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Elizabeth Blackwell Institute for Health Research

bristol neuroscience

Bristol Neuroscience Newsletter

2022: Issue 3

@BristolNeurosci

bristol.ac.uk /neuroscience

b-n@bristol.ac.uk

+44 117 455 6360

Inside this issue:

Hope project helped men at risk of suicide

A project to help men aged 30-64 who are at risk of suicide has saved lives and reduced depression and suicidal thoughts, a study by National Institute for Health and Care Research (NIHR) funded researchers at the University of Bristol has shown. Hope, run by mental health charity Second Step, aims to help men in mental health crisis because of debt, financial, employment or welfare difficulties.

Rates of death from suicide are higher in the Bristol, North Somerset and South Gloucestershire (BNSSG) area than other parts of England. The five year average suicide rate in men aged 35 to 64 is 25.9 per 100,000 in Bristol, compared to 19.7 per 100,000 across England.

ONS data shows that around three-quarters of all suicides are among men, with the highest rates occurring in middle age, so Hope is aimed at this group. It was piloted in 2016 and in 2018 it was rolled out across the BNSSG area.

Hope addresses the distress created by debt, financial, employment or welfare difficulties. It takes mental health and social circumstances into account and doesn't just focus on one aspect of a man's life.

Jackson J *et al*. (2022). Preventing male suicide through a psychosocial intervention that provides psychological support and tackles financial difficulties: a mixed method evaluation. *BMC Psychiatry*.

Farr M *et al*. (2022). Providing men at risk of suicide with emotional support and advice with employment, housing and financial difficulties: A qualitative evaluation of the Hope service. *Journal of Mental Health*.

EVENTS

State of the nation & lessons for pandemic preparedness
8 September 2022, 13.00 - 14.00, Dr Susan Hopkins, CBE (Chief Medical Advisor, UK Health Security Agency), online

Life at Nature Genetics: what we do, how scientific publishing works, and how I got here
9 September 2022, 12.00 - 13.00, Dr Michael Fletcher (Editor, Nature Genetics journal), OS6 Oakfield House and online

Let's Talk Trials
12 September 2022, 9.00 - 16.00, Business Centre Meeting Room 3, Whitefriars, Bristol, BS1 2NT

NIHR/EPSRC Systems Engineering Innovation hubs for multiple long-term conditions information webinar
12 September 2022, 15.00 - 17.00, online

Wellcome Mental Health Award: Integrating sleep and circadian science into our understanding and treatment of anxiety, depression and psychosis information webinar
13 September 2022, 12.00 - 13.00, online

MRC New Investigator Research Grant (NIRG) information webinar
13 September 2022, 14.00 - 15.30, online

Why Fake News is so fascinating to the brain?
13 September 2022, 17.00 - 18.00, online

EBI Global Public Health Strand Final Event
14 September 2022, 15.00 - 18.00, Room 7G1, 7 Priory Road, Bristol BS8 1TZ

Bristol Clock Club meeting
15 September 2022, 10.30 - 17.30, Plenary talks by Prof Ralf Stanewsky (Muenster) and Aarti Jagannath (Oxford), Ada Lovelace Building, room SM4

Neuroanatomical tract-tracing methods: classic techniques currently going viral
16 September 2022, 13.00 - 14.00, Anna Beyeler, Nicholas Foster and José L. Lanciego, online

Help build an AI in the biosciences network: scoping event
21 September 2022, 10.00 - 12.00, online

UKI2S – Translating complex science into successful global companies
21 September 2022, 13.00 - 14.00, Hassan Mahmudul and Oliver Sexton, C42 Biomedical Sciences, University of Bristol

Anil Seth at Gloucester Road Books
21 September 2022, 20.00 - 22.00, A talk, Q&A and signing event with the leading neuroscientist, chaired by Prof. James Ladyman, BA Church Hall, 160A Gloucester Road, Bristol BS7 8NT

FULL EVENTS LISTINGS ARE AVILABLE ON THE BN WEBSITE

NEWS

Matt Jones stepping down as Bristol Neuroscience Director

Matt Jones (School of Physiology, Pharmacology and Neuroscience) will be stepping down as Director of Bristol Neuroscience at the end of September 2022, having completed his four-year term of office. Matt was appointed to the post following an internal Biomedical Sciences review, during which BN was recognised as an area of strength and an example of best practice for collaborative work across disciplines and career stages. Under his leadership, BN: built Research Hubs which reflect our established and growing expertise in these areas; published a strategy highlighting our mission (*Brain Research for Better Lives*) and objectives over the coming years; helped to recruit and support new neuroscience staff across the Faculties of Life Sciences, Health Sciences and Engineering; strengthened ties with industry, including a $1 million initiative with Eli Lilly & Co; consolidated links with Cardiff University, particularly the Cardiff University Brain Imaging Centre and the Neuroscience and Mental Health Innovation Institute; worked with the Development and Alumni Relations Office to help secure several PhD studentships, £100k of GPU for the Neural Computation Hub and important legacy donations.

We are deeply grateful to Matt for his guidance and oversight during his tenure.

A recruitment process for a new Director is underway and we anticipate filling the post by the end of the year. Expressions of interest should be directed to b-n@bristol.ac.uk in the first instance.

Smoking is a cause of depression and schizophrenia

Smoking increases the risk of developing schizophrenia by between 53% and 127% and of developing depression by 54% to 132%, a report has shown. More research is needed to identify why this is the case, and more evidence is needed for other mental health conditions such as anxiety or bipolar disorder.

The evidence, presented at the Royal College of Psychiatrists International Congress on 20 June 2022, has been shared with the Government, which is currently developing a new Tobacco Control Plan for publication later this year.

The Congress was also presented new data on the numbers of smokers with mental

health conditions. Rates of smoking are much higher among people with mental health conditions than those without, and among England's 6 million smokers there are an estimated: 230k smokers with severe mental illness (e.g., schizophrenia and bi-polar disorder), and 1.6 million with depression and anxiety.

These analyses are timely as the Government is currently considering recommendations by the Khan Review for the forthcoming Tobacco Control Plan to deliver its Smokefree 2030 ambition. The review was commissioned to help UK Gov identify the most impactful interventions to reduce the uptake of smoking, and support people to stop smoking, for good. One of the 15 recommendations was for action to tackle the issue of smoking and mental health.

Read the full article

Sleep, circadian rhythms and mental health

This Wellcome scoping report, co-authored by Bristol Neuroscience Director Prof Matt Jones (School of Physiology, Pharmacology and Neuroscience), offers a broad overview of the current research landscape relating sleep and circadian rhythms to mental health, with a focus on depression, anxiety disorders and psychosis.

Sleep is vital for many aspects of our lives – from brain development to our immunity, metabolism and cognition. Despite remarkable progress in our understanding of sleep and circadian biology, the mechanisms linking sleep and circadian rhythm disruptions to causes and symptoms of mental illness remain poorly understood.

The report goes on to identify important gaps and opportunities for further research.

What's inside

- Broad insights into the current research landscape linking sleep and circadian rhythm to mental health - particularly in depression, anxiety disorders and psychosis
- Identifying research gaps and opportunities for further study

Who is this for

- Researchers from any field relevant to mental health
- Researchers in sleep and circadian science
- Lived experience mental health experts

Download the report

Anti-disinformation campaign to be deployed by Google

Short animations giving viewers a taste of the tactics behind misinformation can help to "inoculate" people against harmful content on social media when deployed in YouTube's advert slot, according to a major online experiment.

Working with Jigsaw, a unit within Google dedicated to tackling threats to open societies, a team of psychologists from the universities of Cambridge and Bristol created 90-second clips designed to familiarise users with manipulation techniques such as scapegoating and deliberate incoherence.

This "pre-bunking" strategy pre-emptively exposes people to tropes at the root of malicious propaganda, so they can better identify online falsehoods regardless of subject matter.

Researchers behind the Inoculation Science project compare it to a vaccine: by giving people a "microdose" of misinformation in advance, it helps prevent them falling for it in future – an idea based on what social psychologist's call "inoculation theory". The findings come from seven experiments involving a total of almost 30,000 participants and show a single viewing of a film clip increases awareness of misinformation. The videos introduce concepts from the "misinformation playbook", illustrated with relatable examples from film and TV such as Family Guy or Star Wars ("Only a Sith deals in absolutes").

Read the full news item

Roozenbeek J *et al*. (2022). Psychological inoculation improves resilience against misinformation on social media. *Science Advances*.

Impact of COVID-19 infection on a child's brain development

More than 650,000 babies are born every year in the UK, and during the pandemic some of them will have been exposed to SARS-CoV-2, the coronavirus which causes COVID-19. A national study, funded by the charity Action Medical Research, will investigate the long-term impact of exposure to SARS-CoV-2 in the womb or shortly after birth.

It is known that exposure to certain viral infections shortly after birth or during pregnancy can impact a baby's brain development or affect their development later in life, but it is not known if this is the case with SARS-CoV-2 infection. The SINEPOST (SARS-CoV-2 infection in neonates or in pregnancy) study, led by the University of Bristol in collaboration with researchers from the National Perinatal Epidemiology Unit (NPEU) at

SINEPOST
SARS-CoV-2 infection in neonates or in pregnancy: Outcomes at 18 months

the University of Oxford, Imperial College London, and University of Leicester, aims to compare the impact of SARS-CoV-2 on the development of children who were exposed to the virus during pregnancy or shortly after birth to infants who have not been exposed to the virus.

Most newborn babies infected with SARS-CoV-2 have mild or no symptoms, however they might be at risk of long-term effects. The SINEPOST study will add to what is already known about the impact of exposure to COVID-19, and increase our understanding of the short- and long-term impact of exposure in newborns.

Two hundred and fifty-seven infants have already been enrolled into the study, with recruitment ongoing until October 2022. The children will be followed up when they are 21 to 24 months old, with parents or carers being asked to complete questionnaires on how their child is developing.

Robot helps reveal how ants pass on knowledge

Scientists have developed a small robot to understand how ants teach one another.

The team built the robot to mimic the behaviour of rock ants that use one-to-one tuition, in which an ant that has discovered a much better new nest can teach the route there to another individual.

The findings confirm that most of the important elements of teaching in these ants are now understood because the teaching ant can be replaced by a machine. Key to this process of teaching is tandem running where one ant literally leads another ant quite slowly along a route to the new nest (see image). The pupil ant learns the route sufficiently well that it can find

its own way back home and then lead a tandem-run with another ant to the new nest, and so on.

The team waited for an ant to leave an old nest and placed a pheromone-enhanced robot pin, directly ahead of it. The pinhead was programmed to move towards a new nest on either a straight or sinuous path. They found that the robot had successfully taught the route to the apprentice ant, and ants knew their way back to the old nest whether they had taken a winding path or a straight one.

Read the full article

Franks NR *et al*. (2022). Robotic communication with ants. *Journal of Experimental Biology*.

Future leaders awarded £98 million to tackle global causes

Drs Emma Anderson, Rachel James, Peter Dunne and Sinead English have been selected for their work on dementia, climate change, respecting trans and non-binary identities and nutrition and immunity in pregnancy, respectively.

Emma Anderson (Bristol Medical School, pictured) and her team are aiming to understand the genetic and environmental causal determinants of dementia with a vascular component (DVC). She said:

"The overall aim of my UKRI Future Leaders Fellowship is to reduce the global burden of vascular dementia. The fellowship will help me to identify genetic and environmental determinants of vascular dementia, which is understudied despite contributing to over 50% of all dementia cases.

"I will be genotyping about 7000 brains in the UK Brain Bank Network. This will enable me to perform the largest genetic study of vascular dementia to date, which will help us to develop tools to identify susceptible individuals and establish both potential prevention options and therapeutic drug targets. The genotype data generated will be returned to the brain banks, which will form a fantastic resource for other scientists for decades to come."

Read about the other awards

Link between partner violence, self-harm and suicidality

A new study is the first to show that intimate partner violence (IPV) is strongly associated with self-harm and suicidality in both men and women, and across all ages in England. IPV is a recognised risk factor for psychiatric disorders.

Led by the Violence and Society Centre at City, University of London, in collaboration with the universities of Bristol, Manchester, Leicester and University College London, the study was an analysis of results from the Adult Psychiatric Morbidity Survey (APMS) conducted face to face with over 7,000 adults, in 2014/5.

The study found that 27% of women and 15% of men had experienced IPV at some point

in their life, confirming that women are far more likely than men to experience violence from a partner. People with experience of IPV were more likely to live in more deprived neighbourhoods and to have also experienced many other adversities in their lives. After adjusting for adversities, demographic and socioeconomic factors, people who had experienced IPV compared to those who had not, had in the previous year:

- over twice the risk of self-harming
- almost twice the risk of having suicidal thoughts
- almost three times the risk of attempting suicide

McManus S *et al*. (2022). Intimate partner violence, suicidality, and self-harm: a probability sample survey of the general population in England. *The Lancet Psychiatry*.

New recruits to ARC West dementia research

The National Institute for Health and Care Research (NIHR) Applied Research Collaboration (ARC) West has been awarded £240k to host two new post-doctoral researchers focused on dementia. One of the new recruits will focus on improving the economic evaluation of interventions to support people with dementia; the other will focus on developing a family intervention to support people who have received a dementia diagnosis.

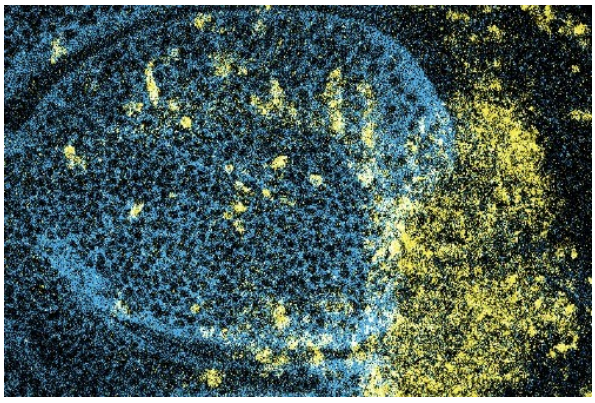
The economic evaluation project is led by Dr Hugh McLeod. ICECAP-O and ICECAP-SCM capability measures offer more holistic assessment of quality-of-life outcomes than the traditional narrower focus on health-related quality-of-life widely used in economic evaluation. These measures ask people to rate aspects of their quality-of-life which are viewed as most important, such as independence.

Prof Richard Cheston will lead the development of a family intervention to support people who have received a dementia diagnosis. Comparatively few of the 200,000 people diagnosed each year with dementia are offered support to help them to adjust to the diagnosis. The Living Well with Dementia course is a group-based post-diagnosis intervention, facilitated by non-psychologists; however, many potential participants would prefer to discuss these issues within their family rather than in a group. Read the full ARC West news item

Taste sensors keep proteins in order in flies

A set of genes that promote sweet taste sensation is also crucial for protein management during fly development, according to a new study led by of the University of Bristol and colleagues. The findings expand the understanding of a key process in successful development and suggest a connection between taste-related genes and disorders of protein aggregation.

The connection between promotion of proteostasis and the sense of taste is likely through the molecular mechanism of the Gr64 proteins, which regulate calcium flow; changes in calcium levels are used as a signal transducer in sensory cells and also regulate multiple proteostatic processes, including both proteosome function and autophagy. Intriguingly, dysregulated and out-of-place gustatory and olfactory receptors have been detected in the affected brain tissue in several human diseases characterised by loss of protein homeostasis, including Alzheimer's disease and Parkinson's disease.



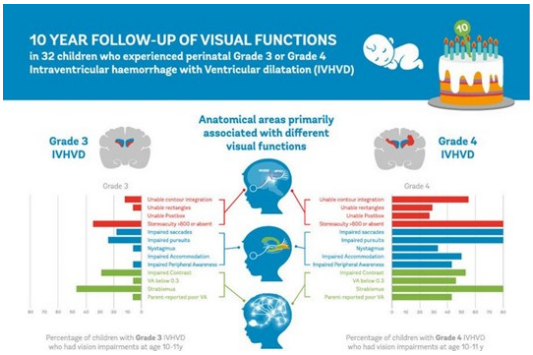
Baumgartner ME *et al*. (2022). The Gr64 cluster of gustatory receptors promotes survival and proteostasis of epithelial cells in *Drosophila*. *PLOS Biology*

Image caption: Mutant wing disc suffering from proteotoxic stress. Cells in the Posterior compartment (on the right, Cyan-negative) have been manipulated to downregulate Gr64 expression and show widespread cell death (Yellow), relative to control Anterior (Cyan-positive) cells.

Pre-term children with IVH need visual assessments

This study examined children 10 to 11 years after grade 3 or 4 intraventricular haemorrhage and ventricular dilation (IVHVD) and investigated whether the grade of IVHVD affected their visual outcome. The team explored associations between visual outcomes with cognitive outcomes and extra support at school.

The findings found that children who experience grade 3 or 4 IVHVD have a high level of visual morbidity at age 10 to 11 years. These children may have unmet visual needs and their outcomes might improve if these needs could be addressed.



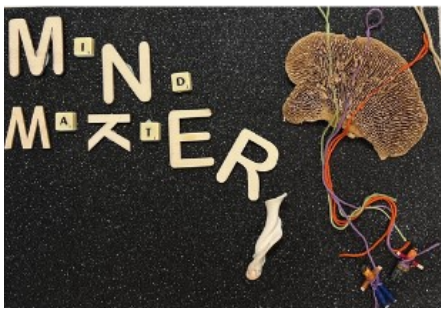
Researchers concluded that preterm children with severe IVH and post-haemorrhagic ventricular dilatation need comprehensive long-term visual assessment and monitoring to ensure their needs are being met.

Williams C *et al*. (2022). Vision function in children 10 years after grade 3 or 4 intraventricular haemorrhage with ventricular dilation: A masked prospective study. *Developmental Medicine & Child Neurology*.

Young person's cognition and anxiety during the pandemic

University of Bristol researchers have been working to determine the extent of the impact of the COVID-19 pandemic on young people and the relationship between anxiety and cognitive function. Understanding this will help to inform a joined-up approach to develop targeted interventions for vulnerable young people in both clinical and educational settings.

Even before the COVID-19 pandemic, the prevalence of emotional issues in adolescents - particularly anxiety disorders - was increasing, and the lockdown and its associated disruptions have likely made this worse. Educational disruption, job or university uncertainty may be particularly anxiety-inducing for older adolescents, and the pandemic has coincided with rising rates of such issues.



Meg Attwood, a PhD researcher at the University of Bristol's School of Psychological Science, and her supervisor Professor Chris Jarrold looked at the impact of the COVID-19 pandemic on both the psychological wellbeing and the cognitive function of older school-aged adolescents, funded by grants from the Elizabeth Blackwell Institute. The funding was used to increase the scope of their work - and increase its impact at the same time.

Three studies (June 2020, September 2020 and February 2021) recruited young people for online surveys about their subjective pandemic-related experiences and cognitive function. Some of these volunteers then participated in follow-up studies designed to objectively assess their cognitive performance.

Read the full news item by the Elizabeth Blackwell Institute

Caption: Adolescents used a variety of visual, auditory, and tactile media to express responses to questions about repetitive negative thinking and resilience.

Grant success for Bristol BRC Nutrition and Lifestyle theme

Researchers at the National Institute for Health and Care Research (NIHR) Bristol Biomedical Research Centre (BRC) Nutrition and Lifestyle theme have been awarded NIHR funding for their *AIM2Change: Helping adolescents to increase their intrinsic motivation to change weight* proposal.

The research co–principal investigators are Dr Elanor Hinton (Bristol Medical School) and Prof Julian Hamilton-Shield (Clinical lead of Care of Childhood Obesity Clinic & Bristol Medical School) together with Dr Aidan Searle (Bristol Dental School) as lead on qualitative methodology and Jennifer Cox (Chartered Health Psychologist & PhD student) as Research Associate and therapist. The work will also benefit from the expertise of Drs Giri and Semple from the Care of Childhood Obesity (CoCO) clinic, Professor Ingram Wright (ACT expert) and Dr Rebecca Kandiyali (health economics).

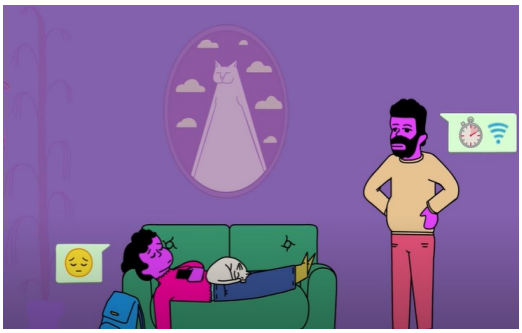
This research aims to co-develop a person-centred intervention based on Acceptance and Commitment Therapy (ACT), focusing on understanding and accommodating the views of the people who will use the intervention, to improve its relevance, and outcomes for them and to increase participation in and adherence to the programme. The ACT programme will be delivered one-to-one to the young people. Qualitative interviews will be conducted with participants at the end of each session to gain an understanding of the comprehensibility, acceptability, and value of intervention components to take forward to a consensus meeting.

Read the full NIHR Bristol BRC news item

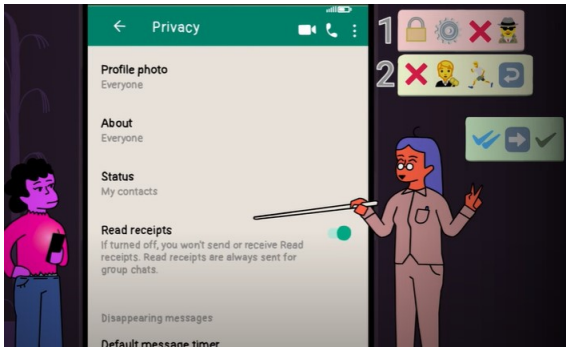
Social media and mental health video award

A video created by Lizzy Winstone and members of the NIHR Applied Research Centre (ARC) West and Bristol Biomedical Research Centre (BRC)'s Young People's Advisory Group (YPAG) about social media and young people's mental health has won a best use of social media for involvement award. The accolade was given at the inaugural Young People's Involvement in Digital Mental Health (YPii DMH) awards in a ceremony at the University of Nottingham on 22 July 2022.

The short video was based on the results of Lizzy's PhD project, working with YPAG members on every aspect of the animation, including the script and voiceover. The YPii DMH special interest research group, which hosted the awards, is part of the research network Emerging Minds. The awards were also supported by the NIHR Mental Health MedTech Co-operative.



Watch the video



Funding successes

From the **British Psychological Society** to Dr Elanor Hinton (Bristol Medical School), £2,160 for *Exploring episodic memory for recent eating using a novel 'what, where, when' task*, starting Jul '22 for 6 weeks.

Reinforcement learning with structured action spaces was supported by a £31,649 grant from **Government Communications Headquarters** (GCHQ). The funds went to Dr Raphael Clifford (Department of Computer Science) starting Oct '22 for four years.

Prof Jemima Dooley (Bristol Medical School) was awarded £46,409 from the **National Institute for Health and Care Research** for *Emergency decision making in dementia care: Exploring context and stakeholder perspectives for intervention development*, starting Jul '22 for 17 months.

A project entitled *Factors Influencing Recovery in Opioid Substitution Treatment*, led by Vicky Carlisle (Bristol Medical School) was funded by a £33,194 grant from **Wellcome**. It began in July 2022 and is expected to complete by January 2023.

Dr Lucy Selman (Bristol Medical School) received an additional £10,000 from the **Economic and Social Research Council** for her existing project, *Supporting people bereaved during COVID-19: a mixed methods study of bereaved people's experiences and the bereavement services supporting them.*

Compass Pathways Ltd has awarded Dr Robert Drake (Physiology, Pharmacology and Neuroscience) £8,000 for *Identifying psilocybin induced behavioural motifs in rodents*, starting Jul '22 for one year.

Dr Lucia Marucci (Dept of Engineering Mathematics, pictured) received £63,119 from the **Biotechnology and Biological Sciences Research Council** for *Mind the Gap: AI-Augmented Cell-Free Systems for In-Cell Predictions*, starting June '22 for one year.

Pinpointing those most at risk of Long COVID

A national study suggests that those at greatest risk of long COVID are women, those aged 50-60, people with poor pre-pandemic mental health and those in poor general health, such as anyone with asthma or who is overweight.

Around two million people in the UK are affected by long COVID (ONS data, 1 May 2022), enduring symptoms for 12 weeks or more after they've been infected. Whilst the syndrome has been widely reported, the frequency and risk factors for the condition are not well understood.

In order to develop new treatments, Children of the 90s – along with nine other population-based cohort studies – has helped researchers to understand what causes some people to suffer the condition more than others. In parallel, researchers also utilised data from electronic health records collected by Spring 2021 for 1.1 million individuals diagnosed with COVID-19. The research is part of the UKRI-NIHR funded multi-institution CONVALESCENCE study, which is run by University College London and is the first of its kind to look at long COVID.

Thompson EJ *et al*. (2022). Long COVID burden and risk factors in 10 UK longitudinal studies and electronic health records. *Nature Communications*.

Poor labour markets amongst Muslims are not cultural

Recent findings challenge a pervasive narrative that problematises Muslims and their faith, providing empirical evidence that comparatively high Muslim unemployment and inactivity rates cannot be explained by their so-called 'sociocultural attitudes'. In doing so, the study lends support to the overwhelming evidence from field experiments that shows anti-Muslim discrimination towards Muslims and those perceived to be Muslim to be a significant barrier to them accessing work.

An analysis of 10 years of data from the UK Household Longitudinal Study (which gathers information on the socio-economic situation and cultural contexts from around 40,000 households) showed that the Muslim penalty (against males and females) did not disappear once religiosity, traditionalist views, and lower civic participation associated with a higher risk of unemployment and inactivity were accounted for. Findings also question the contention that, amongst men, the ethnic penalty is best understood as resulting primarily from two penalties - colour and religion - and suggests that a country-of-origin penalty may also be at play.

The risk of a penalty, particularly in terms of unemployment, was also found to remain considerably high for Black African and Black Caribbean men regardless of whether they practised or identified with a religious faith, providing strong evidence in support of previous research which established that the British labour market is hierarchised based on skin colour.

Sweida-Metwally S (2022). Does the Muslim penalty in the British labour market dissipate after accounting for so-called "sociocultural attitudes"? *Ethnic and Racial Studies*.

Not all sleep drugs are equal

Over the past 50 years, hypnotics including benzodiazepines (BZ; e.g. diazepam, temazepam) and Z-drugs (e.g. zolpidem, zopiclone) have been used to treat anxiety and insomnia. Hypnotics do produce modest, clinically-relevant reductions in sleep latency, but at the expense of side-effects, dependency, and risk of abuse.

Alongside sedation, augmenting $GABA_A$ receptor function may also alter co-ordinated neuronal activity during sleep, thereby influencing sleep-dependent processes including memory consolidation. The team used simultaneous recordings of neural population activity from the medial prelimbic cortex and

CA1 of the dorsal hippocampus of naturally sleeping rats to detail the effects of zolpidem on network activity during the cardinal oscillations of non-REM sleep.

Of the drugs compared here, zolpidem was unique in augmenting co-ordinated activity within and between hippocampus and neocortex during non-REM sleep. Zolpidem's enhancement of hippocampal-prefrontal coupling may reflect the cellular basis of its potential to modulate offline memory processing.

Kersanté F, Purple RJ and Jones MW (2022). The $GABA_A$ receptor modulator zolpidem augments hippocampal-prefrontal coupling during non-REM sleep. *Neuropsychopharmacology*.

Bristol Innovations

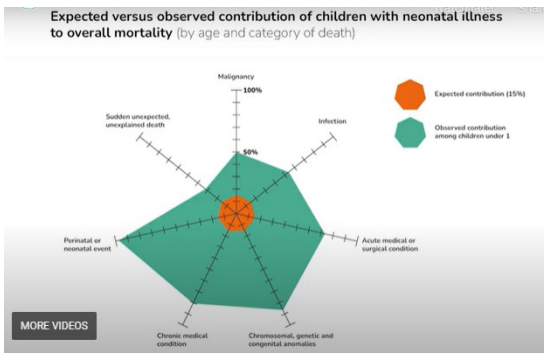
The University of Bristol has launched Bristol Innovations, a new initiative that will combine its far-reaching research expertise with the industry know-how of global partners, leading to progressive sector-wide and multidisciplinary discoveries.

Bristol Innovations is a virtual network designed to increase opportunities for University academics, researchers and entrepreneurial students to collaborate with third party stakeholders to translate research for real-world purposes. It launches at a time when the UK government has pledged to turn the UK into a global innovation hub.

Supported by the Bristol Grid – a University of Bristol digital hub for entrepreneurial activities – the network will enhance the University's efforts to apply its knowledge and expertise for the benefit of millions of people across the world. This includes working with industry partners to identify and respond to social and economic needs; exploring new spin-out and start-up opportunities; investing in more resources for business development; offering more consultancy and licencing opportunities; and working with third parties through knowledge exchange, public engagement and research commercialisation.

Newborn illness and mortality throughout childhood

New evidence has found a link between poor health as a newborn and mortality up to the age of ten. The new report from England's National Child Mortality Database (NCMD), led by the University of Bristol, shows of the 4,829 children aged ten and under who died in England between 2019 and 2021, 72 per cent were found to have required additional care in the neonatal period.



The report shows the dramatic impact of perinatal events – being born prematurely, or suffering an injury or infection shortly after birth – on mortality in the first year of life, where 83 per cent of deaths were linked to additional care requirements after birth. But more surprisingly, it shows for the first time how that risk persists throughout childhood; although they only make up 15% of the population, these children account for 38% of deaths aged 1 to 4 years, and 27% of deaths aged five to nine years.

The publication also examines the factors that could be changed to improve the situation, and presents recommendations for policymakers and health officials. Smoking during pregnancy, lack of involvement from appropriate services and maternal obesity were the three most prominent modifiable factors identified by child death review, and the report authors have called for current interventions to be strengthened and new measures to be deployed to tackle these issues.

Odd D *et al*. (2022). The contribution of newborn health to child mortality across England. National Child Mortality Database.

Seed funding for projects tackling mental health

Seed funding has been awarded to five collaborative GW4 Crucible projects that aim to tackle the challenges of poor mental health and autistic identity. GW4 Crucible offers future research leaders a six month leadership development programme and the opportunity to come together with their peers to consider new interdisciplinary and collaborative approaches to research and its impact.

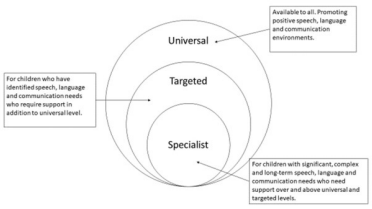
The successful applicants all stem from this year's programme, which had the theme 'Building Back Better: Interdisciplinary Approaches to Mental Health and Wellbeing Research'.

Among the supported projects was *Hystories: Amplifying women's voices for better outcomes in reproductive mental health – A journey through menstruation, pregnancy and menopause.* Led by Dr Siobhan Mitchell (University of Exeter) and Dr Kayleigh Easey (University of Bristol), the group seeks to understand more about the unique mental health needs of women at key stages of reproductive transition, to promote women's narratives and identify ways of amplifying these voices to establish and facilitate opportunities for support.

Read about the other projects

Speech, Language and Communication tool

Early speech, language and communication difficulties can have a long-term impact into adulthood with effects reported on literacy, social and emotional well-being and employment. By identifying children who are at risk of language difficulties early in life it is possible for them to receive intervention in a timely manner to prevent any potential wider effects. Up to two thirds of children identified with speech, language and communication needs require support to make progress and there is evidence that intervention for speech, language and communication difficulties is effective. The challenge is knowing when and how to identify the children who need and will benefit from this intervention.



Dr Yvonne Wren led a team of researchers from the University of Bristol, Cardiff Metropolitan University and the Bristol Speech and Language Therapy Research Unit to review existing screening tools and provide evidence to inform the development of a screening approach suitable for the population of Wales.

Julie Morgan MS, Deputy Minister for Social Services announced this week that the Welsh Government have committed up to £1.5m over three years to develop a SLC identification tool for use with young children. The development plan for the tool was informed by research involving Bristol Speech and Language Therapy Research Unit, Cardiff Metropolitan University and Bristol University.

Find out more about Yvonne Wren's project here.

Dolphins form largest alliance network outside humans

Scientists from the University of Bristol, with colleagues from the University of Zürich and University of Massachusetts, analysed association and consortship data to model the structure of alliances between 121 adult male Indo-Pacific bottlenose dolphins at Shark Bay in Western Australia.

Male dolphins in Shark Bay form first-order alliances of two-three males to cooperatively pursue consortships with individual females. Second-order alliances of four-14 unrelated males compete with other alliances over access to female dolphins and third-order alliances occur between cooperating second-order alliances.

"Not only have we shown that male bottlenose dolphins form the largest known multilevel alliance network outside humans, but that cooperative relationships between *groups, rather than simply alliance size, allows males to spend more time with females, thereby increasing their reproductive success."*

Stephanie King
Biological Sciences

Connor RC *et al*. (2022). Strategic intergroup alliances increase access to a contested resource in male bottlenose dolphins. *PNAS*.

Image: Four male allies and a female, © Dr Simon Allen

PhD studentship success

Bristol Neuroscience is delighted to announce that, thanks to a generous donation from alumnus Steve Scobie and his wife Anne Graham and with additional funding from the University of Bristol, two PhD studentships have been awarded following a competitive process.

The first, led by Drs Paul Anastasiades (Bristol Medical School) and Emma Cahill (Physiology, Pharmacology and Neuroscience), will look at *Determining the role of cerebellar-prefrontal circuitry in social behaviours in a preclinical mouse model of autism spectrum disorder*.

The ability to learn via social cues is fundamental to successfully navigating complex social environments. Disrupted social learning is also one of the hallmarks of autism spectrum disorders, yet the underlying mechanisms are poorly understood. This project aims to determine how cellular deficits in a preclinical mouse model of autism contribute to changes in social behaviour and social learning.

The second project will be led by Seán Froudist-Walsh (Computer Science) alongside collaborators Profs Anissa Abi-Dargham & Mark Slifstein and Dr Jared van Snellenberg (Stony Brook University, USA): *Identifying network and neurochemical mechanisms for hallucinations and working memory deficits in schizophrenia using neural network modelling and neuroimaging*.

The debilitating hallucinations and cognitive symptoms of schizophrenia, while usually considered separately, may emerge due to a common mechanism. The student will develop neural network models to investigate shared mechanisms for hallucinations and cognitive symptoms in schizophrenia, test the models on clinical imaging data, and use this computational platform to propose urgently-needed new treatments.

Sleep differs in those with genetic risk of psychiatric disorders

The brain activity patterns during sleep shed light on the neurobiology behind a genetic condition called 22q11.2 Deletion Syndrome (22q11.2DS) and could be used as a biomarker to detect the onset of neuropsychiatric disorders in people with 22q11.2DS.

Caused by a gene deletion of around 30 genes on chromosome 22, 22q11.2DS occurs in one in 3000 births. It increases the risk of intellectual disability, autism spectrum disorder, attention-deficit hyperactivity disorder and epileptic seizures. It is also one of the largest biological risk factors for schizophrenia. However, the biological mechanisms underlying psychiatric symptoms in 22q11.2DS are unclear.

The team recorded sleep EEG over one night in 28 young people aged six to 20-years old with the chromosome deletion and in 17 unaffected siblings. They measured correlations between sleep EEG patterns and psychiatric symptoms, as well as performance in a recall test the next morning. They found that the group with 22q11.2DS had significant alterations in sleep patterns including a greater proportion of N3 NREM sleep (slow-wave sleep) and lower proportions of N1 (the first and lightest sleep stage) and rapid eye movement (REM) sleep, compared with their siblings.

Donnelly N *et al*. (2022). Sleep EEG in young people with 22q11.2 deletion syndrome: a cross-sectional study of slow-waves, spindles and correlations with memory and neurodevelopmental symptoms. *eLife*.

Call for change on eating fish during pregnancy

A woman's mercury level during pregnancy is unlikely to have an adverse effect on the development of the child provided that the mother eats fish. The findings drew together analyses on over 4,131 pregnant mothers from the Children of the 90s study in the UK, with similar detailed studies in the Seychelles.

Importantly, the researchers also found that it does not appear to matter which types of fish are eaten because the essential nutrients in the fish could be protective against the mercury content of the fish. The more important factor was whether the woman ate fish or not. This contrasts with current advice warning pregnant women not to eat certain types of fish that have relatively high levels of mercury.

Although there are several studies that have considered this question, this research has looked at two contrasting studies of populations with mercury levels measured during pregnancy where the children were followed up at frequent intervals during their childhood.

Golding J *et al*. (2022). The benefits of fish intake: Results concerning prenatal mercury exposure and child outcomes from the ALSPAC prebirth cohort. *NeuroToxicology*.

FUNDING OPPORTUNITIES

Research Professional provides access to an extensive database of funding opportunities, and can send out tailored alerts based on specific keywords input by the user. UoB staff and students have **FREE** online access to the database from any device.

You can search for funding information by discipline, sponsor, database searches, by recent calls or by upcoming deadlines. If you register for the site and log in, you'll be able to:

- **Set up automated funding opportunity email alerts** - **tailored according to your discipline and research interests**
- **Save searches and bookmarks**
- **Sign up for higher education news bulletins**

Find out more about the platform on the RED website. Note that some calls may have an internal process; check the major bids webpage to see if such a process is in place.

The following listings represent a *brief selection* of available funding for the Bristol Neuroscience community. **Full listings of opportunities** are sent out via Faculty Research Directors and/or School Research Directors, and **are available on the Research Development website**.

National Institute of Neurological Disorders and Stroke, US
BRAIN initiative – biology and biophysics of neural stimulation and recording technologies (R01 clinical trial optional)

Closing date: 3 October 2022 Award amount: unspecified

This supports researchers in developing new and improved technologies to record from and control specified cell types and circuits to modulate and understand function in the central nervous system. The aim is to characterise, model and validate the neurobiological, cellular and circuit responses of neuronal and non-neuronal cells in the central nervous system to fields produced by neural stimulation and to understand the biological and bioinformatic content of signals recorded from neuronal and non-neuronal cells and circuits in terms of shape, size, orientation, propagation and location of signal generators at varying temporal and spatial scales.

Alzheimer's Research UK
Pilot project grants

Closing date: 5 October 2022 Award amount: £50,000

These support novel research ideas that if successful would lead to a major project or programme application to ARUK or other funding body. Grants are worth up to £50,000 each for up to two years, and may be used to cover staff salaries, equipment, animal costs and running costs.

Internationale Arbeitsgemeinschaft Functional Kinetics FBL Klein-Vogelbach
Susanne Klein-Vogelbach prize for the research of human movement

Closing date: 5 October 2022 Award amount: CHF 10,000

This recognises researchers in neuroscience, orthopaedics and associated sciences working to establish a better understanding of the underlying principles of human movement and its rehabilitation, meaning all kinds of muscular-induced human movement, including mime and music. Authors who have published a scientific paper in this area within the last two years, or whose paper has been accepted for publication, are eligible to apply. Papers in English are preferred.

Ataxia UK
Ataxia grants

Closing date: 10 October 2022 Award amount: £70,000

These support relevant research on ataxia. This supports research into conditions in which ataxia is the principle symptom, and in which the ataxia is likely to be progressive, including conditions such as Friedreich's ataxia, the spinocerebellar ataxias and other cerebellar ataxias. The following schemes are supported: research projects; PhD studentships; research fellowships; travel awards for researchers or students presenting at conferences; satellite meetings at major symposia of other organisations dealing with related disorders; small grants for research projects, worth up to £5,000.

BRACE
Pilot grants

Closing date: 15 November Award amount: £70,000

These support medical scientific research into the different forms of dementia. Research is supported in four main areas: understanding how the brain works and what has gone wrong in someone with dementia; development of effective and accurate means of diagnosing the condition as early as possible; finding new treatments and assessing their effectiveness in clinical trials; investigating the potential link between certain DNA genes and the chances of developing dementia. Researchers in South West England or South Wales, based within appropriate academic and research institutions, and preferably ones where there is clear evidence of existing studies in dementia, may apply.

National Institute for Health and Care Research
Health and social care delivery research programme – researcher-led workstream: 22/117

Closing date: 16 November Award amount: unspecified

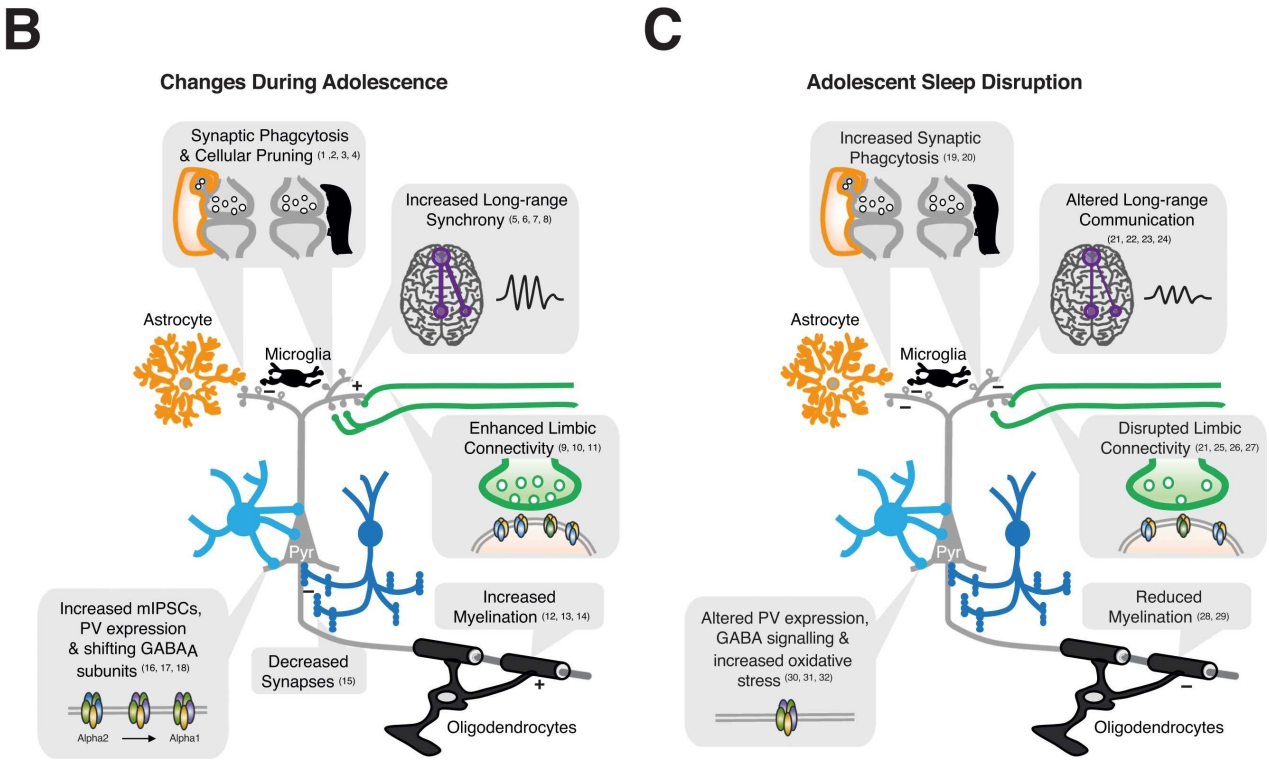
The aim is to fund research that will lead to improvements in health services that will be of greatest benefit to the NHS and to patients. The workstream is open to all relevant research areas but it also has a continued interest in specific fields, including dementia, mental health, chronic pain and the prevention and treatment of obesity.

SHOWCASED ARTICLE

Adolescent sleep and the foundations of prefrontal cortical development and dysfunction

Anastasiades PG, de Vivo L, Bellesi M, Jones MW (2022). *Progress in Neurobiology*.

Modern life poses many threats to good-quality sleep, challenging brain health across the lifespan. Curtailed or fragmented sleep may be particularly damaging during adolescence, when sleep disruption by delayed chronotypes and societal pressures coincides with our brains preparing for adult life via intense refinement of neural connectivity. These vulnerabilities converge on the prefrontal cortex, one of the last brain regions to mature and a central hub of the limbic-cortical circuits underpinning decision-making, reward processing, social interactions and emotion. Even subtle disruption of prefrontal cortical development during adolescence may therefore have enduring impact. In this review, we integrate synaptic and circuit mechanisms, glial biology, sleep neurophysiology and epidemiology, to frame a hypothesis highlighting the implications of adolescent sleep disruption for the neural circuitry of the prefrontal cortex. Convergent evidence underscores the importance of acknowledging, quantifying and optimizing adolescent sleep's contributions to normative brain development and to lifelong mental health.



B) Adolescent PFC maturation is characterised by refinement of intra-PFC and long-range connectivity. These changes bring about increased limbic connectivity, increased co-ordinated activity with other distal brain regions, such as components of the DMN and FPN. Changes in long-range interactions are thought to be driven by increases in axon myelination. At the synapse level changes in synaptic density, receptor subunit composition and function are observed at both excitatory and inhibitory synapses. Fast synaptic inhibition of PFC pyramidal neurons is promoted by the shift from alpha2- to alpha1-containing GABAA receptors, while chandelier synapses to the axon initial segment are reduced. Glutamatergic synaptic reorganisation is regulated by synaptic phagocytosis and associated pruning via astrocytes and microglia. C) Sleep impacts many of the developmental processes that occur during adolescence. Sleep disruption impacts glial cells, causing reduction in myelin thickness and increasing synaptic phagocytosis. Reduced sleep also causes oxidative stress in PV interneurons, altering PV expression levels and cellular function. Limbic and long-range connectivity are also impaired, uncoupling the PFC and other frontal cortices from connected brain regions, or forcing networks to work harder to maintain normal function.

CONTACTS

Bristol Neuroscience

Director: recruitment in progress

Memory Hub Lead: Emma Cahill, Lecturer
Area of research - Physiological basis of memory and adaptive behaviour

Movement Hub Lead: Paul Chadderton, Associate Professor in Neurophysiology
Area of research - to reveal the cellular and circuit mechanisms involved in motor control and learning in the cerebellum

Neural Computation Hub Lead: Conor Houghton, Associate Professor in Computer Science
Area of research - understanding information processing and coding in the brain

Sleep Hub Lead: Matt Jones, Professorial Research Fellow in Neuroscience
Area of research - neuronal networks in cognition and disease

Mental Health Hub Lead: in progress

Network Facilitator: Joseph Butler, *Research Development Manager (interim), Faculty of Life Sciences*

Network Administrator: Catherine Brown (Elizabeth Blackwell Institute)

The content of this newsletter is not the intellectual property of the Network, but rather an amalgamation of information obtained through a variety of sources including our community members, research groups and University of Bristol school bulletins and press releases. Affiliations are stated wherever possible, however please note that omissions do happen and we apologise in advance for any you may come across. All information is merely for educational and informational purposes. We cannot offer medical advice and any queries regarding treatment for a specific medical condition or participation in a clinical trial should be addressed to your healthcare provider. While the information herein has been verified to the best of our abilities, we cannot guarantee that there are no mistakes or errors.

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