University of BRISTOL
Elizabeth Blackwell Institute for Health Research

Bristol Neuroscience Newsletter

2021: Issue 2

bristol neuroscience

@BristolNeurosci

bristol.ac.uk /neuroscience

b-n@bristol.ac.uk

+44 117 428 4012

Inside this issue:

BBC presents Bristol research

Sir David Attenborough's *Life in Colour*, produced by Bristol-based TV production company Humble Bee Films, aired on the BBC earlier this year. Over the series, Sir David unearthed how colour, and how creatures perceive that colour, dictates the undulations of the animal kingdom.

University of Bristol researchers helped the series' wildlife camera operators show how bright orange tigers can go unnoticed to their prey, how fiddler crabs see a property of light completely invisible to humans, and how mantis shrimp use colour as an intruder-warning system.

Bengal tigers

A tiger's vibrant orange stripes are obvious to us, but research by the Camo Lab found that it provides the perfect camouflage for their environment because their primary prey, sambar deer, cannot differentiate between red and green hues. Their colour blindness means tigers are extremely difficult to spot against green vegetation. Drs Laszlo Talas and John Fennell (Bristol Veterinary School) lead the project.

Fiddler crabs

Recent discoveries, including by former Bristol PhD student Sam Smithers, Dr Martin How and Prof Nicholas Roberts (Biological Sciences), found that fiddler crabs can see a whole property of light that is invisible to humans. They helped the producers develop a new camera so the audience could view the world as fiddler crabs see it, including polarized light.

Mantis shrimp

Mantis shrimp are one of the few other animals that can see – and use - the polarisation of light, and can use this light to spot predators and even communicate with each other.

Read the full press release

Watch the episodes on BBC iPlayer (you will need an account)

EVENTS

SW Long COVID / post COVID Syndrome Assessment services – impact and opportunities for SW AHPs
22 June 2021, timings TBC, online

COVID-19 and Co-production in Health and Social Care Research: book launch and talk
22 June 2021, 16.00 - 17.15, online

Inclusive Research Collective: Inclusive Human Participant Research
23 June 2021, 13.00 - 14.30, Pollyanna Sheehan (University of Bristol), online

About Fundamentals of Vision
24 June 2021, 13.00 - 14.00, Michael Herzog (Professor for Psychophysics, Brain Mind Institute, EPFL, Lausanne), online

NENS Exchange Grants live online session
24 June 2021, 14.00 - 15.00, online

Sensory and behavioural components of neocortical signal flow in discrimination tasks with short-term memory
24 June 2021, 15.00 - 16.00, Yasir Gallero-Salas (Helmchen Lab, University of Zürich), online

Research Ethics Conference 2021 (REC2021)
25 June 2021, 9.00 - 17.00, online

Neural Dynamics Forum
25 June 2021, 13.00 - 14.00, Steve Coombes (University of Nottingham), online

Hippocampal-prefrontal interactions guide knowledge acquisition and generalization
28 June 2021, 15.00 - 16.00, Prof Alison Preston (Dept. of Neuroscience, Psychology & Psychiatry, University of Texas), online

Inclusive Research Collective: Environmental Impact of Research
30 June 2021, 13.00 - 14.30, Martin Farley (Green Lab Associates) & Chathurika Akurugoda (University of Colombo), online

Autophagy and Medicine: Maintaining health and preventing disease
1 July 2021, 14.00 - 18.10, online

The Digital Economy NetworkPlus SPRITE+ Sandpit event
2 July 2021, 13.00 - 14.30, online

Snapshot seminar
5 July 2021, 13.00 - 14.00, Dr Peter Brennan (University of Bristol), online

FULL EVENTS LISTINGS ARE AVILABLE ON THE BN WEBSITE

NEWS

GPs need training to spot risk of psychosis

GPs are in a good position to identify patients who are at risk of developing psychosis, however it is not always easy for them to do so. In a recent study of the possible barriers, researchers at the University of Bristol's Centre for Academic Primary Care and Centre for Academic Mental Health found that not all GPs were familiar with the concept of being 'at risk of developing psychosis' and some felt they would benefit from further training in identifying patients who might fall into this group.

The research, funded by the National Institute for Health (NIHR) Bristol Biomedical Research Centre explored GPs' views and experiences of identifying patients with an 'at-risk' mental state. Twenty GPs from the South West of England were interviewed between March and July 2019. Other barriers to managing patients with an at-risk mental state included patients not presenting or disclosing psychotic symptoms, lack of continuity of care (i.e. being seen by the same GP), and only the most severely ill patients being able to access specialist mental health services.

Strelchuk D *et al*. (2021). Identifying patients at risk of psychosis: a qualitative study of GP views in South West England. *British Journal of General Practice*.

Listen to the BJGP podcast about the study

Schizophrenia-associated genes respond to anti-psychotics

A severe long-term mental health condition that is historically poorly understood and treated, schizophrenia is relatively common, affecting 1-2% of the population, and is known to be up to 80% genetic in origin. Genome sequencing of people with schizophrenia have identified a list of novel genes and mutations associated with the disease. Many are expressed in the brain and are involved in how neurons communicate with each other by electrical and chemical signals released at synapses. The research was performed by the first student, Dr Sergio Hidalgo, on the dual PhD programme from the University of Bristol and the Pontificia Universidad Católica de Chile. He studied the role of two schizophrenia associated genes on behaviours associated with the disease, using the genetics of the fruit fly, *Drosophila:* Rim is involved in neurotransmitter release at synapses; CACNA1A and CACNA1B in humans and cacophony in flies, are voltage-sensitive calcium channels involved in electrical and chemical signalling in and between neurons. They found that fly Rim mutants showed several behavioural changes seen in people with schizophrenia who may have Rim mutations. These included preferring larger social distances between individuals when in a group and changes in smell. They also found the circadian deficits reported in schizophrenia were also present in Rim mutant flies. Strikingly, treatment with the commonly used antipsychotic, haloperidol, rescued some of the Rim mutant's behavioural problems.

Hidalgo S *et al*. (2021). Assessing olfactory, memory, social and circadian phenotypes associated with schizophrenia in a genetic model based on Rim. *Translational Psychiatry*.

Hidalgo *et al*. (2021). The Drosophila ortholog of the schizophrenia-associated CACNA1A and CACNA1B voltage-gated calcium channels regulate memory, sleep and circadian rhythms. *Neurobiology of Disease*.

Funding successes: Part 1

Prof Elek Molnar (Physiology, Pharmacology and Neuroscience [PPN]) received funding from **Innovate UK** for a Knowledge Transfer Partnership (KTP) project with Hello Bio, an Avonmouth-based specialist supplier of life science research tools. The project will facilitate the commercialisation of immunochemicals developed and used by Elek for his research of glutamate receptors. In neuroscience there is a lack of high quality, reliable antibody support and standardised validation procedures for various experimental approaches. The KTP will address these challenges through closer industrial collaboration. The grant will fund PhD student Matthew Wilkinson (PPN) as a KTP Associate.

Nils Kappelmann (PhD student at the Max Planck Institute of Psychiatry, Munich) won a £250,000 **Medical Research Council** (MRC) Neuroimmunobiology Data Generation award for early career researchers. Nils will be working with Profs Golam Khandaker (Bristol Medical School), Gareth Jones (Cellular and Molecular Medicine), Caroline Relton (Bristol Medical School) and colleagues at the MRC's Integrative Epidemiology Unit. The project is entitled *Immunological Mechanisms and Therapeutic Targets for Depression*.

Dr Paul Anastasiades (Bristol Medical School) was successful with his **Academy of Medical Sciences** Springboard award for *The role of the cerebellum in thalamic development*. The award is worth £100,000.

Dr Dima Damen (Computer Science) was awarded a £325,349 from the **Engineering and Physical Sciences Research Council** for *Interpretable and open world AI.* The project will run from Dec' 20 to May '23.

Dr Hannah MacGregor (Biological Sciences) received £9,809 from **The Association for the Study of Animal Behaviour** to conduct a pilot project on the effects of turbidity on fish shoaling behaviour in collaboration with Dr Christos Ioannou (also Biological Sciences).

Science of Happiness course improves mental health

The first course of its kind in the UK, the University of Bristol's Science of Happiness programme uses the latest peer-reviewed studies in psychology and neuroscience to educate students about what is scientifically proven to make us happier. Launched in 2018, it was proposed in response to an increase in student mental health problems across the country. In a recent survey of UK students nearly half said they were currently experiencing mental health issues.

Any student can enrol on the Science of Happiness, the only Bristol University course that gives credits toward a student's degree but does not involve any exams or coursework. Instead, students gain credit for their engagement in weekly activities and "happiness hubs" led by senior student mentors and complete a final group project.

A recent paper showed that three cohorts of students ended the course with markedly better mental health than control groups. One of the many take aways from the course includes the idea that loneliness impacts on our health by impairing our immune systems. Last year, the Science of Happiness course was turned into a successful BBC podcast, the Happiness Half Hour.

Hood B *et al*. (2021). Benefits of a psychoeducational happiness course on university student mental well-being both before and during a COVID-19 lockdown. *Health Psychology Open*.

Co-operation between male dolphins

Social animals can possess sophisticated ways of classifying relationships with members of the same species. Bottlenose dolphins form the most complex alliances outside humans; and a team of Bristol researchers, with colleagues from the Universities of Zürich and Massachusetts, wanted to classify these relationships.

They used 30 years of observational data from a dolphin population in Shark Bay, Western Australia, and sound playback experiments to assess how male dolphins responded to the calls of other males from their alliance network. Males responded strongly to all of the allies that had consistently helped them out in the past, even if they weren't currently close friends.

On the other hand, they didn't respond strongly to males who hadn't consistently helped them out in the past, even if they were friends. What this shows is that these dolphins form social concepts of 'team membership', categorising allies according to a shared cooperative history.

King S *et al*. (2021). Cooperation-based concept formation in male bottlenose dolphins. *Nature Communications.*

Watch the video

Image: © Dr Simon Allen

Online gambling during lockdown

Regular gamblers were more than six times more likely to gamble online compared to before the COVID-19 pandemic. The study showed regular male gamblers were particularly prone to gambling more often online during the public lockdown in the UK, compared to their previously reported gambling habits.

Although overall men and women gambled less frequently during lockdown, partly due to betting shops being closed, some forms of gambling increased. For instance, usage of online gambling, including poker, bingo, and casino games, grew sixfold among regular gamblers. Respondents who gambled occasionally were still found to be more than twice as likely than before to gamble online. Those who struggled financially before the pandemic were more likely to report gambling during lockdown.

The study provides insights into how people's attitudes and gambling behaviour changed during lockdown, when people were unable to participate in most social activities. The findings reveal that although many forms of gambling were restricted, a minority of regular gamblers significantly increased their gambling and betting online. As with so many repercussions of the pandemic, inequalities have been exacerbated and particularly vulnerable groups were worse affected. The research builds on other evidence, including the YouGov Covid-19 tracker study, which found that regular gamblers turned to new online options during lockdown. Data from the Gambling Commission derived from the biggest gambling operators in the UK also showed increased revenues during lockdown for online gambling, especially on esports, which dramatically gained in popularity as live sporting events traditionally betted on were suspended.

Emond A *et al*. (2021). Gambling by young adults in the UK during COVID-19 lockdown. *Journal of Gambling Studies*.

PReCePT: new Quality Improvement innovation toolkit

A new Quality Improvement (QI) innovation toolkit (PDF) has been produced for clinical teams implementing change across the health service. The toolkit was informed by the learning from the *Prevention of cerebral palsy in pre-term labour* (PReCePT) study, which aims to reduce the risk of premature delivery. Premature birth is the main cause of brain injury and cerebral palsy in babies; giving magnesium sulphate to women at risk can protect babies from brain injury. The study, a research trial in 40 maternity units across England, will assess which is the best method of implementation to improve and sustain magnesium sulphate uptake in maternity units.

The team behind the study

believe that what they have learned on this study will be applicable across the health service, not just in maternity units but in other specialties.

The toolkit includes:

- worksheets to help teams approach change projects
- communications and implementation plans
- project snapshot, capsule summary and embedding tools

The toolkit outlines steps to success and explains each step in detail.

Studying the neural basis of emotion

A Marie Skłodowska-Curie Innovative Training Network will explore the brain circuits that underlie emotional behaviour thanks to funding of €4.5 million by the European Research Council.

The award creates a Virtual Institute of seven European universities, including the University of Bristol, and nine industry/charity partners. The funds will support 15 PhD students working across the consortium over the next four years.

The training network focuses on the role of a previously overlooked part of the brain, the cerebellum, and its involvement in the control of emotions. The cerebellum contains more nerve cells than all other brain regions put together. It developed very early in the course of evolution and takes on important control functions in humans and animals, such as controlling fine limb movements. Damage to the cerebellum leads to serious clinical symptoms in humans, which in addition to movement disorders can also include cognitive and emotional impairments.

The new consortium, called CEN (Cerebellum and Emotional Networks), will address the contribution of the cerebellum in the control of emotions, and in particular fear and anxiety.

Key to unlocking new treatments and therapies for emotional disorders is to gain a comprehensive understanding of the nature and function of the neural networks that underpin such behaviours in both health and disease. A central aim of CEN is to share and combine knowledge in the field of cerebellar research and in the field of anxiety disorders. The knowledge gained will inform the development of new therapeutic strategies for individuals suffering from emotional disorders.

Prof Richard Apps
Network Co-ordinator

Ants socially distance too!

On 15 March 2021 Chris Packham and Dr Nathalie Stroeymeyt (Biological Sciences) explained how ants employ social distancing to prevent diseases spreading across their colonies. The episode was part two of six of the Animal Einsteins series on BBC Two.

Using advanced computer software to track hundreds of ants, the researcher compared their movements when some in the group were infected.

She found that once exposed to a fungal disease, contaminated ants spend less time inside the nest where they might transmit infection. They also increase the distance between themselves and healthy ants in order to combat the spread of the disease. By reorganising their social network within hours of the first contact with the pathogen, they minimise the risk that anybody will become seriously ill with the disease and minimise the routes of transmission to the queen and young workers. The social distancing we observed was not only between contaminated and healthy individuals, but also among healthy ants themselves, which suggests that pro-active social distancing may be more widespread than previously thought.

Childhood obesity prevention lifestyle bias

An analysis of the studies included in the Cochrane review *Interventions for Preventing Obesity in Children* has revealed a strong bias towards interventions that aim to change individual 'lifestyle' behaviours. This bias could influence the types of policy that governments put in place to prevent childhood obesity.
The team, including researchers from the National Institute for Health (NIHR) Applied Research Centres (ARCs) West and North East & North Cumbria, analysed the 153 randomised control trials included in the review.

They used a tool from Public Health England to categorise the types of interventions tested in each trial into:

- biological factors
- individual lifestyle factors
- social and community factors
- living and working conditions
- wider conditions

Over the last 30 years, research has shown that healthier environments are needed to prevent childhood obesity. Obesity is the result of many different factors that all connect to one another. These include how our environment enables physical activity, the influence of social circles, genetic factors and whether people already have a tendency to gain weight.

In 2007, a government report identified 108 factors that contribute to the population's levels of obesity. Despite broad acknowledgement that obesity is caused by a wide range of factors, over 90% of the trials had some focus on changing individual lifestyle factors, most often via educational sessions.

Nobles J *et al.* (2021). A secondary analysis of the childhood obesity prevention Cochrane Review through a wider determinants of health lens: implications for research funders, researchers, policymakers and practitioners. *International Journal of Behavioural Nutrition and Physical Activity*.

Understanding sight loss thanks to colour-blind octopus

University of Bristol research into octopus vision has led to a quick and easy test that helps optometrists identify people who are at greater risk of macular degeneration, the leading cause of incurable sight loss. The breakthrough uses new technology developed by lead researcher, Prof Shelby Temple (Biological Sciences), to measure how well octopus– which are colour-blind – could detect polarised light, an aspect of light that humans can't readily see. Using this novel technology, the team showed that octopus have the most sensitive polarisation vision system of any animal tested to date. Subsequent research used the same technology in humans and led to the development of a novel medical device that assesses the risk factor for sight loss later in life. Humans can perceive polarised light because macular pigments in our eyes differentially absorb violet-blue light depending on its angle of polarisation, an effect known as Haidinger's brushes.

The more of these pigments a person has, the better protected they are against sight-loss. By inventing a method to measure polarisation vision in octopuses, the team were able to use the core technology to develop a novel ophthalmic device that can quickly and easily screen people for low macular pigments, a strong risk factor for increased susceptibility to macular degeneration.

Temple S, How M, Roberts N *et al*. (2021). Thresholds of polarization vision in octopuses. *Journal of Experimental Biology*.

Image © Shelby Temple

Funding success: Part 2

Dr Shelley McKeown Jones received £602,171 from the **Economic and Social Research Council** for *Shared spaces: understanding adolescent intergroup interactions*. Based in the Centre for Psychological Approaches for Studying Education, Dr Jones' project will run from March '21 for three years.

UK Research & Innovation awarded £128,552 to Prof Gene Feder (Bristol Medical School) for *Primary care response to domestic violence and abuse in the COVID-19 pandemic: interrupted time series and qualitative study*.

Prof Adam Finn (Cellular and Molecular Medicine) is co-Investigator on a €3.1m **European Commission**-funded project entitled *Jiu-Jitsu with misinformation in the age of Covid: Using refutation-based learning to enhance vaccine uptake and knowledge among healthcare professionals and the public* (JITSUVAX). The project will run from April '21 for four years.

The **Brigstow Institute** has awarded Ideas Exchange funding to thirteen new interdisciplinary research partnerships including the *Eating Disorder Stakeholder Group* involving Dr Helen Bould (Bristol Medical School), Dr Lucy Biddle (Bristol Medical School), Prof Ian Penton-Voak (Psychological Science) and Dr Jon Bird (Computer Science).

Tropical paper wasps babysit for neighbours

Wasps provide crucial support to their extended families by babysitting at neighbouring nests, according to new research by a team of biologists from the Universities of Bristol, Exeter and UCL. The findings suggest that animals should often seek to help more distant relatives if their closest kin are less in need.

By closely observing twenty thousand baby wasps and their carers on colonies around the Panama Canal, the research team could determine the usefulness of workers on colonies of different sizes. They showed that workers become less useful as the number of colony members rises, due to a surplus of help. A wasp on a

colony with few larvae but lots of other workers becomes almost useless: the best thing to do is to babysit the larvae of other relatives.

By helping more distant relatives who are more in need - those living next door with fewer carers - workers can pass on more copies of their genes overall. We believe that similar principles of diminishing returns might explain seemingly paradoxical acts of altruism in many other social animals.

Andy Radford
Professor of Behavioural Ecology (Biological Sciences)

Kennedy P *et al*. (2021). Diminishing returns drive altruists to help extended family. *Nature Ecology and Evolution*

Watch the video abstract

Opioid agonist treatment to reduce drug-related death

Treatment of people addicted to opioids with methadone or buprenorphine (opioid agonist treatment, or OAT) reduces many of the harms associated with injecting drug use including death by overdose, suicide, injury, or other causes. OAT also reduces the risk of HIV or hepatitis C virus transmission and increases engagement to HIV treatment and improves its outcomes. Globally, mortality remains high among people who inject drugs (primarily opioid drugs), with OAT access being poor and its impact potentially limited by short durations of treatment.

A team led by Bristol's NIHR Health Protection Research Unit in Behavioural Science and Evaluation modelled different scenarios to predict how many drug related deaths could be prevented over a 20-year period by scaling up OAT among people who inject drugs. They modelled three global settings: Kyiv (Ukraine), Tehran (Iran) and Perry County, Kentucky (USA), and predicted how many deaths from overdose, suicide, injury, and HIV and hepatitis C related disease could be prevented. They found that scaling up use of OAT to 40% could avert between 12-24% of all drug related deaths, including 13-19% of overdose deaths, with greater impact in settings with significant HIV mortality (Tehran and Kyiv). Improving the length of time people were on OAT and providing-prison based OAT were predicted to have significant additional impact, averting between 27-48% of drug related deaths.

Stone J *et al*. (2021). Modelling the intervention effect of opioid agonist treatment in multiple mortality outcomes in people who inject drugs: a three-setting analysis. *Lancet Psychiatry*.

Germ Defence behaviours to reduce virus spread

As the COVID-19 vaccination programme expands and a roadmap for unlocking Britain continues, research which looked at data from over 28,000 users of the online 'Germ Defence' since May 2020 highlights the continued, critical importance of breaking chains of virus transmission within our homes. Whilst the nation has taken to washing its hands regularly, other behaviours, such as cleaning and disinfecting surfaces or social distancing within the home, have proved harder. Psychologists from the Universities of Bath, Bristol and Southampton warn of the continuing risks of household transmission of COVID-19 and the continued importance of breaking chains of transmission. Longer-term, in a post-pandemic world, they emphasise that these behaviours will continue to remain important and could help to reduce the future spread of other infectious diseases, including seasonal flu. They also highlight the need to address barriers that some people might face in engaging with infection control behaviours, in particular financial ones, where houses are high occupancy, or where individuals have caring responsibilities.

Ainsworth B *et al*. (2021). Improving infection control behavior patterns in the home during the COVID-19 pandemic... *Journal of Medical Internet Research*.

Germ Defence has been rolled out to GP practices across England to help reduce household SARS-CoV-2 infections

Tackling social isolation as we age

An interdisciplinary team from across the University of Bristol has received funding for the 'Connecting through culture as we age: digital innovation for healthy ageing' project as part of the UK Research and Innovation Health Ageing Challenge Social, Behavioural and Design Research Programme.
Launched in March 2021, the project *Connecting through culture as we age* is one of seven research projects which received funding to embark on ambitious programmes of work over the next three years.

Led by the School of Education's Dr Helen Manchester, the project aims to tackle inequalities related to the accessibility and content of digital arts and culture, enable vital research and development, and establish new business models to encourage inclusive digital innovation in the arts and cultural sector.

Many in society are experiencing isolation and loneliness that is accelerated by COVID-19 restrictions and is resulting in increased reliance on digital devices. These same restrictions are also having catastrophic impacts on the arts and cultural sector, with venues closed and artists and creatives struggling to find work. This project will tackle the strong demand for digital innovation with a focus on both building audiences for the arts and benefitting socially isolated older people leading to improved wellbeing and quality of life. The project will work alongside disabled, Black, Asian and minority ethnic older people and those experiencing poverty. It aims to support the creative industries to better understand diverse older audiences, co-design new digital, cultural products and provide a new evidence base for policy-making that tackles inequalities in arts and cultural provision for healthy ageing outcomes.

Future of flying

More than half of adults plan to fly less or much less, even after they have been vaccinated against COVID-19, citing worries about the virus and climate change.

The snapshot survey, conducted by researchers at the University of Bristol's Cabot Institute for the Environment, captured views of nearly 500 respondents about how they might fly in the wake of the global pandemic.

The huge impact of the pandemic on the aviation industry has been widely reported as air travel has ground to a virtual halt, resulting in significant job losses and many countries providing financial support to the sector.

So far, little research has been done to explore whether, and why, passengers might return to flying in the future. This survey aims to provide early insights into how the pandemic might affect their attitudes towards flying and the frequency with which they plan to do so going forward. This has important consequences for the hundreds of thousands of people who rely on this sector for their jobs and livelihoods.

Dr Ed Atkins
Geographical Sciences

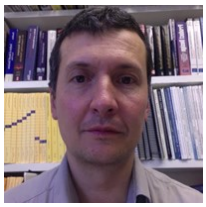
The online survey, completed between March and April 2021, found this apparent reluctance to fly increased among older people. The study adds further insights following results of a YouGov poll last July, which showed two-thirds of Britons would not feel safe travelling by plane. Read more

European Research Council funding awards

Six senior researchers from the University of Bristol have been awarded over €13M in European Research Council (ERC) Advanced Grants in recognition of their excellent science and potentially ground-breaking research. Among them are:

Prof Stephan Lewandowsky (Psychological Science) for *Protecting the Democratic Information Space in Europe* (PRODEMINFO). A truth taskforce is set to combat misinformation and champion democracy in Europe. Stephan will lead the €2.5m project which aims to gain a greater understanding of people's perception of truth in an age rife with fake news and conspiracy theories. The research will more clearly identify the scale and subject matter of this so-called 'infodemic', which involves issues such as anti-vaccination misinformation and disregard for other protective health measures during the COVID-19 pandemic, as well as hate speech. The investigations will result in the development of sophisticated interventions to expose inaccurate information, raise awareness of the facts, and promote democratic freedom.

Prof Fabrizio Scarpa (Aerospace Engineering) for *Natural nEUROactive Mechanical mETAmaterials* (NEUROMETA). This project aims to build futuristic classes of materials all made from natural, bio-based resources and mimicking in simple ways how the human brain memory works to adapt their shape and performances to different loading and environmental conditions. An ambition of NEUROMETA is to use natural fibres from resources existing in UK, Europe, South America, Asia and Africa to produce these paradigmatic metamaterials locally and in a sustainable way.



Studies on COVID-19 vaccination

A survey analysis conducted by a team at Bristol and King's College London looked at a range of factors that previous studies had found to be related to hesitancy about getting vaccinated against the coronavirus and found that women, young people, less-educated people, and members of other than white ethnic groups are more hesitant about getting vaccinated, as are people who get their information about COVID-19 from social media. However, they also found that many of these differences can be explained by people's attitudes towards vaccines in general and also by whether or not they suspect that there has been a conspiracy or cover-up connected with COVID -19:

Allington D *et al*. (2021). Coronavirus conspiracy suspicions, general vaccine attitudes, trust, and coronavirus information source as predictors of vaccine hesitancy among UK residents during the COVID-19 pandemic. *Psychological Medicine*.

Preference for the Astra-Zeneca vaccine declined in April '21 when concerns about blood clots increased. Despite this, vaccine confidence was higher than it was towards the end of 2020, and the proportion of people who say they want to be vaccinated has risen. The research, led by the University of Bristol, King's College London and the NIHR Health Protection Research Unit in Emergency Preparedness and Response, found that 17% of the public said they'd prefer to have the AZ vaccine if they had a choice - down from 24% in March '21. 23% of people believed the AZ vaccine causes blood clots – up from 13% the

month before. But the public are still most likely to say this claim is false (39%) or that they don't know whether it's true (38%). Vaccine-hesitant people are more than twice as likely as both the public overall and the vaccine-confident to believe the AZ vaccine causes blood clots. But a growing belief that the UK's main COVID-19 vaccine is linked to blood clots has not dented overall levels of confidence in vaccines in general.

Report: Allington D *et al*. (2021). COVID-19 vaccines: Confidence, concerns and behaviours.

Nearly one in five people who haven't had a COVID vaccine say they'll feel resentful towards those who have if they don't get one in time for their summer holidays; 39% of the public believe unvaccinated people will face discrimination. The proportion of the public who think vaccine passports will infringe civil liberties has increased since March and about half think they'll be sold on the black market, according to another new study.

They also found that four in ten people think younger age groups will be less likely to get vaccinated when it's their turn, and that some have confusions about second vaccinations and how the jabs affect fertility.

When people are asked how their trust in the UK government has changed as a result of the overall experience of the pandemic, 18% say it has increased, while 39% say it has decreased (39% say it's made no difference). But they have a much more favourable perception when asked how the vaccination programme has influenced their views.

Reports: Allington D *et al*. (2021). Covid-19 vaccines: beliefs, uncertainties and passports.
Allington D *et al*. (2021). Coronavirus: vaccine beliefs as the rollout ramps up.

Risk-takers predisposed to smoking and e-cig use

Research by the University of Bristol has found that the association between smoking and e-cigarette use could be explained by a broader genetic susceptibility to risk-taking. The findings imply that the genetic influences associated with people taking up smoking also influence people being e-cigarette users; these were also found to be associated with risk-taking behaviours more generally, such as externalising disorders in childhood. Previous research had already established that some individuals are more likely to smoke due to genetic influences, but little is currently known about the genetic influences on e-cigarette use.

Given that many e-cigarette users have smoked before, it is likely that there may be an overlap between genetic influences on smoking and e-cigarette use. People who are genetically predisposed to smoking are more likely to smoke and therefore more likely to use e-cigarettes to quit smoking.

However, an overlap in genetic predisposition to smoke and use e-cigarettes may also explain why people who use e-cigarettes but have not smoked before are more likely to go on to start smoking later - the behaviours share common genetic influences.

Khouja J *et al*. (2021). Association of genetic liability to smoking initiation with e-cigarette use in young adults: A cohort study. *PLOS Medicine*.

Faking death to escape predators

Many animals feign death to try to escape their predators, with some individuals in prey species remaining motionless, if in danger, for extended lengths of time.

The University of Bristol has documented an individual antlion larvae pretending to be dead for an astonishing 61 minutes. Of equal importance, the amount of time that an individual remains motionless is not only long but unpredictable. This means that a predator will be unable to predict when a potential prey item will move again, attract attention, and become a meal.

Predators are hungry and cannot wait indefinitely. Similarly, prey may be losing opportunities to get on with their lives if they remain motionless for too long. Thus, death-feigning might best be thought of as part of a deadly game of hide and seek in which prey might gain most by feigning death if alternative victims are readily available.

The study involved evaluating the benefits of death-feigning in terms of a predator visiting small populations of conspicuous prey. Researchers used computer simulations that utilise the marginal value theorem. The modelling suggests that antlion larvae would not gain significantly if they remained motionless for even longer than they actually do. This suggests that in this arms race between predators and prey, death-feigning has been prolonged to such an extent that it can hardly be bettered.

Franks NR, Worley A & Sendova-Franks AB (2021). Hide-and-seek strategies and post-contact immobility. *Biology Letters*.

Image: Antlion larva playing-dead-thumb © Nigel R. Franks

National COVID guidance changed contact patterns

CONQUEST (COroNavirus QUESTionnaire) is an online survey of contacts, behaviour, and potential SARS-Cov-2 symptoms for University of Bristol staff and students. It was set-up to measure changing behaviour and contact patterns during the pandemic to predict how COVID-19 will spread in university settings. The survey, launched 23 Jun '20, investigated whether there were differences in contact patterns for staff and students during four different COVID-19 guidance periods: the period following the first lockdown (23 Jun - 3 Jul '20); the relaxed guidance period (4 Jul - 13 Sep '20); "rule-of-six" period (14 Aug - 4 Nov '20); and the second lockdown (5 Nov - 24 Nov '20). The research showed that there was high adherence to the guidance throughout the survey period for both staff and students, with few people meeting in groups larger than six, despite many students living in large households. The study setting is unique, as universities were allowed to carry on teaching throughout the lockdown, meaning that large gatherings of people were still allowed - also notable due to the high prevalence of COVID-19 among students and their potential for high numbers of contacts due to their large household sizes. The survey continues to capture responses and behaviours and further research will be done to look at variation in behaviours over time and factors to explain this.

Trickey A *et al*. (preprint). University students and staff able to maintain low daily contact numbers during various COVID-19 guideline periods. *medRxiv*.

Domestic abuse increased globally during pandemic

Incidence of domestic abuse may have doubled in some countries during the COVID-19 pandemic, suggests an editorial by Prof Gene Feder in Bristol Medical School, colleagues in Brazil and Nepal, and the CEO of IRISi, a social enterprise in the UK domestic violence sector. The article highlights the need for improved access to support services and 'safe spaces' due to the global rise in calls to domestic abuse hotlines and in police incident reports.

In south Asia, calls to the national helpline in Nepal doubled between April and June 2020 compared with the previous year. In Brazil, domestic abuse was increasing even before the pandemic because of cuts in social and healthcare funding and to support programmes.

Yet in some countries emergency department attendance for domestic abuse and non-partner sexual violence has fallen substantially, along with general emergency department attendance, suggesting that reduced access to health services or shift during the pandemic made recognition of abuse and appropriate support even more difficult. The authors argue that after the pandemic, resources are targeted on improving the healthcare response by building on the increased visibility of this kind of abuse, improved understanding of its association with other inequalities, and the likelihood that healthcare in many countries will continue to use a blend of remote and face-to-face consultations.

Feger G *et al*. (2021). Domestic violence during the pandemic. *British Medical Journal*.

Award for student fighting loneliness in the elderly

Jade Bruce was behind a project that saw more than 100 University of Bristol students handwrite personalised messages for the elderly residents of St Monica's Trust, a retirement village in Westbury-on-Trym. "Loneliness is an epidemic which disproportionally affects older people," the 21-year-old said.

"According to Age UK, two out of five older people say the TV is their main source of company. I found this statistic shocking, and knew the pandemic was only going to make things worse."

The University has now presented Jade, from Shropshire,

with their Outstanding Award, an accolade given to just a handful of students each year who go beyond the call of duty to make positive change in society.

During her second year at University, the Cellular and Molecular Medicine student volunteered for Link Ages, a project that reduces isolation among older people. She became project co-ordinator of Link Ages in her final year and hit upon the idea of handwritten Christmas cards. Each year more than 1,000 students take part in the PLUS Award, a year-long initiative that helps students grow through extra curricular activities.

An epigenetic clock for bats

New research by the University of Bristol as part of a team led by the University of Maryland (UMD) identifies age-related changes to DNA, revealing longevity-related differences among bat species. The study found that DNA from tissue samples can be used to accurately predict the age of bats in the wild. The study also showed age-related changes to the DNA of long-lived species are different from those in short-lived species, especially in regions of the genome near genes associated with cancer and immunity. This work provides new insight into causes of age-related declines.

The researchers looked at DNA from 712 bats of known age to find changes in DNA methylation at sites in the genome known to be associated with aging. Analysing methylation may provide insight into many age-related differences between species and lead to a better understanding of the causes for age-related declines across many species.

Wilkinson GS *et al.* (2021). DNA methylation predicts age and provides insight into exceptional longevity of bats. *Nature Communications*.

Clockwise from top left: common vampire bat, greater horseshoe bat, velvety free-tailed bat and greater mouse-eared bat. All can live 30 years or longer except velvety free-tailed bat, which only lives to 6 years of age. © Clockwise from top left: G. Wilkinson, G. Jones, M. Tschapka, S. Puechmaille

Increased child emotional difficulties during the pandemic

Whilst the rise in emotional problems in teenagers and young adults since the pandemic has become clearer, little is known about the emotional response of preschool and primary school aged children. Using data tracking children's emotional development at multiple ages before and during the pandemic, a research team explored differences in trajectories of emotional difficulties in children before and during the pandemic.

Emotional problems usually peak around age two and then decline over childhood, but the peak of emotional problems at age two was lower during the pandemic than before the pandemic. Emotional problems usually reduce after the “terrible twos”, but during the pandemic the expected reduction wasn’t there. So older children in the pandemic had much higher levels of emotional difficulties than would be expected at their age. At the age of eight, their scores on the emotional difficulties measures were ten points higher in the pandemic sample than what we would expect based on pre-pandemic data.

The findings suggest that primary school children may have emotional difficulties at the level expected during the "terrible twos". This could reflect a delay in emotional development that, if not supported, may far outlive the pandemic and have long-term consequences for this generation of children.

Paul E *et al*. (preprint). Trajectories of child emotional and behavioural difficulties before and during the COVID-19 pandemic in a longitudinal UK cohort. *medRxiv*.

Watch the video abstract

Suicide rates during the pandemic

A new observational study is the first to examine suicides occurring during the early phase of the COVID-19 pandemic in multiple countries and finds that suicide numbers largely remained unchanged or declined in the pandemic's early months. The authors note that – while their study provides the best available evidence on the pandemic's effects on suicide so far – it only provides a snapshot of the first few months of the pandemic and effects on suicide might not necessarily occur immediately.

We need to continue to monitor the data and be alert to any increases in suicide, particularly as the pandemic’s full economic consequences emerge.

Policy-makers should recognise the importance of high-quality, timely data to support suicide prevention efforts, and should work to mitigate suicide risk factors associated with COVID-19, such as the heightened levels of stress and financial difficulties that some people may experience as a result of the pandemic. Increasing mental health services and suicide prevention programmes, and providing financial safety nets may help to prevent the possible longer-term detrimental effects of the pandemic on suicide.

Prof Jane Pirkis, Director
Centre for Mental Health
University of Melbourne

Pirkis J *et al*. (2021). Suicide trends in the early months of the COVID-19 pandemic: interrupted time series analysis of preliminary data from 21 countries. *Lancet Psychiatry*.

The Keen, the Concerned, the Content

The UK population is made up of three distinct groups, each with different levels of concern and eagerness about going back to normal life after the pandemic. The study, carried out by King's College London, the University of Bristol and the NIHR Health Protection Research Unit in Emergency Preparedness and Response, is based on Ipsos MORI survey data. Analysis of survey data from 1 to 16 April 2021 reveals the groups – named the Keen, the Concerned and the Content – vary according to their reasons for not wanting to return to pre-COVID life, how comfortable they think they will feel resuming various activities once they are allowed, their life satisfaction during lockdown, and their views on the need to fight COVID versus protecting civil liberties.

- **The Keen** (52%), keenest to return to normal life and least likely to have concerns about doing so; disproportionately male.
- **The Concerned** (34%), disproportionately female and the group with the highest share of households earning less than £35k a year. Concerned about restrictions lifting and the impact on public health.
- **The Content** (14%), the most highly educated, most middle-class and highest-earning. Most content with lives under lockdown and reluctant to go back to normal.

Report: Allington D *et al*. (2021). The Keen, the Concerned, the Content: the three groups anticipating the return of normal life...

Scotland most negative about UK's COVID response

Among the home nations, people in Scotland are most likely to think the coronavirus crisis has been handled badly in the UK, to say that the pandemic has damaged their trust in the UK government, and to distrust Boris Johnson on issues relating to COVID-19. The research, by the University of Bristol and King's College London, also looked at perceptions of Nicola Sturgeon's trustworthiness on coronavirus, as well as perceptions of the UK government more generally, revealing that the Scottish public are most likely to feel ignored by Westminster.

Fifty-five per cent of people in Scotland think the coronavirus crisis has been handled badly in the UK – similar to

Wales, where virtually the same proportion (51%) believe the pandemic has been mismanaged. This compares with 45% of people in Northern Ireland and 40% in England who feel the same. Fifty-five per cent of the Scottish public also say that the overall experience of the pandemic has decreased their level of trust in the UK government – the only country where a majority feel this way, and far above Wales (43%) and Northern Ireland (43%), where this sentiment is next-highest. In both Wales (28% vs 21%) and Scotland (26% vs 16%), people are more likely to say the rollout of the vaccination programme and communications about it has decreased their trust in the UK government than increased it.

Report: Allington D *et al*. (2021). Covid and trust: how the nations of the UK rate their governments.

Changes in vaccine hesitancy

Half (52%) of those who said they would definitely not get a COVID-19 vaccine when asked back in November/ December 2020 have now done so, indicating that many people's hesitancy has disappeared since the UK's vaccine rollout began. Among people who said they were not very or not at all likely to accept a vaccine when asked last year, an even greater share – 84% – have since been vaccinated.

The research, by King's College London and the University of Bristol, is based on a survey of 4,896 UK adults aged 18 to 75 conducted between 1 and 16 April 2021. It follows up a study in Nov/Dec 2020 and tracks 1,879 of the same individuals to see how their views have changed and why.

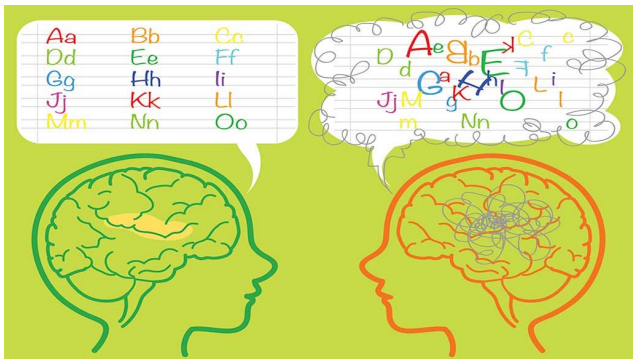
The analysis reveals that, overall, 94% of people who have been invited for a vaccine have taken up the offer; despite this, there's a need to avoid complacency, as vaccine intentions and beliefs still vary among different groups, potentially undermining the very high levels of coverage needed to stay on track for a further easing of lockdown, and leaving some communities more exposed.

Misinformation continues to be a problem: 43% of the public now say they've seen or heard messages encouraging people *not* to get a Covid vaccine since the start of the pandemic – up from 35% in Nov/ Dec 2020. This increase is reflected across nearly all the ethnic and religious groups surveyed.

Report: Allington D *et al*. (2021). Covid-19: vaccine take-up and trust.

People with learning disabilities die prematurely

People with learning disabilities continue to die prematurely – and although there are some early signs of improvements, there are still considerable differences compared to the general population. The latest annual report from the Learning Disabilities Mortality Review (LeDeR) programme compares data from the deaths of 9,110 people who died in 2018, 2019 and 2020.



Sixty-three per cent of people with learning disabilities die before reaching the age of 65, compared to 15 per cent in the general population. However, the report says there are some early indicators of improvements in the care of people with learning disabilities, with the average age at death increasing by one year to 61 and a reduction in the proportion of preventable, treatable and overall avoidable medical causes of death. Both measures, however, remain considerably worse for people with learning disabilities compared to the general population.

Overall, there has been a steady increase in the proportion of reviewers who felt that a person's care met or exceeded good practice as well as a reduction in the proportion noting problematic aspects of care.

There was a significant increase in the number of deaths at the peak of the COVID-19 pandemic from March to May 2020.

ELIZABETH BLACKWELL FUNDING

Nurturing Research. Improving Health.

EBI Identifying Candidates for Wellcome Trust Investigator Awards

This scheme is designed to support a small number of permanent academic staff at UoB within the first five years of their appointment, who are planning to apply for an Investigator Award from the Wellcome Trust. Applications will be accepted on a rolling basis. **Heads of School are asked to nominate** members of staff who can be eligible for this scheme by emailing ebi-health@bristol.ac.uk

EBI Workshop Support

Support interdisciplinary workshops in health research at new or emerging interface between two or more disciplines. **Applications are accepted on a rolling basis.**

Returning Carers Scheme

The University of Bristol is running a Returning Carers Scheme (RCS) to support academic staff across all faculties in re-establishing their independent research careers. **Applications are accepted on a rolling basis**.

EBI Seed Fund: Public Engagement with Health Research

Seed funding is available for health researchers who would like to deliver public engagement events and activities. **Applications are accepted on a rolling basis**.

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 for Health Research
Efficacy and mechanism evaluation programme – dementia research call: 21/507

Closing date: 10 Aug 21 Award amount: unspecified

This supports dementia research to address important health and social care questions. Research could involve any aspect of prevention, diagnosis, treatment, support or care, and related health and social care services. Research proposals must be within the remit of the efficacy and mechanism evaluation programme, which funds ambitious studies evaluating interventions with potential to make a step-change in the promotion of health, treatment of disease and improvement of rehabilitation or long-term care.

BRACE
PhD studentships

Closing date: 15 Aug 21 Award amount: £90,000

These enable PhD students in South West England or South Wales to conduct 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

Lundbeck Foundation
Brain Prize

Closing date: 01 Sept 21 Award amount: DKK 10 million

This recognises original and influential advances in research on the nervous system, encompassing a wide range of disciplines from basic neuroscience to applied clinical research aimed at producing new scientific knowledge on aetiology, pathogenesis, diagnosis, treatment and prophylaxis of diseases affecting the brain and the nervous system.

National Institute on Aging
Mechanism-focused research to promote adherence to healthful behaviours to prevent mild cognitive impairment and Alzheimer's disease and related dementias (R01 clinical trial optional)

Closing date: 15 Sept 21 Award amount: USD 2.5 million

This supports ancillary studies that address psychological and interpersonal mechanisms driving adherence to behaviour or lifestyle change relevant to the prevention of cognitive decline, mild cognitive impairment (MCI) and Alzheimer's disease and Alzheimer's disease-related dementias. Ancillary studies to ongoing, early- to late-stage clinical intervention trials are welcomed. They should provide the opportunity to explore novel psychological and interpersonal mechanisms by collecting new data from participants enrolled in the ongoing parent study.

Medical Research Council
Research grants – neurosciences and mental health

Closing date: 29 Sept 21 Award amount: £1 million

These are suitable for focused research projects that may be short- or long-term in nature. In addition, they may be used to support method development and continuation of research facilities and may involve more than one research group or institution. The board aims to support research that transforms the understanding of physiology and behaviour of the human nervous system throughout the life course in health, illness, as well as how to treat and prevent disorders of the brain. The scope includes the following areas:

- fundamental discovery research relating to the development, function and disorders of the human nervous system, including use of in silico systems, relevant animal models and experimental studies in humans
- population-level research, using epidemiological, genetic, electrophysiological, neuroimaging, 'omic approaches, and computational modelling, to elucidate disease risks, aetiologies and progression of disorders of the nervous system
- research to inform novel strategies for preventing and treating disorders of the nervous system

Medical Research Council
Programme grants – neurosciences and mental health

Closing date: 29 Sept 21 Award amount: unspecified

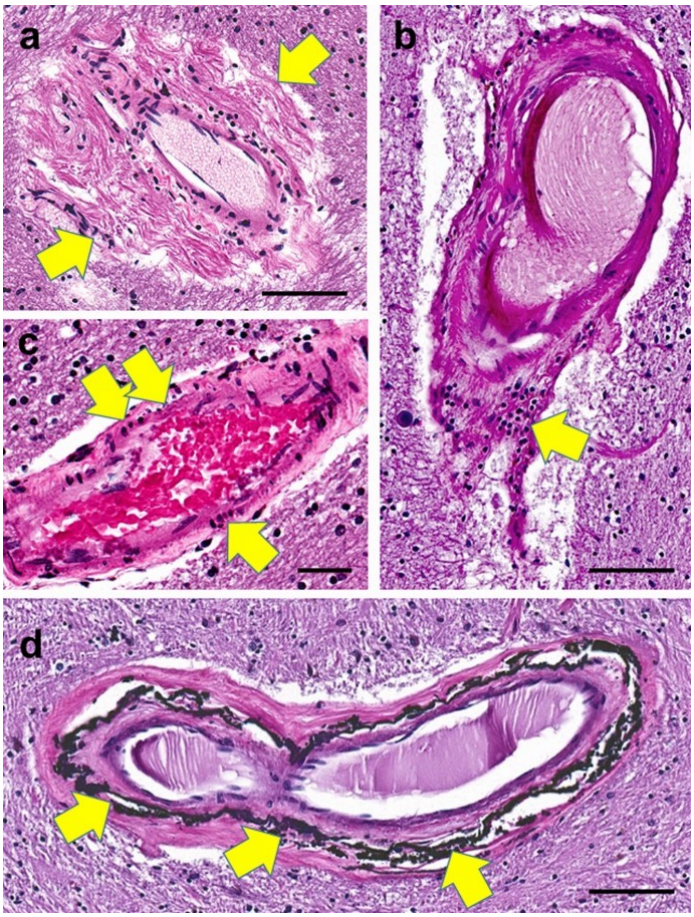
Provide large, long-term and renewable programme funding for big ideas.

SHOWCASED ARTICLE

Brain arteriolosclerosis

Blevins BL, Vinters HV, Love S *et al*. (2021). *Acta Neuropathologica*.

Brain arteriolosclerosis (B-ASC), characterized by pathologic arteriolar wall thickening, is a common finding at autopsy in aged persons and is associated with cognitive impairment. Hypertension and diabetes are widely recognized as risk factors for B-ASC. Recent research indicates other and more complex risk factors and pathogenetic mechanisms. Here, we describe aspects of the unique architecture of brain arterioles, histomorphologic features of B-ASC, relevant neuroimaging findings, epidemiology and association with aging, established genetic risk factors, and the co-occurrence of B-ASC with other neuropathologic conditions such as Alzheimer's disease and limbic-predominant age-related TDP-43 encephalopathy (LATE). There may also be complex physiologic interactions between metabolic syndrome (e.g., hypertension and inflammation) and brain arteriolar pathology. Although there is no universally applied diagnostic methodology, several classification schemes and neuroimaging techniques are used to diagnose and categorize cerebral small vessel disease pathologies that include B-ASC, microinfarcts, microbleeds, lacunar infarcts, and cerebral amyloid angiopathy (CAA). In clinical-pathologic studies that factored in comorbid diseases, B-ASC was independently associated with impairments of global cognition, episodic memory, working memory, and perceptual speed, and has been linked to autonomic dysfunction and motor symptoms including parkinsonism. We conclude by discussing critical knowledge gaps related to B-ASC and suggest that there are probably subcategories of B-ASC that differ in pathogenesis. Observed in over 80% of autopsied individuals beyond 80 years of age, B-ASC is a complex and under-studied contributor to neurologic disability.



Arteriolar walls can show different histomorphologies with aging. In panel **a**, peri-arteriolar (adventitial) fibrosis is extensive and non-concentric (arrows).

Panel **b** shows a collection of lymphocytes (arrow) in portions of the vessel wall. In panel **c**, vessel wall changes include pyknotic-appearing smooth muscle cells (arrows). Siderocalcinosis, distinct from B-ASC, has been associated with dementia and is usually seen preferentially in the globus pallidus (arrows in d).

Synonyms for this include medial vascular calcification, calcific medial arteriosclerosis, and Monckeberg's medial sclerosis. Scale bars = **a**, **b**, and **d** 100 µm; **c** 60 µm

CONTACTS

Bristol Neuroscience

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

Memory Hub Leader: Jack Mellor, Professor in Neuroscience.
Area of research - synaptic plasticity and its role in learning and memory

Movement Hub Leader: 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 leader: Conor Houghton, Reader in Computational Neuroscience
Area of research - understanding information processing and coding in the brain

Sleep Hub Leader: Matt Jones (as above)

Mental Health Hub Leader: in progress

Network Facilitator: Sandra Spencer (Research Development)

Network Administrator: Catherine Brown (Elizabeth Blackwell Institute)