a strong commitment to engaging the wider community in neuroscience research and medicine
- Represents local neuroscience to external bodies, such as industry, funders, and other universities
- Provides a single point of contact for those interested in neuroscience: students, researchers, journalists, patients, carers and the general public



EVENTS

The Environmental-Data Automated Track Annotation (Env-DATA) system

28 May 2015, 12:00. Gil Bohrer (Ohio State University), Lecture Theatre 1.18, Queen's Building

Novel approach to stimulate neural stem/precursor mediated myelin repair: Implications in Multiple Sclerosis therapy

28 May 2015, 13:00. Dr. Yasir Ahmed Syed (Dept of Clinical Neurosciences and Wellcome Trust & MRC Cambridge Stem Cell Institute), Lecture Theatre SM2, Maths Building

Limbic Brain Anatomy Course

1-2 June 2015. King's College London

Professor Carol Brayne (Director, Cambridge Institute of Public Health): Challenging the “dementia tsunami”

3 June 2015, 18:30. Watershed.

Cortisol and degenerative disease

4 June 2015, 12:45. Brian Walker (University of Edinburgh), Canynge Hall, LG08

Snapshots: Seminars in Physiology, Neuroscience and Pharmacology

15 June 2015, 13:00. Carmen Coxon & Paul Banks, E29 Medical Sciences Building

Translational cognitive neuroscience: the case of depression

17 June 2015, 12:30. Jonathan Roiser (UCL), OS6 (Seminar Room), Oakfield House

MRC Integrative Epidemiology Unit: Mendelian Randomization Conference

22 June 2015, 9:00. Victoria Rooms, Bristol

Workshop in Epilepsy Engineering

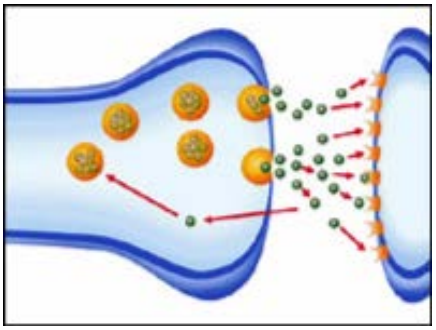
29 June 2015, 10:00. Christophe Bernard (Aix-Marseille); Jonathan Halford (Medical University South Carolina); Louis Lemieux (UCL); Jesus Pastor (Hospital Universitario de La Princesa Madrid), University of Surrey, Guildford campus

Health Services Research Network Symposium

1-2 July 2015. Nottingham

Dr Angelica Ronald, GEL Laboratories, Centre for Brain and Cognitive Development, Birbeck, University of London (title tbc)
2 July 2015, 16:00. Seminar Room, Second Floor, Oakfield House

European Synapse Meeting
7-9 September 2015. Bristol



Pharmaceutical and Biotechnology Industry Event
15 September 2015, 10:00. Wills Memorial Building

Researcher Links workshop in Brazil on CNS therapies
18 September 2015, 9:30. Florianópolis, Santa Catarina, Brazil

Early Career Neuroscientist Day
21 September 2015, 9:30. At-Bristol

One Science: Life at the Interface - Wellcome Trust
22 September 2015, 10:00. Wellcome Collection, London

West of England Academic Health Science Network Annual Conference
15 October 2015, 9:30. Cheltenham Racecourse

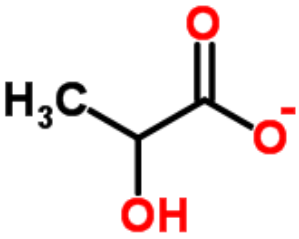
Colston Research Society Symposium: New Developments in PTSD Research and Treatment
16 November 2015, 9:00. Barbara Rothbaum (Emory University), M Shed

Advanced notice: Following the success of the BN festival held in 2013 (link takes you to YouTube film of the event), another **BN Festival is planned for 2016**. The event will be held in March 2016 in the Wills Memorial Building with a Plenary Lecture on the Friday evening. Anyone who would like to be involved can contact Alex Thompson (alexc.thompson@bristol.ac.uk). More info and a confirmed date will follow shortly. In the meantime, if anyone has public engagement funds on grants which they feel could be used to support the event, please let us know.

NEWS

- **Congratulations** to Professor Graeme Henderson who has been elected to an Honorary Fellowship of the British Pharmacological Society
- **Dr Thelma Lovick** (PI-Bristol), Professor Marcus Brandeo (PI-São Paulo-Riberirao Preto) and co-applicants Dr Emma Robinson (Bristol) and Dr Janete Anselmo-Franci (Brasil) have been awarded a joint grant from RCUK/CONFAP Newton Fund titled *Tackling mental health disorders in females*. £99k has been awarded for one year.

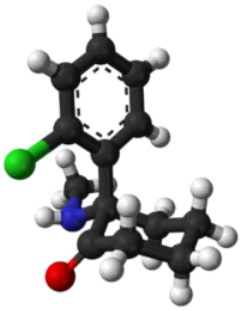
- **EurekAlert!** is an online resource run by the American Association for the Advancement of Science. One of its top news releases attracted a record number of online hits over the last 12 months, a research story covering a publication by F. Tang, S. Lane, A. Korsak, J.F.R. Paton, A.V. Gourine, S. Kasparov & A.G. Teschemacher which appeared in February's issue of Nature Communications. With 177,830 views, the article describes how the authors had identified a previously unknown mechanism in the body which regulates the hormone lactate, crucial for motivation, stress responses and control of blood pressure, pain and appetite. The breakthrough could be used to design drugs to help fight health problems connected with these functions in the future.



- **Professors Neil Marrion** and Eamon Kelly have been appointed as Editors of the Concise Guide to Pharmacology, a biennial publication of the British Journal of Pharmacology
- **Afferent Pharmaceuticals** based in California has appointed Professor Julian Paton as a Consultant; the company has also gifted him £70,000 towards his research on hypertension and the role of the carotid body.
- **An award of** £14k was made by the University of Bristol's 2014 Developmental Fund to develop an MRI-compatible amplifier; Professor Julian Paton and PIs Drs David Cussans & Emma Hart will be working on the project
- **The University** of Auckland bestowed the 2015 Distinguished Visitor Award on Professor Julian Paton; the award aims to enable scholars and researchers who have made very significant contributions to their disciplines to visit the university and participate in its intellectual life. He was hosted in February 2015 by Dr Carolyn Barrett in the Department of Physiology and spent time with researchers there, the Faculty of Medical and Health Sciences and the Auckland Bioengineering Institute. He also gave a public lecture exploring the recent advances in the treatment of cardiovascular disease.

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

- **Dr Emma Robinson** has been awarded $4,500 for the Boehringer Ingelheim Challenge: *Understanding the Antidepressant Effect of Ketamine.* Major depressive disorder (MDD) is a debilitating psychiatric disorder with about 20 million prevalent cases in the USA; however, about 50% of MDD patients do not respond adequately to initial treatments. Recent evidence shows that ketamine administered to patients with treatment resistant depression has resulted in marked improvement within hours of treatment; Boehringer Ingelheim seeks a working hypothesis for ketamine's mechanism of action and sustained antidepressant effect.



- **Professor Graeme Henderson** spoke at the Opening Ceremony of the Indian Pharmacological Society Congress in Guwahati, India on 28 December 2014
- **A paper into the** potential effects of plain packaging on the sale of tobacco products appeared in the January issue of *Addiction*. The results showed that whereas branded packs increased the probability of participants making the cigarette choice by 10 per cent compared to when nothing

was presented, the plain packs did not. The implication is that plain packs are less effective at prompting smokers to purchase cigarettes compared to branded packs. Co-author Professor Marcus Munafó confirmed that the study only modelled the ability of *pack stimuli* to promote a cigarette-seeking choice; in the natural environment, smoking may be governed by a whole range of factors, including tobacco withdrawal, the presence of other people smoking, time of day, etc.

- **Consuming a** moderate amount of alcohol can make the drinker appear more attractive than when sober, according to new research undergone by Professor Marcus Munafó and colleagues. Volunteers were presented with images depicting an individual photographed while sober and after consuming either 250ml (one glass) of wine or 500ml. They were then asked to rate which of the two images was more attractive. Those who had consumed a single glass were rated as more attractive than sober individuals, but consuming more than one glass reversed the outcome. It was suggested that vasodilation associated with alcohol consumption could lead to an increase in facial flushing, which is perceived as healthy and attractive. Low doses of alcohol may also result in an increase in positive mood that is apparent in subtle smiles and more muscle relaxation. Understanding the mechanisms through which alcohol influences social behaviour, including factors that may impact on the likelihood of engaging in risky sexual behaviour, is important if we are to develop evidence-based public health messages.

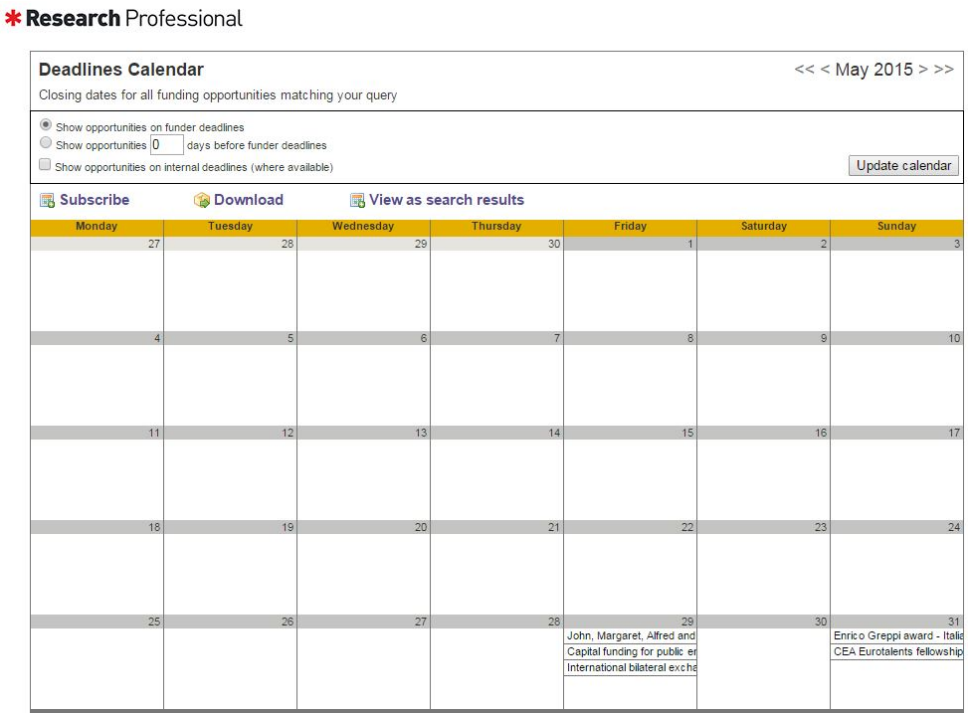
- **The NIHR Clinical** Research Network has made significant progress and achievement in the growth and delivery of the commercial research portfolio over the last five years and was keen to recognise the contributions of key Principal Investigators towards these achievements. Nominations were received in four categories: delivered their first commercial study successfully; have consistently delivered to time and target for commercial studies; worked above and beyond their call of duty to support commercial research; and recruited the first global/European patient for a commercial study. One such nominee was Jonathan Evans. In February nominees attended a meeting which included talks by NIHR and industrial representatives who spoke about the impact of the Network on commercial research from a global perspective.
- **A project entitled** *PDE5 Inhibition of Afferents and Interstitial Cells in Overactive Mouse Bladders* led by Marcus Drake (PI) and co-applicants Chris Fry, Tony Pickering and Julian Paton has been awarded an RO1 grant by US NIH jointly to University of Pittsburgh and the University of Bristol. The team will receive USD$2.5M over the next five years.
- **Professor Alan Roberts** has been elected a Fellow of the Royal Society. Emeritus Professor in the School of Biological Sciences, Alan studies the central nervous system of very young *Xenopus* tadpoles to try to understand how the animal's simple swimming behaviour arises. He is interested in the overall organisation of neuronal control systems and the cellular and synaptic properties that underlie them.
- **The Institute of** Clinical Neurosciences at Southmead has successfully completed the Brain Centre (formerly the Elgar House) refurbishment project. Thanks to the University's Centenary Campaign and funds raised by BRACE, BrAMS, PD researchers and not least the CAR office, £1.5M was invested into creating a purpose-built clinical research facility and outpatient clinic which the research teams for Parkinson's, dementia and MS have all now moved into.

BIOMEDICAL REVIEW

In 2014 the Vice Chancellor initiated a review of biomedical research and education at the University. A number of internal and external panel members were asked to deliver a series of strategic planning options on the structure, collaborative opportunities and alignments for increasing the power and impact of biomedical research. A proposed research framework has been identified and the highlights were presented to staff at an open forum on 6 May 2015. For further details on these outcomes, please see the Strategic Office website. Some documents are restricted to UoB staff only due to confidentiality.

FUNDING OPPORTUNITIES

A **calendar** of potential **funding opportunities** for Neurosciences has been set up via Research Professional which details the funding opportunity according to submission deadline for the whole year. This calendar is accessible via their **website** and will be updated automatically according to specified search criteria (Personality Disorders, Depression & Other Mood Disorders, Bipolar Disorder, Anxiety Disorders, Alzheimer's Disease & Senile Dementia, Neuroscience, Neurology). Other subjects can be added by request- please email the theme with suggestions and/or comments.



A general list of funding opportunities listed by Faculty is available on the RED website.

EPSRC funding changes

The EPSRC have updated their on-going refresh of priority areas for Fellowships. For Healthcare Technologies please note the following expected calls: Fellowship call to be announced (August - September 2015); a pilot call for Healthcare Technologies Fellowships aligned to their recently published strategy (early and established career stage). To be removed, effective from 01-Oct-15 are: Regenerative Medicine (early and established career stage); Diagnostics (early and established career stage); Therapeutics (early and established career stage).

Alzheimer's Research UK

Dementia consortium

Supports the development of new drug targets emerging from across the academic sector that aim to benefit patients with Alzheimer's and related dementias. Approaches may cover all aspects of dementia therapy, from treating the underlying pathology to improving cognition and other mental symptoms. Targets should be early stage, but should have some supporting data to support their role in disease.

Award amount: £500,000 Deadline: Bi-monthly expressions of interest

Guarantors of Brain

Salary support for trainee neurologists in basic neuroscience

Supports young clinicians intending to pursue careers in neurology who wish to combine clinical training with research. Applicants must be eligible for, or be engaged in, neurology higher specialist training in the UK. In the event that an aspiring neurologist wishes to work in a post carrying a non-clinical research salary in a relevant area of neuroscience, they may apply for support to make up the difference between a non-clinical and clinical salary for up to three years.

Award amount: unspecified Deadline: none

Guarantors of Brain

Entry and Exit Scholarship

This scholarship provides bridging salary support for up to one year to early career clinicians based in the United Kingdom. The scheme is intended to provide transitional funding at entry from the early ST grades, prior to obtaining a research fellowship, or on completion of research whilst waiting for an StR post. Funding consists of full time salary (including superannuation, etc.) on the Specialty Registrar scale according to age and experience. New scholarships will be awarded on a rolling basis as existing scholars leave the scheme. Applicants must be eligible for or engaged in Neurology or related specialty higher specialist training in the UK (including MRCP or equivalent). The candidate must be able to demonstrate the intention to have a career in clinical neurology or related specialties, plus the intention to secure a definitive training post, research fellowship or lectureship in clinical neurology or related specialties in the UK.

Award amount: £50,000 Deadline: rolling basis

Henry Smith Charity

Medical research grants

Support research on child health, bowels and gastroenterology, lung diseases, neurology, pancreatic disease, spinal conditions, urinary and faecal incontinence, and engineering and medicine. Applications are not accepted from individuals or NHS trusts. Grants are normally tenable for up to three years and may be used towards refurbishment, capital projects or equipment as well as project and salary costs.

Award amount: unspecified Deadline: none

Newton Fund RCUK-NRF International

PhD Partnering Scheme Call

To facilitate the building of sustainable, long-lasting strategic links between UK and international Research Organisations (ROs), both at an individual and group level, by supporting the training of PhD students and the development of an international cohort of early career researchers. Proposals will be handled through the University's Major Bids process.

Funding available: £150,000 Deadline: internal deadline 01-Jun-15

Avon Primary Care Research Collaborative

Research Capability Funding

To support academics, clinicians and commissioners who are planning to submit a NIHR grant application. The call is an opportunity to secure dedicated time to plan, design, and write a NIHR grant application. The RCF awards can ring-fence your own time, or be used to employ an assistant researcher to work under your supervision. The recipients of the award must use the funds to write a NIHR grant application, and submit this application through NHS Bristol CCG. The research should be focused on a health setting which is relevant to APCRC, e.g. primary care, community care or public health in the Bristol, North Somerset and/or South Gloucestershire CCG areas.

Funding available: unspecified Deadline: 01-Jun-15

National Institute of Neurological Disorders and Stroke

NINDS exploratory clinical trials (R01)

Supports exploratory clinical trials; these may evaluate drugs, biologics, devices, or surgical, behavioural or rehabilitation therapies. The maximum project period is five years.

Funding available: unspecified Deadline: 05-Jun-15

US Department of Defense

Peer reviewed medical research programme – technology and therapeutic development award

supports the translation of promising preclinical findings into products for clinical applications, including prevention, detection, diagnosis, treatment or quality of life, in at least one of the congressionally directed topic areas of interest.
Projects must be directly related to the healthcare needs of the military service members, veterans or other beneficiaries, and address at least one of the following topic areas: chronic migraine and post-traumatic headaches; dystonia; fragile X Syndrome; integrative medicine; metals toxicology; psychotropic medications; sleep disorders.
Award amount: US$1.8M Deadline: 11-Jun-15

Mental Health Research UK
PhD scholarships

Mental Health Research UK and the Schizophrenia Research Fund invite applications for their PhD scholarships. This round includes the following scholarships: the John Grace QC PhD scholarship for research into schizophrenia; anxiety disorder PhD scholarship. One application only from a university will be considered for each scholarship.

Award amount: £120,000 Deadline: 12-Jun-15

National Institute of Mental Health
Molecular and cellular substrates of complex brain disorders (R21)
Seeks to foster the introduction of novel scientific ideas, model systems, tools, agents, targets, and technologies that have the potential to advance research at the interface between cellular and molecular mechanisms and that address gaps in understanding the biological mechanisms behind putative disease associated processes with the goal of accelerating progress in emerging research areas relevant to complex brain disorders.

Award amount: US$275,000 Deadline: 16-Jun-15

National Institute on Aging
Lifespan human connectome project: ageing (U01)
Encourages research to extend the experimental protocols developed through the human connectome project to middle-age and elderly adults to investigate the structural and functional changes that occur in the brain during typical ageing.

Award amount: US$6M Deadline: 15-Jun-15

International Brain Research Organization
IBRO-ISN fellowships programme
Aims to provide research opportunities for neuroscientists and support the global advancement of neuroscience research. Applications from candidates who have completed their PhD within the past

seven years are preferred. Qualified candidates will not yet have begun working at the laboratory where he or she is applying for. Fellowships are tenable for one year.

Award amount: €35,000 Deadline: 15-Jun-15

US Department of Defense

Peer reviewed medical research programme – discovery award

Supports innovative, untested, high-risk and potentially high-reward research that will provide new insights, paradigms, technologies or applications in the programme's topic areas. The proposed research project should be novel and innovative and include a well-formulated, testable hypothesis based on a sound scientific rationale and study design. The inclusion of preliminary data is strongly discouraged and clinical trials are not allowed. Projects must be directly related to the healthcare needs of the military service members, veterans or other beneficiaries, and address at least one of the following topic areas: chronic migraine and post-traumatic headaches; dystonia; fragile X Syndrome; integrative medicine; metals toxicology; psychotropic medications; sleep disorders.

Award amount: US$200,000 Deadline: 25-Jun-15

Brain & Behavior Research Foundation

NARSAD distinguished investigator grant

Supports basic and clinical research relevant to schizophrenia, mood disorders or other serious mental illnesses including research with anxiety, bipolar disorders, personality disorders or early or late onset of severe brain and behaviour disorders. The programme is is designed to stimulate the development of key personnel and resources, to facilitate the rapid initiation of research in innovative areas and to enable investigators to create unique scientific opportunities.

Award amount: US$100,000 Deadline: 01-Jul-15

Alzheimer's Research UK

Global clinical trials fund

Supports clinical trials in the UK or worldwide that have the potential to be of benefit to dementia patients. The scheme covers the following activities: studies that aim to demonstrate target engagement, and phase I or phase II clinical trials undertaken to ascertain the potential safety and efficacy of novel or re-purposed drug-based interventions in human subjects; clinical trials of non-drug based, complex interventions; opportunities for research add ons to ongoing clinical trials, such as biomarker add-ons.

Award amount: £500,000 Deadline: 03-Jul-15

Alzheimer's Research UK

Major Project Grants

These fund high-quality research projects on Alzheimer's disease and related dementias. The lead applicant and point of contact must be based in a UK academic or research institution, but the application may include researchers or institutions outside the UK. The lead applicant or co-applicant must hold a tenure or tenure-track appointment.

Award amount: £1M Deadline: 03-Jul-15

Association Française contre les Myopathies

Research Grants / Postdoc Proposals

Aim to increase the understanding of the neuromuscular system including the development of therapies for neuromuscular diseases and rare genetic disorders and improve quality of life for patients with neuromuscular diseases. Grants support innovative research within: fundamental research and physiopathology of diseases of the neuromuscular system; development of therapeutic approaches for rare diseases; clinical and care management. Special attention will be given to projects on congenital muscular dystrophies. Three award types are available including trampoline grants for early career investigators worth €50,000 over one year; research projects for one year, with the possibility of extension and postdoctoral fellowships available for up to two years.

Award amount: €50,000 Deadline: 07-Jul-15

Muscular Dystrophy Canada

Respiratory Care and Neuromuscular Disorders

Funding supports proposals related to improving respiratory health for people living with neuromuscular diseases.

Award amount: CDN$ unspecified Deadline: 10-Jul-15

European Research Council

Starting Grants

Intended to enable exceptional researchers between 2 and 7 years from PhD completion to become independent research leaders and strengthen their own research team or programme. Proposals to the call will be handled through the University's major bids process. Applicants are required to complete a brief University stage application form for internal review, available here.

Award amount: €1.5M Deadline: internal deadline 18 August 2015

Benign Essential Blepharospasm Research Foundation

Research Grants

Research proposals must relate specifically to benign essential blepharospasm and Meige and include new treatments, pathophysiology and genetics, photophobia and dry eye.

The principal investigator must hold a MD or PhD.

Award amount: US$150,000 Deadline: 31-Aug-15

Wings for Life Spinal Cord Research Foundation

Project research grants

Support basic and clinical research projects, translational studies and early stage clinical trials related to spinal cord injury. Projects may address all aspects of spinal cord lesions, nerve regeneration, trophic support of lesioned neurons and functional changes induced by lesions preferentially in mammals. Proposals should have a view to translation from laboratory to clinical setting and clinical research projects can be in the fields of diagnosis, acute lesion management including surgery, neurology, urology, rehabilitation or other areas related to paraplegia.

Award amount: US$ not specified Deadline: 01-Sep-15

Grete Lundbeck European Brain Research Foundation

The Brain Prize

Nominations for the annual Brain Prize are sought; this recognises highly original and influential advances in research in any area of neuroscience. The intention of the prize is to raise the visibility of European neuroscience and to be a stimulus to this field of research. More than one individual may receive the prize if several researchers have contributed significantly. Nominees may be of any nationality, but research must have been conducted in Europe or in collaboration with researchers in Europe.

Award amount: €1M Deadline: 1-Sep-15

National Institute of Neurological Disorders and Stroke

Parkinson's disease biomarker programme discovery projects (U01)

Support up to three years of study towards the discovery, assay optimisation and replication stages required for the development of biological biomarkers for Parkinson’s disease.

Award amount: US$450,000 Deadline: 04-Sep-15

Alzheimer's Research UK

Preparatory clinical research fellowship

Supports clinicians at various stages of training who are planning a career in academic medicine. The aim is to provide fellows with the necessary track record and skills to compete for full clinical fellowship through ARUK or elsewhere. The fellowship work should address the causes, cures, prevention, diagnoses and treatments of Alzheimer’s disease and related dementias.

Award amount: £20,000 Deadline: 09-Oct-15

Alzheimer's Research UK

Pilot project grants

Fund small, innovative research projects and pilot studies that, if successful, can lead to a major project or programme application to ARUK or other funding body. The work should address the causes, cures, prevention, diagnoses and treatments of Alzheimer's disease and related dementias.

Award amount: £50,000 Deadline: 09-Oct-15

Alzheimer's Research UK

Network accelerate scheme

Provides funds for research resources or tools that could be of benefit to biomedical dementia research in the ARUK network and beyond. This could include the generation and validation of reagents, the maintenance or creation of research resources or scientific networking beyond what could normally be covered by network centre grants.

Award amount: £250,000 Deadline: 09-Oct-15

Motor Neurone Disease Association

Biomedical research project grants

Aimed at understanding the causes of motor neurone disease, elucidating disease mechanisms and facilitating the translation of therapeutic strategies from the laboratory to the clinic.

Funding available: £255,000 Deadline: 30-Oct-15

International Foundation for Research in Paraplegia, CH

Research grants

To promote basic and clinical research related to spinal cord injury. Research projects may address all aspects of central nervous system and spinal cord lesions, nerve regeneration, trophic support of lesioned neurons, and functional changes induced by lesions, preferentially in mammals. Clinical research projects may be situated in the fields of diagnosis, acute lesion management including surgery, neurology, urology, rehabilitation, and other areas related to paraplegia.

Funding available: CHF150,000 Deadline: 31-Oct-15

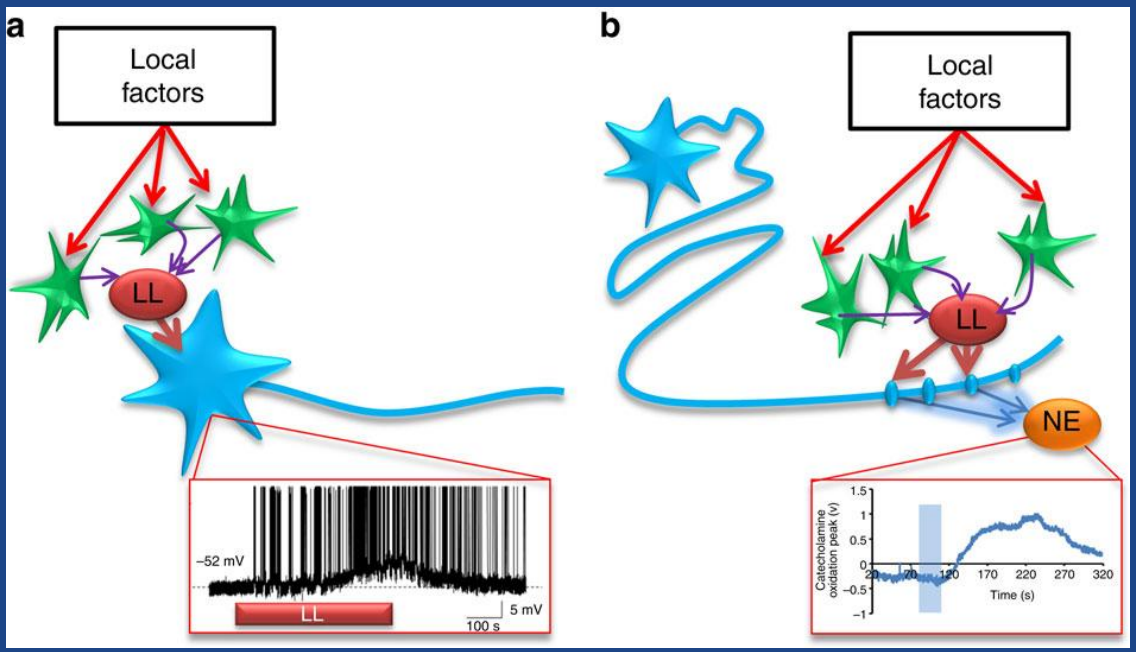
THIS MONTH'S SHOWCASED ARTICLE

Lactate-mediated glia-neuronal signalling in the mammalian brain

F. Tang, S. Lane, A. Korsak, J. F. R. Paton, A. V. Gourine, S. Kasparov & A. G. Teschemacher

Nature Communications. 5, 3284. doi:10.1038/ncomms4284

Astrocytes produce and release L-lactate as a potential source of energy for neurons. Here we present evidence that L-lactate, independently of its caloric value, serves as an astrocytic signalling molecule in the locus coeruleus (LC). The LC is the principal source of norepinephrine to the frontal brain and thus one of the most influential modulatory centers of the brain. Optogenetically activated astrocytes release L-lactate, which excites LC neurons and triggers release of norepinephrine. Exogenous L-lactate within the physiologically relevant concentration range mimics these effects. L-lactate effects are concentration-dependent, stereo-selective, independent of L-lactate uptake into neurons and involve a cAMP-mediated step. In vivo injections of L-lactate in the LC evokes arousal similar to the excitatory transmitter, L-glutamate. Our results imply the existence of an unknown receptor for this 'glio-transmitter'.



(**a**) Astrocytes (green) residing within the LC release L-lactate upon activation, which causes depolarization of the NEergic neurons (blue) and increases their firing rate (inset below). This could lead to both, increased NE release in the projection areas of LC neurons (for example cortex or hippocampus) and local somato-dendritic NE release within the LC which may primarily affect inhibitory auto-receptors. (**b**) Direct effects of L-lactate on the NE release machinery at the level of axonal varicosities may facilitate release of NE (inset below), irrespective of the frequency of incoming action potentials. In this way, NE release could be differentially regulated via a range of local signalling mechanisms in different projection areas innervated by the LC.

PUBLICATIONS

Hogarth L., Maynard O.M., and Munafo M.R. (2015). Plain cigarette packs do not exert Pavlovian to instrumental transfer of control over tobacco-seeking. *Addiction*. 110(1), pp.174-182.

van den Abbeele, J., Penton-Voak, I.S., Attwood, A.S., Stephen, I.D. and Marcus R. Munafo M.R. (2015). Increased Facial Attractiveness Following Moderate, but not High, Alcohol Consumption. *Alcohol and Alcoholism*. Published online 25 February 2015.

Marina, N., Ang, R., Machhada, A., Kasymov, V., Karagiannis, A., Hosford, P.S., Mosienko, V., Teschemacher, A.G., Vihko, P., Paton, J.F.R., Kasparov, S. and Gourine, A.V. (2015). Brainstem hypoxia contributes to the development of hypertension in the spontaneously hypertensive rat. *Hypertension.* 65, pp.775-83.

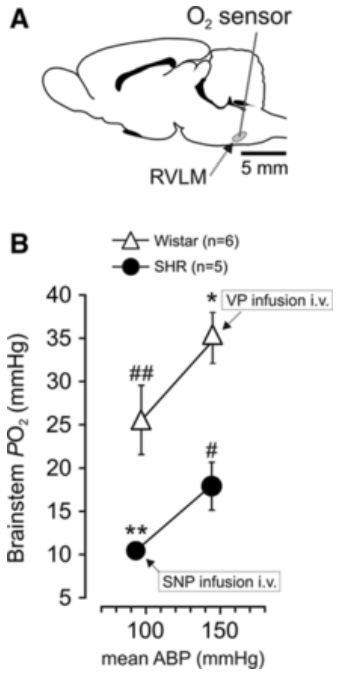


Image caption: *Brainstem of the spontaneously hypertensive rat (SHR) is hypoxic at physiological levels of the systemic arterial blood pressure. A, Schematic drawing of the rat brain in sagittal projection illustrating the site of PO_2measurements taken from the anatomic location of the presympathetic circuits of the rostral ventrolateral medulla (RVLM). B, Summary data showing parenchymal PO_2 levels in the RVLM of anesthetized SHRs and Wistar rats.*

Edwards, I.J., Lall, V.K., Paton, J.F., Yanagawa, Y., Szabo, G., Deuchars, S.A. and Deuchars, J. (2014). Neck muscle afferents influence oromotor and cardiorespiratory brainstem neural circuits. *Brain Structure and Function*. 220,pp.1421-36.

Cooke, A.E., Oldfield, S., Krasel, C., Mundell, S.J., Henderson, G., Kelly, E. (2015). Morphine-induced internalization of the L83I mutant of the rat μ-opioid receptor. *British Journal of Pharmacology*. 172(2), pp. 593-605.

Moran, R.J., Jones, M.W., Blocker, A.J., Adams, R.A., Stephan, K.E., Friston, K.J. (2015). Losing Control Under Ketamine: Suppressed Cortico-Hippocampal Drive Following Acute Ketamine in Rats. *Neuropsychopharmacology*, 40, pp.267-77.

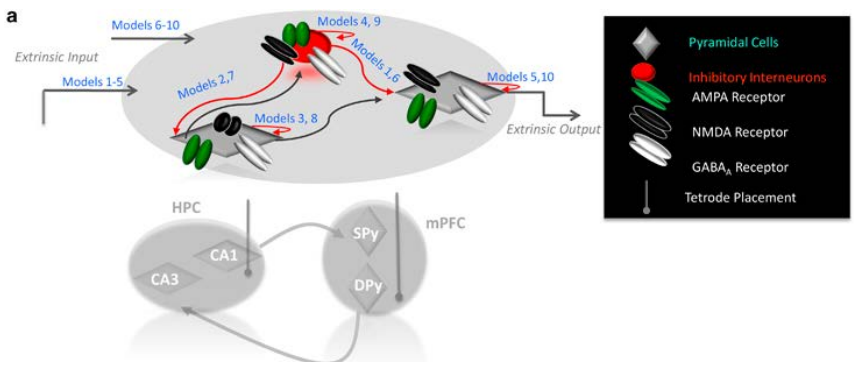


Image caption: *The neural mass model used to represent each source. Three neuronal sub-populations represent each source, with two pyramidal cell*

populations. Glutamatergic within source (intrinsic: gray arrows) and between source (extrinsic: gray arrows) connections are mediated by AMPARs and NMDARs. Intrinsic GABAergic currents (red arrows) are mediated through $GABA_A$receptors. In our model, comparison of 10 possible effects of ketamine were tested (blue text): all models allowed for extrinsic NMDA and AMPA mediation. Models 1–5 allowed extrinsic modulation at pyramidal cells, whereas models 6–10 allowed for extrinsic modulations at pyramidal cells and interneurons. Within these groups, models were tested which had ketamine effecting either inhibitory connections intrinsically (models 1, 2, 6, and 7) or local feedback inhibition onto particular cells types (models 3, 4, 5, 8, 9, and 10). All models included intrinsic ketamine effects at NMDARs. Bottom: tetrode electrodes in dorsal CA1 and medial PFC were analyzed using DCM. Cross-spectral densities were computed and served as data features to optimize a network model comprising a multi-layered hippocampal formation and mPFC.

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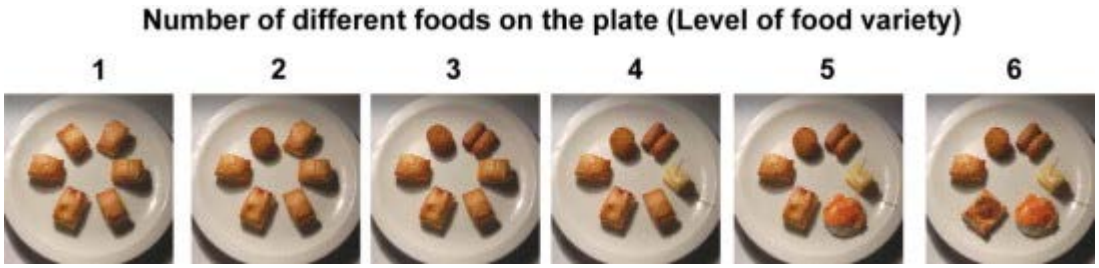

Image caption: *Examples of stimuli with different levels of meal variety (1–6). Level 1 has the lowest meal variety (all of the foods the same) and level 6 has the highest (six different test foods on the plate).*

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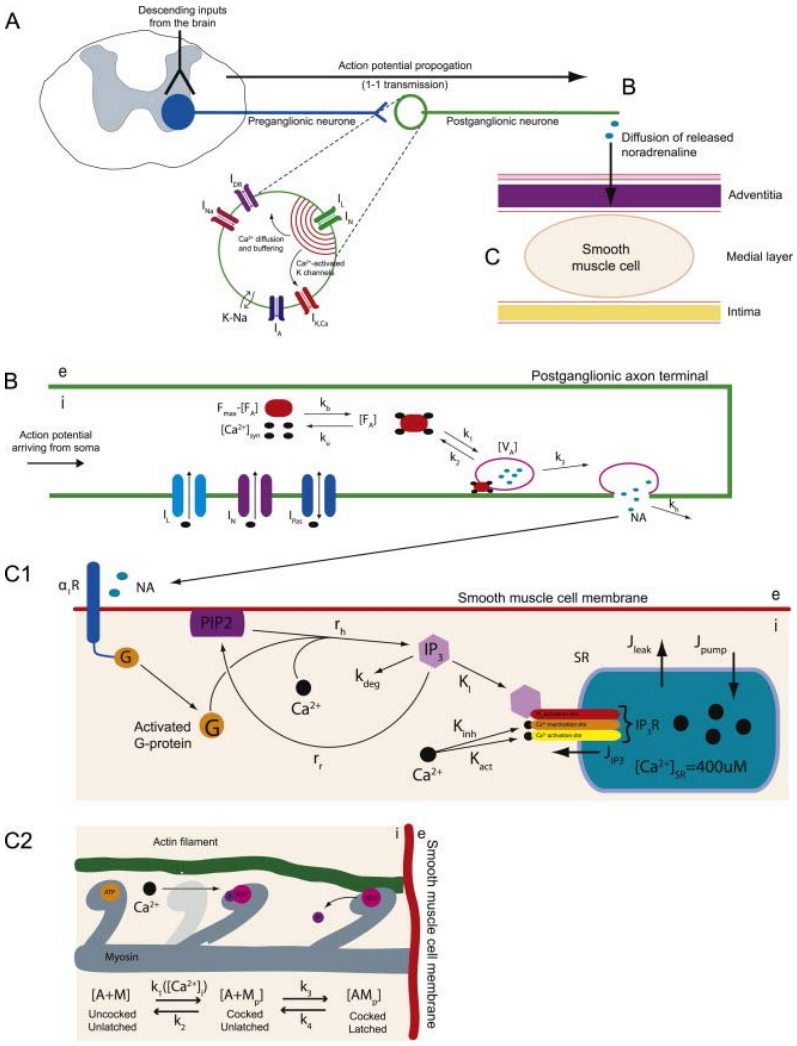

Image caption: *The mathematically modelled pathway from SPGN excitation to smooth muscle cell activation. The mathematically modelled pathway from SPGN excitation to smooth muscle cell activation. (A) The model of a SPGN from Briant et al. (2014). Action potentials propagate down the SPGN axon to the postganglionic terminal. (B) This activates I_L and I_N, triggering the influx of calcium into the postganglionic terminal, increasing $_{[Ca2+]syn}$. Four molecules of intracellular calcium bind to a fusion protein, activating it (F_A). Once activated, the fusion protein can bind to, and consequently activate, a vesicle V. The activated vesicles, V_A, are assumed to be pre-docked to the synaptic membrane; once activated, it immediately releases its NA contents into the cleft. (C_1) Released noradrenaline activates α_1Rs on the SMC membrane, activating a G-protein (G). This G-protein, drives the hydrolysis of PIP_2. Hydrolysed PIP2 cleaves to form IP3, which activates an IP_3R located on the membrane of the SR. Activation of this receptor causes an efflux of Ca^{2+} from the SR (J_{IP3}), increasing $_{[Ca2+]SMC}$. These receptors also have inactivation and activation sites for $_{[Ca2+]SMC}$. Fluxes of Ca^{2+} across the SR membrane also exist due to leakage (J_{leak}) and calcium pumps (J_{pump}). (C_2) The intra-SMC matrix contains actin (A) and myosin (M) filaments. At rest these filaments are in a detached state,A+M. When the myosin heads are phosphorylated by calcium (M_P), they able to attach to the actin filaments, yielding the stateAM_P—a cross-bridge. This cross-bridge can then conduct a 'power stroke', sliding the actin filament and producing a contractile force.*

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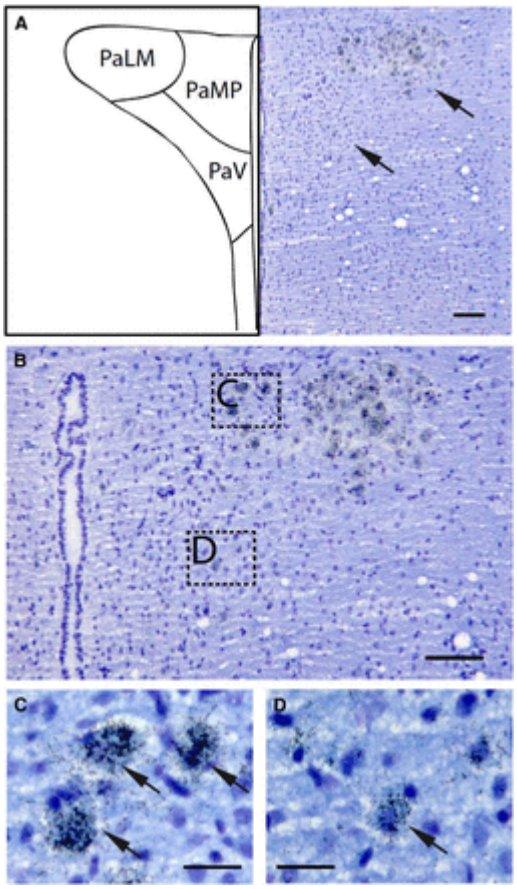

Image caption: *The distribution of Slc12a1 mRNA in the PVN of a dehydrated rat. Representative photomicrographs showing the distribution of Slc12a1 mRNA in the PVN of a dehydrated rat as demonstrated by* in situ *hybridization histochemistry. A, Prominent labeling was observed in the magnocellular compartment of the PVN while lower expression was detected in the parvocellular regions. The pattern of distribution can be clearly observed in B. Higher power photomicrographs of the magnocellular and parvocellular subdivisions are shown in C and D, respectively (indicated by the dashed boxes in B). The arrows point to cells expressing the Slc12a1 transcript, where magnocellular neurons show much higher levels of expression. Scale bars: A, B, 100 µm; C, D, 50 µm. PaLM, paraventricular nucleus of the hypothalamus, lateral magnocellular part; PaMP, medial parvocellular part; PaV, ventral parvocellular part.*

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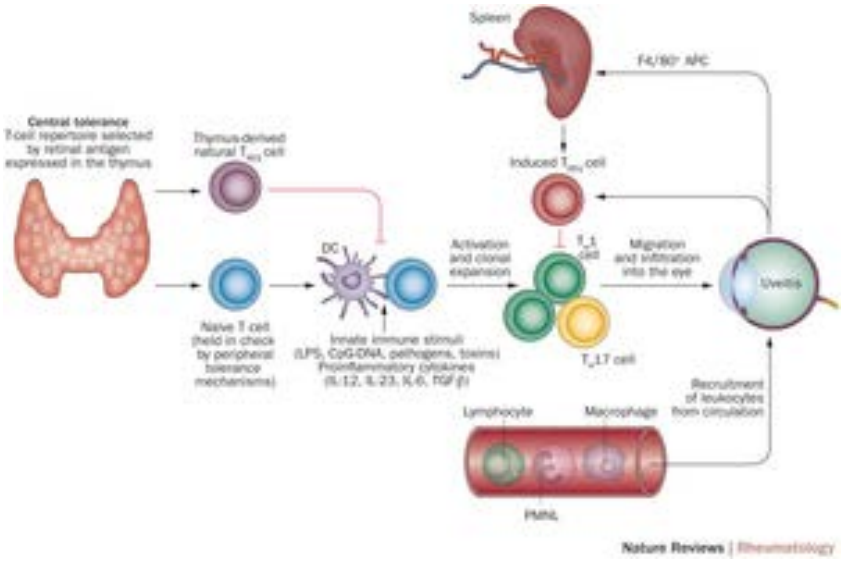

Image caption: *Immunopathogenesis of uveitis. Incomplete thymic elimination of effector T cell precursors capable of recognizing retinal antigens, combined with deficient peripheral tolerance, results in persistence of circulating, non-tolerized T cells.*

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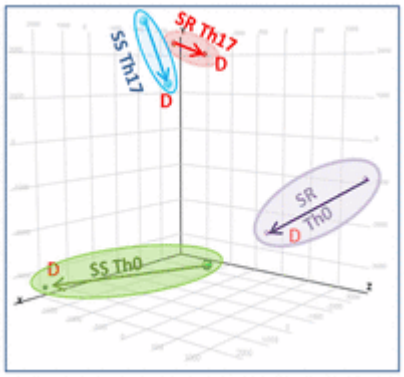

Image caption: *Human Th17 cells exhibit a restricted genome-wide response to glucocorticoids. PCA of genes with at least twofold changes between any two of the four conditions. The shift in gene expression in response to Dex is proportional to the length of the arrow. These are presented as untreated and Dex treated Th17 and Th0 cells derived from SS or SR patients; D, post-Dex treatment.*

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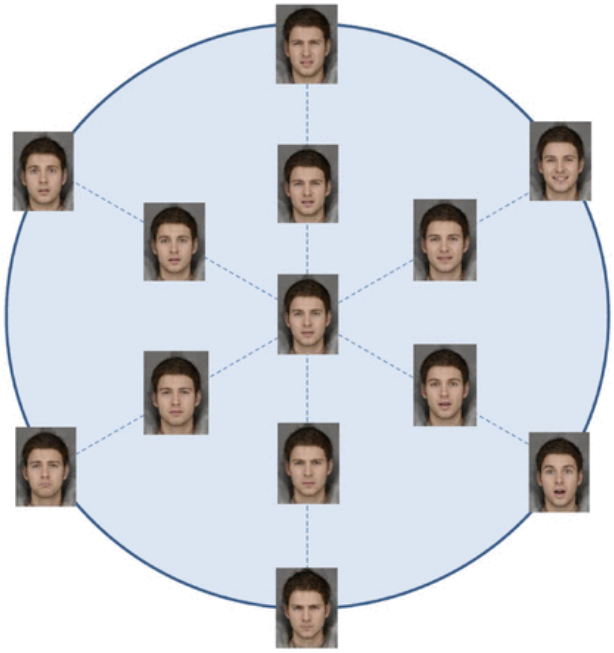

Image caption: *Emotional expression continua.*

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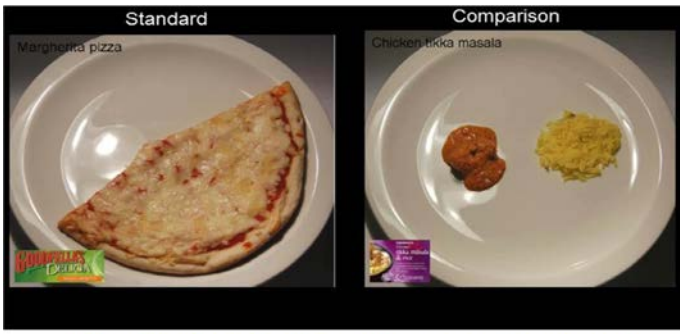

Which of these foods would fill you up the most?

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Image caption: *A screen capture of a matched fullness 'expected satiation' task. (Image courtesy of Prof. Jeff Brunstrom).*

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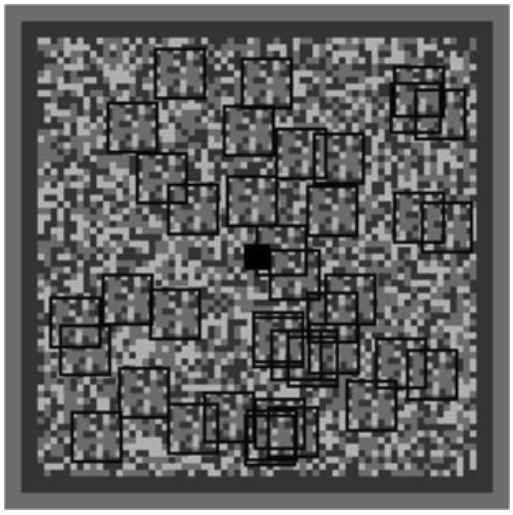

Image caption: *Example of the display a subject saw at the end of a trial after the objects stopped moving, prior to identifying the target by mouse click. The treatment shown here is 40 objects in a 268 × 268 pixel display, square marks the initial location of the mouse-driven cursor. At the start of the trial, only the target to be tracked was framed in black and white and all objects started moving. This border remained for the first 1 s of the trial, and then was removed for the remaining 4 s.*

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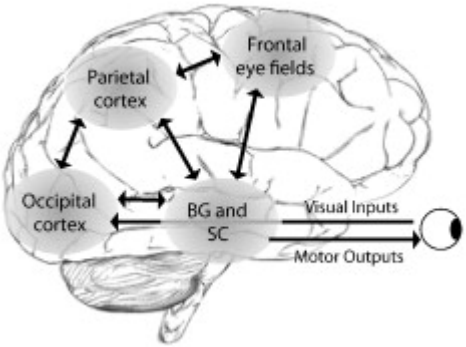

Image caption: *A sketch of the sensory-motor saccade network, from where most of theoculomotor response variability must somehow arise.*

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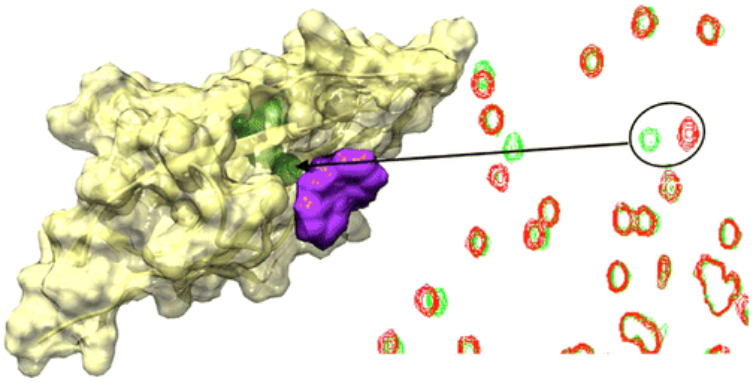

Image caption: *The tyrosine kinase A (TrkA) receptor is a validated therapeutic intervention point for a wide range of conditions. TrkA activation by nerve growth factor (NGF) binding the second extracellular immunoglobulin (TrkAIg2) domain triggers intracellular signaling cascades. In the periphery, this promotes the pain phenotype and, in the brain, cell survival or differentiation.*

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- Zaf Bashir, Centre for Neuro Dynamics, Physiology & Pharmacology
- Yoav Ben-Shlomo, Social & Community Medicine
- Kei Cho, Centre for Neural Plasticity
- Rachel Churchill, Social & Community Medicine
- Polly Clarke, Postgraduate Rep, Physiology and Pharmacology
- Liz Coulthard, Institute of Clinical Neurosciences
- Jonathan Evans, Social & Community Medicine
- Iain Gilchrist, Experimental Psychology
- Matt Jones, Physiology & Pharmacology
- Kevin Kemp, Clinical Sciences
- Stafford Lightman, Clinical Sciences
- Astrid Linthorst, Clinical Sciences
- Mike Mendl, Animal Health and Husbandry
- Tony Pickering, Physiology & Pharmacology
- Hans Reul, Clinical Sciences
- Emma Robinson, Physiology & Pharmacology
- Alastair Wilkins, Institute of Clinical Neurosciences