



Brain Research UK



Our vision is a world where everyone with a neurological condition lives better, longer

The brain is the most complex organ in our body. It weighs just 3lb, yet it controls our emotions, senses and actions, every single one of them. It is how we process the world around us. So when it breaks down, we break down.

It doesn't have to be this way.

There are hundreds of neurological conditions. We fund research to discover the causes, develop new treatments and improve the lives of all those affected.

Let's unite to accelerate the progress of brain research. Today.



1 in 6 of us
has a neurological condition



More under 40s
are killed by brain tumours than by any other cancer



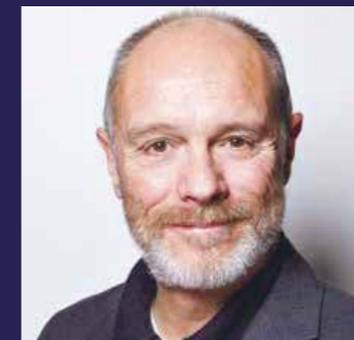
Every 90 seconds
someone is admitted to hospital with a brain injury



£10 billion
is the annual cost of migraines to the UK economy



Welcome to our annual review



One in six of us has a neurological condition.

Brain Research UK is the leading dedicated funder of neurological research in the UK. We fund the best science to achieve the greatest impact for people affected by neurological conditions, to help them live better, longer.

Due to a change in our reporting year, this review covers an exceptional, and busy, eighteen month period from October 2018 to March 2020 during which time we awarded grants totalling almost £2.1 million.

We continued our commitment to PhD and project grant funding within our three priority areas of neuro-oncology, acquired brain and spinal cord injury, and headache and facial pain. In addition, we awarded key funding of over £600,000 from the Graeme Watts Endowment to support Professor Linda Greensmith's continued research into motor neurone disease at UCL Institute of Neurology.

In the following pages, we feature a few stories from our many inspiring supporters. We receive no government funding and it is only thanks to our valued supporters that we are able to fund the life-changing, life-saving research highlighted in this review.

Despite the challenges of Covid-19, our determination to progress neurological research to the benefit of all those affected remains as strong as it was when we began in 1971.

Too many of us are touched by these devastating conditions. My heartfelt thanks to everyone who so kindly supports our work. I look forward to all we can continue to achieve together in the future.

Jim Gollan
Chair of Trustees

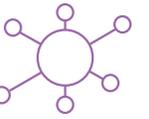
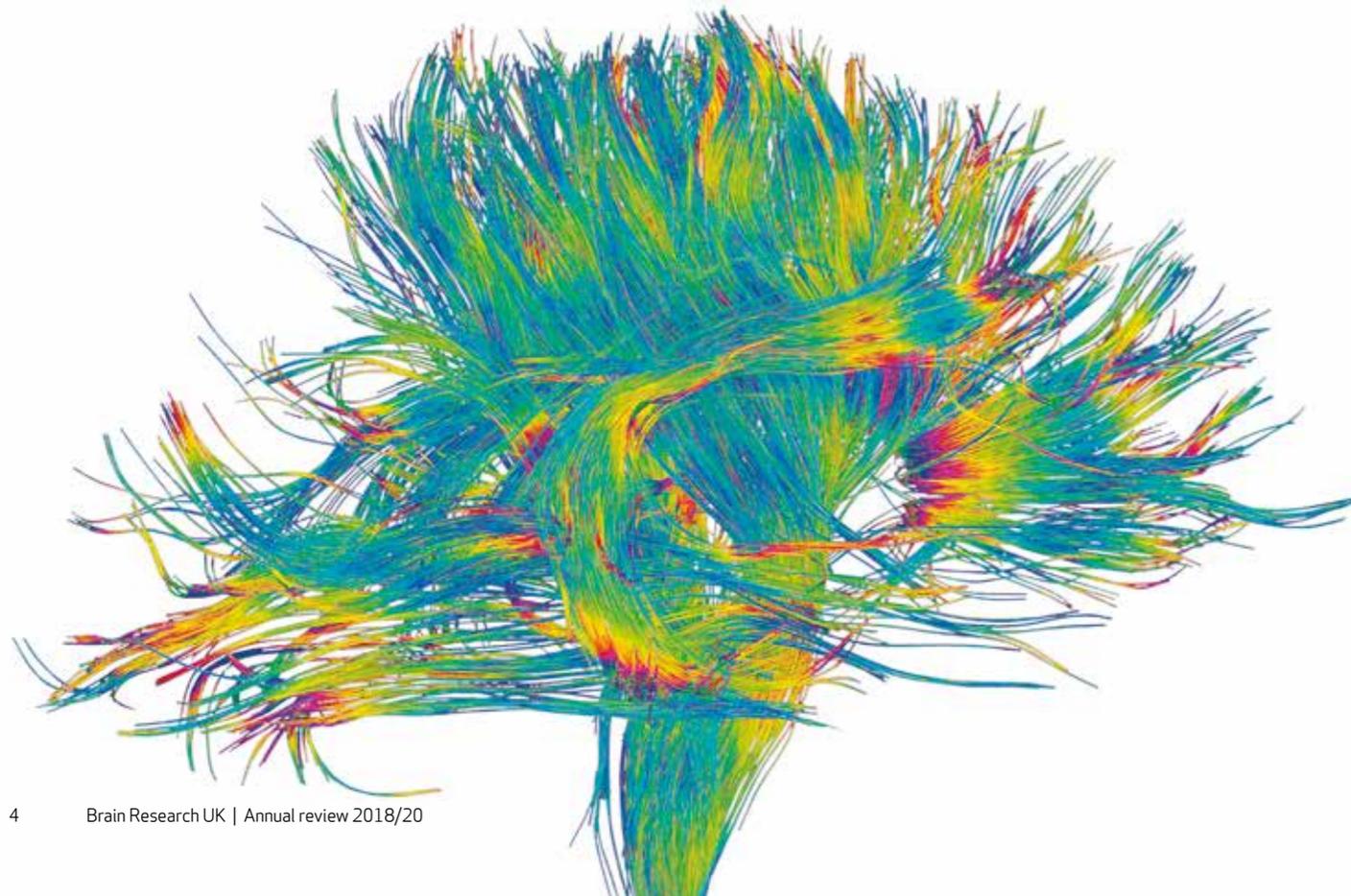
Strategy 2020-2023



Our vision is a world where everyone with a neurological condition lives better, longer

Brain Research UK is well positioned to fulfil its objects and to improve the lives of those affected by one of hundreds of neurological conditions through the funding of essential research and accelerating its progress.

During 2019, a significant amount of work went in to the preparation of our strategy for the next three years. Recognising the need for improved understanding as to how to treat and cure neurological conditions, our strategy sets out how we can have a greater impact on those living with a neurological condition through the funding of more research, underpinned by stable, secure financial foundations. Key highlights of our strategy are outlined below; Covid-19 means there will be some adaptations to its implementation but its focus and strategic aims remain undiminished.



Our research

We will continue to fund world class, impactful neurological research.

Within this broad remit of neurological research, our aim is to focus our funding in areas where research investment is most urgently needed. Since 2016, our focus has been on research into brain tumours, brain and spinal cord injury, and headache and facial pain. In each of these three areas, there is a large unmet patient need that is not reflected in current levels of research funding.

Brain tumours

- 11,500 people are diagnosed with a primary brain tumour every year in the UK. These tumours are difficult to diagnose and difficult to treat, and cause more deaths in people under 40 than any other cancer.
- We want to improve the outlook for people with brain tumours by funding research that takes forward our understanding of the mechanisms underlying tumour development, and helps develop better ways to diagnose and treat these tumours.

Brain and spinal cord injury

- This theme covers “acquired” brain and spinal cord injuries – that is, those that occur after birth. These injuries may be traumatic, caused by an accident or external injury, or non-traumatic, such as those caused by stroke.
- We want to improve understanding of how to repair the brain and spinal cord after injury, to help people make a better recovery.

Headache and facial pain

- There are hundreds of different types of headache and facial pain disorders, including migraine and cluster headache. Headache has been described as the most common medical complaint known to man and, because of its prevalence, is one of the leading causes of disability.
- We want to improve people’s lives by funding research that addresses the causes and mechanisms of headache and facial pain, and advances diagnosis and treatment of these disorders.

We will continue with our two national funding schemes through which we offer project grants and PhD studentships in our priority areas. Over the next three years, we aim to fund a minimum of six studentships and nine project grants and we will collaborate with other funders and charitable organisations to maximise research impact.

Our priority areas will continue to be reviewed on an annual basis.

Strategy 2020-2023



Collaboration

We will work collaboratively, across both fund-seeking and grant-making activities, with likeminded organisations with shared purpose.

We will become an active member of a neuro charity network seeking and building successful, collaborative partnerships in order that our research has a greater benefit for those with a neurological condition.

Fundraising

We will focus on developing our existing flagship fundraising streams, such as the London Marathon, and will seek to grow sustainable income from major donor and corporate fundraising channels.

We will invest in fundraising streams in which we have a greater degree of control in order to manage any risk and increase return and, by 2023, we hope to achieve a sustainable net operating surplus of at least £1m, before charitable expenditure and investment gains.

Communications

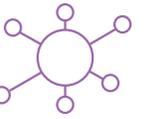
We will diversify our communications activities to ensure that we retain existing, and attract new, supporters.

Our communications channels will be an extension and a reflection of our caring approach and will tell powerful, visually presented stories of people and how our research funding has helped, and continues to help, those with a neurological condition.

Organisation

In order to achieve the strategic goals outlined above, we will continue to monitor, and where necessary improve, our working practices and the way we work as a team.

We will focus on being a lean, agile, modern and adaptable organisation that can mobilise and respond quickly to changing circumstances.

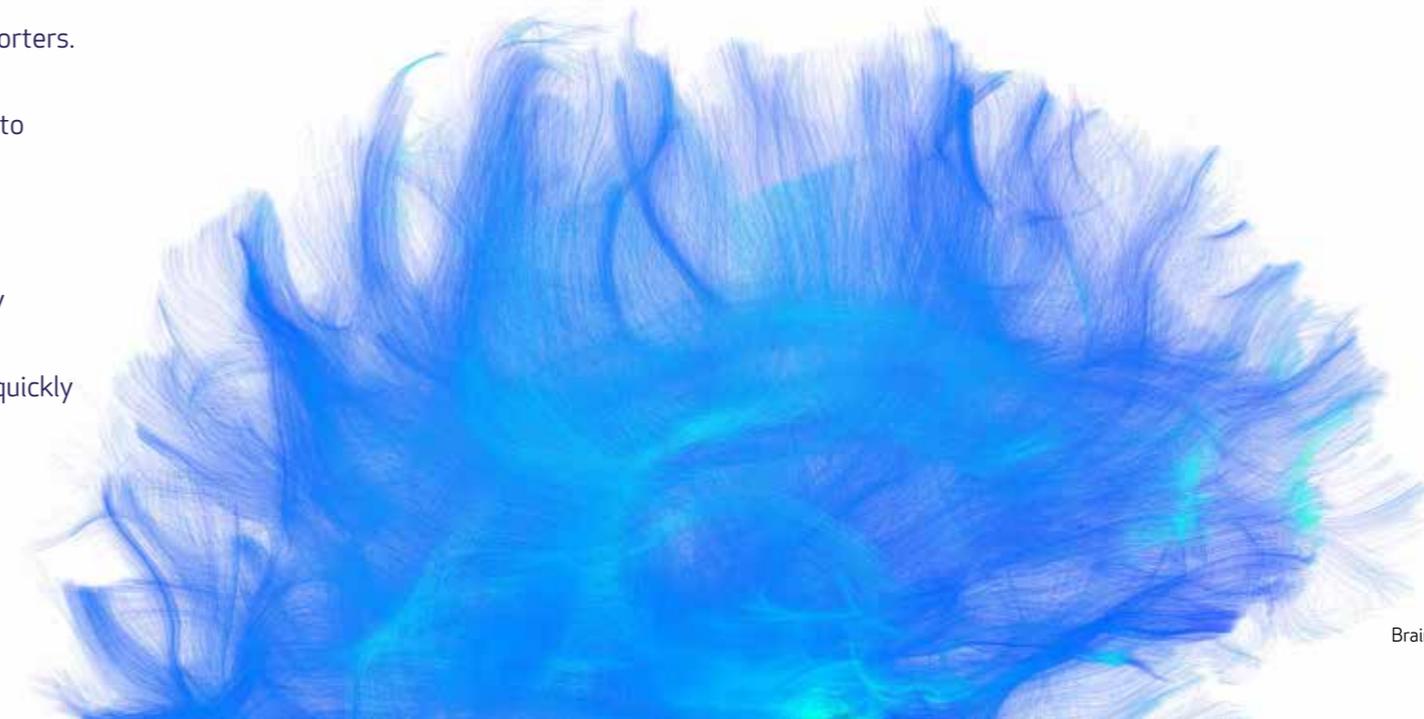


“Brain Research UK is well positioned to fulfil its objects and to improve the lives of those affected by one of hundreds of neurological conditions through the funding of essential research and accelerating its progress.

Recognising the need for improved understanding as to how to treat and cure neurological conditions, our strategy sets out how we can have a greater impact on those living with a neurological condition through the funding of more research, underpinned by stable, secure financial foundations.

Our vision is a world where everyone with a neurological condition lives better, longer.”

Caroline Blakely,
Chief Executive, Brain Research UK



Our research



Our charitable objects allow us to fund research into all types of neurological condition. This is a broad remit and, within this, some areas of research have a higher profile – and consequently a higher level of funding – than others.

Following review in 2016, we identified three areas of research where there is a particular disparity between the level of unmet patient need and levels of research investment: brain tumours, brain and spinal cord injury, and headache and facial pain.

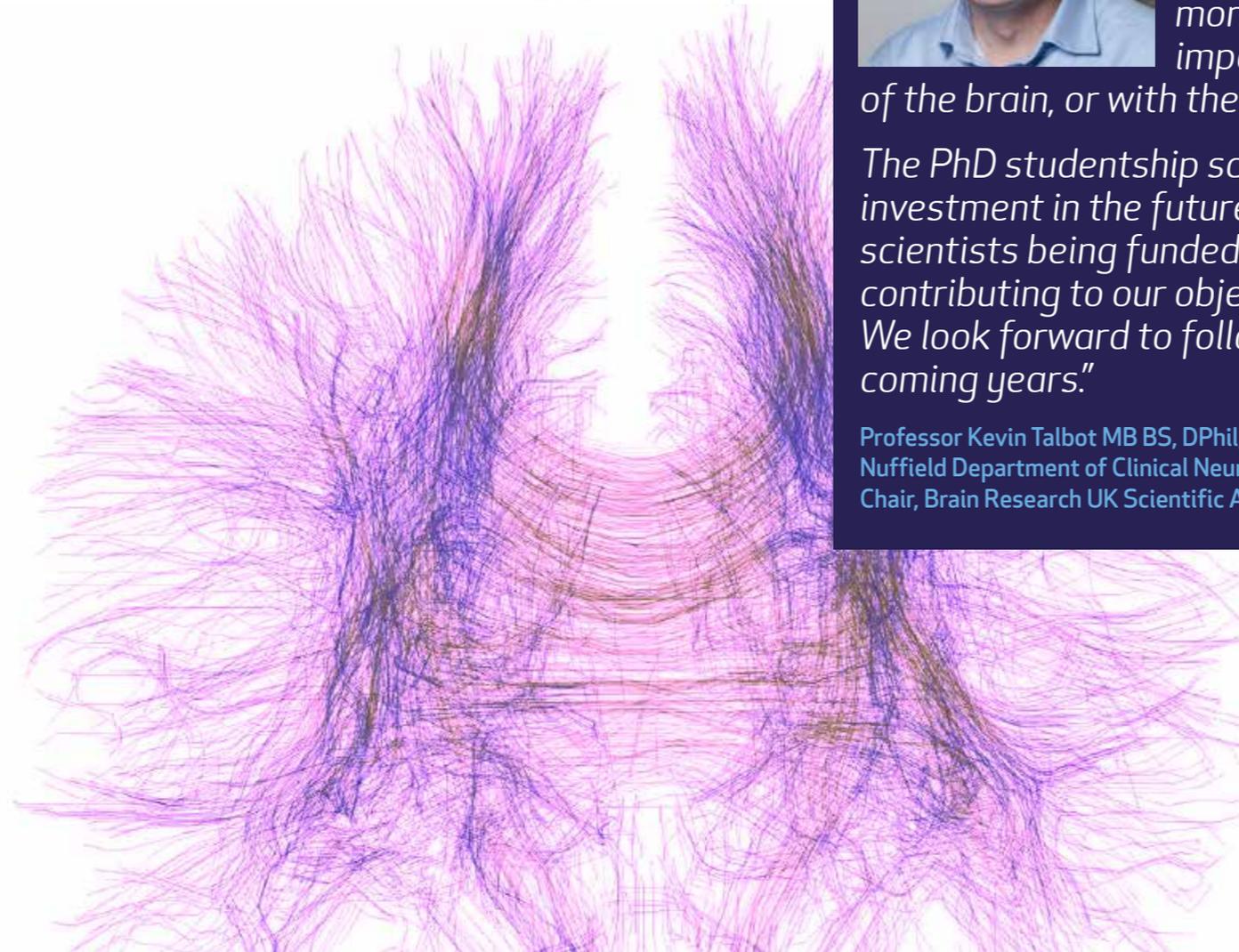
We elected to prioritise these three areas of research, focusing our funding on research that will help unravel the underlying mechanisms of these conditions and aid the development of new diagnostic and treatment approaches.

During 2018 to 2020 we continued to focus on these three priority areas, which we review annually.

Once again, we received large numbers of high quality applications under both our project grant and our PhD studentship schemes. All applications are considered in open national competition, with awards made after a two-stage process that involves review by external expert reviewers as well as our own Scientific Advisory Panel. In this way, we can be sure that we are funding research that is most likely to deliver results for those affected by these conditions.

In addition to the research funded under these priorities, we are custodians of restricted endowment funds that enable us to fund research in other conditions, including motor neurone disease and dementia.

Some of our research is described on the following pages.



“The quality of the applications for research funding we receive remains very high and thanks to the generosity of Brain Research UK’s many supporters, we are delighted to have been able to fund more exciting research over the past 18 months, research that we hope will have a direct impact on the lives of people living with diseases of the brain, or with the consequences of brain or spinal cord injury.

The PhD studentship scheme is particularly important as an investment in the future of brain research, and each of the young scientists being funded is carrying out important research that is contributing to our objectives under the three priority themes. We look forward to following the progress of their research over the coming years.”

Professor Kevin Talbot MB BS, DPhil, FRCP
Nuffield Department of Clinical Neurosciences, University of Oxford
Chair, Brain Research UK Scientific Advisory Panel



Our research

Brain tumours

Every year in the UK, more than 5,000 lives are lost to brain tumours.

Compared to other types of cancer, a disproportionate number of brain tumour deaths are in younger people: they kill more under 40s than any other cancer.

With more than 130 different types of brain tumour, which may all present with different types of symptoms, they are difficult to diagnose and exceptionally difficult to treat. Survival rates vary widely between the different types of tumour but overall, only 40% of adult patients survive one year from diagnosis, and only 20% survive five years.

Despite this, brain tumour research receives a very low share of UK cancer research funding. It is clear to see how sustained investment in research into other cancers has transformed the outlook for patients. Increased investment in brain tumour research is urgently needed in order to increase the pace of research and find ways to treat these deadly tumours.

This is why we are prioritising research into brain tumours. We want to improve the outlook for people with brain tumours by funding research that takes forward our understanding of the mechanisms underlying tumour development, and helps develop better ways to diagnose and treat these tumours.

Funding research into brain tumours

Since we made brain tumours one of our research priorities in 2016, we have invested more than £700,000 in much-needed research to advance understanding of brain tumours, how they develop, and how they can be treated.

We are now funding two PhD studentships and two research projects focused on brain tumours.

Three of these four grants focus on glioblastoma, a devastating brain tumour affecting around 3,000 people every year in the UK. Glioblastoma has a bleak prognosis. It is a grade four tumour, meaning that it grows and spreads quickly. It is difficult to remove surgically because it infiltrates the brain, with finger-like tentacles that can wrap around vital brain structures. They often appear resistant to treatment with chemotherapy and radiotherapy, or quickly recur. Only one in five glioblastoma patients survive a year from diagnosis, and very few of these survive more than three years.

The fourth of these grants focuses on a tumour called diffuse intrinsic pontine glioma (DIPG), a high grade childhood brain tumour. This brain stem tumour mainly presents in children aged 5 to 10 years and has no cure.

New treatments for these tumours are desperately needed and each of the four projects, described overleaf, takes a different approach.



▶ Richard's story Living with a brain tumour diagnosis

In February 2017, Richard admitted himself to hospital, feeling unwell. As he slept, his wife Sue received the devastating news that he had an inoperable brain tumour, a grade 2 astrocytoma, also known as a 'diffuse' astrocytoma.

Richard underwent a painful biopsy, which involved removing part of his skull. This was followed by six weeks of radiotherapy and then a year of chemotherapy. This treatment has stopped the tumour growing, and Richard's condition is stable. But the tumour is still there, and the expectation is that it will start growing again. No one can predict when, they can only watch and wait.

Richard continues to live the fullest life that he can. He is affected by fatigue and has problems with word recollection. He knows that there will be difficult times ahead and that there will be further treatment if the tumour starts to grow again. He doesn't plan long-term anymore, but focuses everything on what is happening over the next few months.

Since his diagnosis, Richard has run the London Marathon, swum the Serpentine, and completed a 100-mile cycle ride to raise funds for research into brain tumours.



"I support Brain Research UK because, whilst there is no cure for me, research can help someone else in the future. I want to be part of that."

Our research

Brain tumours



▲ **Dr Claudia Barros,**
University of Plymouth

Dr Claudia Barros, at the University of Plymouth, is focused on a population of cells known as cancer stem cells that are harboured within a brain tumour and can fuel and reform tumour masses, even after treatment. She has identified a set of molecules within these cells that are potentially responsible for brain tumour formation, and is examining their role in the proliferation and maintenance of glioblastoma cells.



▲ **Rhiannon Barrow,**
University of Leeds

Rhiannon Barrow is a second year PhD student at the University of Leeds. She is growing miniature tumours, known as spheroids, to replicate some of the features of glioblastoma, and to enable analysis of the role of a specific gene that appears to be involved in treatment resistance.



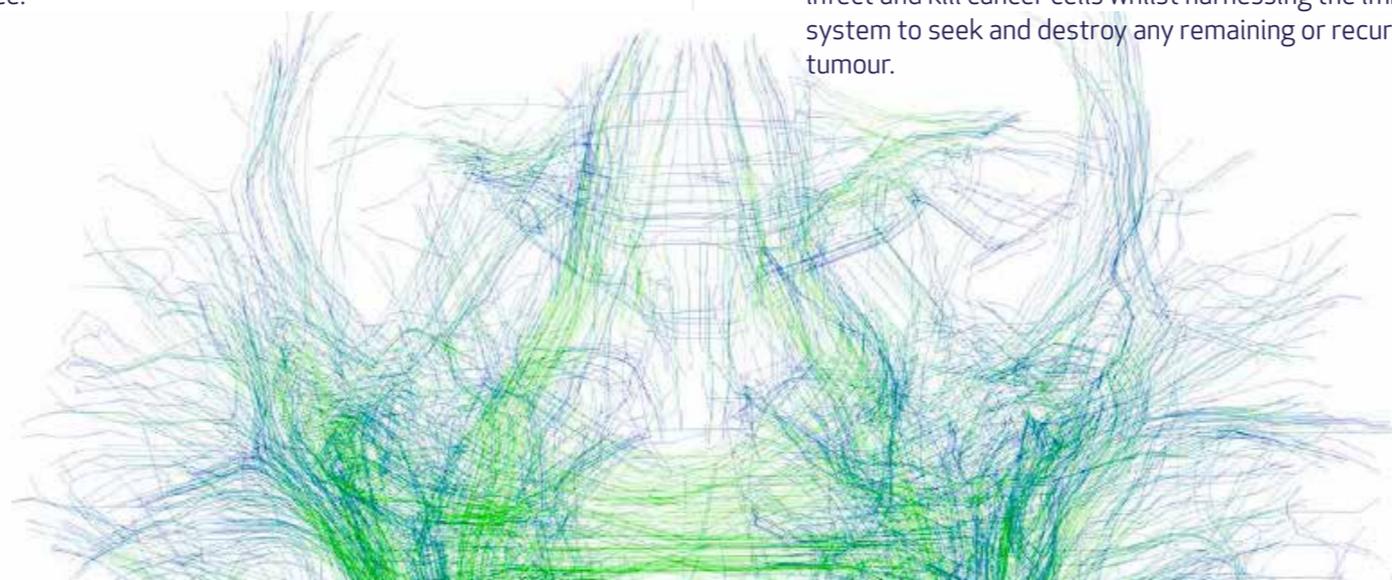
▲ **Richard Baugh,**
University of Oxford

Richard Baugh, a third year PhD student at the University of Oxford, is exploring ways to harness different cells of the immune system to fight glioblastoma. He is using an approach known as oncolytic virotherapy, which involves the use of specially engineered viruses to selectively infect and kill cancer cells whilst harnessing the immune system to seek and destroy any remaining or recurring tumour.



▲ **Professor Chris Jones,**
The Institute of Cancer Research, London

Professor Chris Jones, at the Institute of Cancer Research in London, is focused on the devastating childhood brain tumour, diffuse intrinsic pontine glioma (DIPG). There is no cure for this tumour, and most children die within 18 months of diagnosis. He is building on previous work that has shown that a gene called *ACVR1* is mutated in some DIPG tumours. He has developed a thorough understanding of the role of *ACVR1* in the biology of DIPG and is testing the effects of drugs that inhibit *ACVR1*.





Our research

Brain and spinal cord injury

Better emergency care means that many more people now survive brain and spinal cord injuries. This means that there are many people living with the long-term effects of these injuries.

The range of effects is huge. It includes the more obvious problems such as restricted movement and communication, as well as a wide range of less visible problems such as fatigue, pain and problems affecting thinking, attention and mood.

Sophie, featured opposite, made a good recovery from a severe brain injury but was left with enduring problems with memory and her senses of smell and taste.

We have highlighted brain and spinal cord injury as an area in need of increased research investment in order to help people overcome these problems and make the best recovery from their injury – whether this is being able to walk again, use their arms, communicate or recover senses or memory.

Funding research into brain and spinal cord injury

We want to improve the outlook for people with brain and spinal cord injuries by funding research to advance understanding of how to promote repair of the brain and spinal cord.

Since making brain and spinal cord injury a research priority in 2016, and thanks to the remarkable support of people like Sophie, we have invested almost £2.5 million in research to help us understand how to repair the brain following injury.

We are funding seven research projects and two PhD studentships under this theme.

One of our latest projects to be funded is being led by Professor David Menon, a leading expert in neurocritical care at the University of Cambridge and Addenbrooke's Hospital. Awarded funding in 2019, his project focuses on the role of the immune system in recovery from brain injury. There is evidence that the body's immune response to a severe traumatic brain injury compounds the damage in some patients, leading to a worse outcome. Professor Menon is aiming to improve understanding of the response, how it might affect recovery, and how it could be prevented or treated to improve outcomes for patients.



◀ Sophie's story

Sophie was out with friends when a stumble left her fighting for her life. She fell back, hitting her head on a concrete floor. She woke up in a specialist neurological care unit several days later.

The blow to Sophie's head had caused bleeding between the brain and the skull, causing an accumulation of blood known as a subdural haematoma. With nowhere to go, the accumulating blood puts pressure on the brain, damaging the delicate tissue. Sophie later learned that the doctors who treated her had been shocked at the severity of the damage to her brain and had not expected her to survive.

Sophie made a remarkable recovery and was discharged from hospital after two weeks. Following subsequent treatment for complications involving her vision, Sophie was left with two remaining issues. She had lost her senses of smell and taste, a condition known as anosmia, and suffered from mild memory loss.

She was determined not to focus on the negatives and instead to embrace every opportunity that came her way. She took part in the 2019 London Marathon less than two years after her injury, raising an incredible £5,600 for brain research.



"One of the first goals I set myself after my accident was to run the London Marathon for Brain Research UK. Focusing on the training and raising funds for the charity enabled me to leave behind the trauma of my brain injury. Running through the finish line knowing that I had completed a marathon and had raised funds that would change lives was the best feeling I'd ever felt."

Our research

Headache and facial pain

Headaches are extremely common, nearly everyone has one occasionally. When they occur repeatedly, they are a symptom of a headache disorder. More than 20 million people in the UK are affected by a headache or facial pain disorder, two in five adults.

Primary headache disorders include migraine, tension-type headache, and cluster headache. These range in frequency and severity. Because of their prevalence, headaches are one of the leading causes of disability, responsible for three quarters of all neurological-related disability.

New treatment approaches are desperately needed, but a lack of research investment has hampered progress. This is why we are prioritising research into headache and facial pain.

We want to improve people's lives by funding research that addresses the causes and mechanisms of headache and facial pain, and advances diagnosis and treatment of these disorders.



Living with migraine – not just a bad headache

Oliver experienced his first migraine when he was 27. He describes his experience:

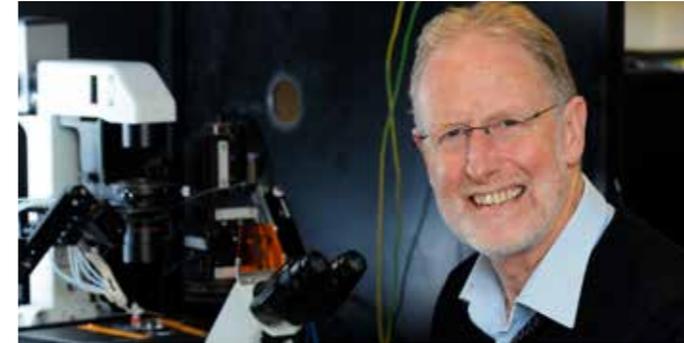
“One day, out of the blue, I went numb on one side of my face and slowly started to lose my peripheral vision. Then I started to get an interference pattern in the middle of my eyesight. It was scary as hell, but at the same time it was difficult to think properly or make simple decisions.

After an hour or so of that, the pain kicked into my skull. I took some pills and went to bed, but started to hyperventilate from the pain and my muscles all seized up. My wife called an ambulance and I puked lentils everywhere. We had no idea what was going on, I'd always thought migraines were just a bad headache. I'm super lucky that I was able to figure out what triggers it for me and what pills work.”



Funding research into headache and facial pain

Since making headache and facial pain one of our research priorities in 2016, we have invested £670,000 in much-needed research to advance understanding of these disorders and how to treat them. We are funding four PhD studentships and one research project.



▲ Professor Peter McNaughton, King's College London

In 2018, we funded a new project by Professor Peter McNaughton at King's College London. He is aiming to take forward our understanding of migraine and how to treat it. Supported by a solid body of preliminary work, he is proposing a new and original idea of how migraine pain may develop, focused on tiny channels in the membranes of the nerve cells that transmit migraine pain, called 'ion channels'. He aims to establish whether blocking a specific type of ion channel could hold the key to the development of new, more effective treatments for migraine.



▲ Dr Emer O'Connor, UCL Queen Square Institute of Neurology

The first of our PhD awards in this priority area went to Dr Emer O'Connor, who cultivated an early passion for neurological research as a junior doctor when she encountered patients with cluster headache, a rare headache disorder characterised by recurring bouts of excruciating headaches. It has been described as one of the most painful conditions known to man.

“I was called to the ward one night because a gentleman was having a cluster episode and I will never forget how horrific it was. I had never seen anyone in that much pain in all my life. It was just horrific to see someone suffering in that way – he was screaming and banging his head off the wall, and crying and crying. They say that cluster headache is the worst pain that you can possibly experience, and I didn't quite believe it until I saw that.”





Our research

PhD studentship awards

A key component of our research strategy is our investment in the future of brain research, through our PhD studentships. These studentships help to build capacity in our priority research areas, promoting them to young researchers as attractive areas of research. Boosting capacity in this way will help ensure that these priority areas get a bigger slice of research funding in the future. Successful candidates receive funding to cover PhD fees, personal stipend and research costs, typically £120,000 over three to four years. During this financial period, we have funded the following three students:



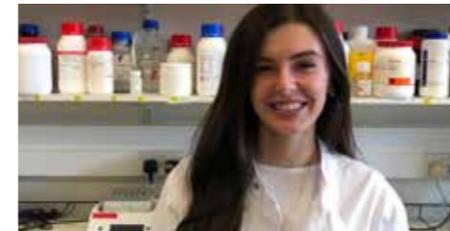
▲ Char Palfrey, University of Leeds Understanding the causes of migraine

Char Palfrey was awarded a PhD studentship in March 2020 to pursue research to help understand the causes of migraine. Char's research aims to better explain what goes on in the nerve cells of migraine patients that makes those patients experience such intense headaches, and to direct future research into the development of more effective treatments. The research focuses on a protein called ANO1, which appears to have a role in increasing activity of pain nerves further down the spine, increasing the perception of pain. Char is applying the hypothesis to the groups of nerve fibres in the head that are activated during migraine to examine the role of ANO1 in migraine and determine whether it could be targeted by drugs to reduce pain signalling and migraine pain.



▲ Haya Akkad, UCL Institute of Cognitive Neuroscience Modulating speech recovery after stroke

Haya Akkad was awarded a PhD studentship in March 2019 to pursue research aimed at improving recovery in patients left with speech and language impairments (aphasia) after stroke. Working with patients from the new intensive aphasia clinical service at the National Hospital for Neurology and Neurosurgery in London, Haya is building on her earlier work showing how a form of electrical brain stimulation can boost learning when paired with behavioural training. For her PhD project she is now pairing the brain stimulation protocol with language training, to boost recovery in patients suffering from chronic aphasia following stroke. To optimise the effectiveness of the brain stimulation she will ensure that the current is being targeted appropriately by using a new tool to personalise the dose to each patient's brain scans.



▲ Olivia Grech, University of Birmingham Headache mechanisms in Idiopathic intracranial hypertension

Olivia Grech was awarded a PhD studentship in March 2019 to enable her to pursue research into the disabling headache disorder Idiopathic intracranial hypertension (IIH), a condition defined by increased pressure inside the skull. It causes debilitating headaches in 95% of those affected and visual loss in 25%. The causes of IIH are unknown, although it is linked to bodyweight. Prevalence of the disease has increased drastically over recent years, yet care for patients has been hindered by a lack of knowledge about the mechanisms of the disease. Olivia is studying the disease mechanisms and features of IIH, and hopes to provide much-needed insight on the headache mechanisms and how they could potentially be modified using existing drugs. This will provide evidence for translation into future IIH headache therapies.



Completed studentship

▼ Dr Lorenzo Caciagli, UCL Queen Square Institute of Neurology

Following completion of his medical degree, Lorenzo Caciagli took a break from medical training to pursue research in epilepsy and neuroimaging, with the longer-term aim of combining a career in medicine and research.

Funded by a Brain Research UK PhD studentship, in 2014 he joined the prestigious Clinical Neurosciences PhD programme at UCL Institute of Neurology. This enabled him to work for four years in the world-renowned National Hospital for Neurology and Neurosurgery in Queen Square, London, home to cutting-edge clinical and translational research.

Using magnetic resonance imaging (MRI), Lorenzo set out to advance our understanding of different types of epilepsy, how they progress over time, and the mechanisms that give rise to some of the different cognitive symptoms that accompany these epilepsies. His work has given important new insights into three common epilepsy syndromes – temporal lobe epilepsy, frontal lobe epilepsy, and juvenile myoclonic epilepsy. He has presented his findings widely at national and international conferences, and published papers in prestigious journals.

Lorenzo was awarded his PhD in July 2019 and has now taken up a post-doctoral research position at the University of Pennsylvania, where he is building on aspects of his PhD research.



Our research



Project grant awards

During the 18 month period under review, we completed one cycle of project grant awards via our annual national, competitive call for applications under our three priority research themes.

These grants are intended to fund discrete projects of up to three years duration, focused in our priority research areas, addressing large unmet need and showing a clear pathway to clinical impact.

The following three projects were funded, at a total cost of £875,527.



▲ Professor David Menon, University of Cambridge The role of the immune response in traumatic brain injury

Professor Menon is an intensive care consultant at University of Cambridge and a renowned expert in neurocritical care and research. He wants to find ways to reduce the harm caused by traumatic brain injury (TBI), the leading cause of death and disability of young adults in the developed world.

His research is building on evidence that the body's immune response to a severe TBI compounds the initial damage in some patients, via a process called autoimmunity, leading to a worse outcome.

The team will now screen TBI patients for the development of autoantibodies, a marker of autoimmunity, and see how the development and persistence of these correlates with outcome, assessed with brain scans and memory tests. And they will dig deeper to understand the underlying mechanisms of autoantibody production, to get a deeper understanding of how to target the immune system with drugs that could prevent or treat the development of autoimmunity and instead harness the healing role of the immune system.



▲ Dr Barry McColl, University of Edinburgh Using immune cells to enhance brain repair after stroke

Like Professor Menon, Dr Barry McColl is focused on the role of the immune system in brain repair. Widely recognised as a leader in the field of neuroimmunology, Dr McColl is building on pilot data showing that a protein that stimulates a certain type of immune cell enhances short-term recovery of forelimb function in mice.

Because long-term recovery is ultimately what matters to patients, and to rule out that this is a transient effect, Dr McColl now needs to assess whether the treatment can enable better recovery in the longer-term, and to learn more about how it does this, and how the effects can be monitored.

This will give further insight as to how immune cells can be manipulated to influence brain repair after stroke, with applicability to other types of brain injury, and potentially to neurodegenerative diseases.



▲ Dr Kimberley Whitehead, University College London Boosting brain waves to aid repair after neonatal brain injury

Babies who have suffered a brain injury are likely to experience life-long difficulties. Dr Whitehead wants to advance understanding of the newborn brain's natural repair mechanisms in order to establish whether it is possible to boost these and reduce the risk of disability.

Her work is based on the observation that straight after an injury, electrical impulses in the brain, or 'brainwaves', decrease in size. This is an indication that there is less communication between brain cells. Over the next few weeks, however, the brainwaves become much larger than usual and it is thought that this is a natural repair mechanism that is compensating for the low levels of brain activity straight after the injury.

Dr Whitehead first wants to confirm whether these extra-large brainwaves are a helpful thing, and will then proceed to explore different ways to boost brainwaves in order to enhance repair. If successful, this work could result in the development of new methods to reduce disability caused by neonatal brain injury.





Our research

Leopold Muller endowment: supporting cutting edge neuroimaging research

In 1995, we received our largest ever single donation – a sum of £3.6 million from the Estate of the late Leopold Muller – endowed for the purpose of supporting new neuroimaging facilities at UCL Institute of Neurology. In 2019, the remaining funds were gifted to UCL to enable the purchase and installation of a new state-of-the-art ultra-high field MRI scanner.

An incredible legacy born out of terrible tragedy

Leopold Muller arrived in Britain from Czechoslovakia in 1938 after his wife and two daughters died in the Holocaust. He developed a hugely successful restaurant and hotel business, amassing great personal wealth, which was distributed to UK charities following his death in 1988. The funds left to us were used to establish an endowment to fund the operating costs of the new Functional Imaging Laboratory at UCL Institute of Neurology. This new lab brought together an interdisciplinary group of neuroscientists to exploit rapidly evolving brain imaging technology to answer key biological questions about cognition. The laboratory was renamed the Leopold Muller Functional Imaging Laboratory, in recognition of this tremendous gift.



▲ L-R. Prof Cathy Price, Director of Wellcome Centre for Human Neuroimaging; Dr Andrew Welchman, Wellcome; Jonathan Kropman, Vice Chair of Brain Research UK; and Prof Richard Frackowiak, Founding Director of the Wellcome Centre for Human Neuroimaging celebrate the opening of the 7T scanning facilities in January 2020.



World-leading neuroimaging research

The Wellcome Centre for Human Neuroimaging (WCHN), which houses the Leopold Muller Functional Imaging Lab, brings together clinicians and scientists who use imaging techniques to study the neural basis of human mental functions, and how these break down in neurological and psychiatric disease.

Their work has made a huge contribution to neuroscientific knowledge and has helped drive the development of MRI techniques. They have trained hundreds of neuroscientists and clinicians from around the world.

A new generation of '7T' scanners now offer unprecedented power to reveal the detailed structure and function of the brain, pushing imaging resolution to the sub-millimetre scale. We were pleased to apply the balance of funds remaining in the Muller Endowment, £2.483 million, to support the purchase and installation of a 7T scanner at the WCHN. The scanner was delivered in May 2019 and, following a period of set up and testing, the new facilities were officially opened in January 2020.

This cutting-edge technology will transform the team's study of the detailed function of the brain and advance mechanistic understanding of neurological and psychiatric disorders. With their access to patient populations at the National Hospital for Neurology and Neurosurgery, they plan to study patients who are gene positive for Huntington's disease, Alzheimer's disease, frontotemporal dementia and epilepsy. These are people who have genetic characteristics that mean they are more likely to develop these diseases but do not yet have symptoms. Using 7T imaging to study the brains of these patients will give unprecedented new insights into the very earliest stages in the development and progression of these diseases and could potentially pave the way for pre-symptomatic treatments.

"The arrival of the new 7T MRI scanner is a very exciting time for our Centre because it greatly advances our capacity to gain mechanistic understanding into various neurological and psychiatric disorders. We aim to exploit this new technology and our findings to positively impact patient care."

Professor Cathy Price,
Director,
Wellcome Centre for Human Neuroimaging

Our research



Graeme Watts endowment: supporting vital research in motor neurone disease



Professor Linda Greensmith heads the Graeme Watts Laboratory at UCL Queen Square Institute of Neurology in London. She founded the Lab in 1999, supported by funds left to Brain Research UK by the family of Graeme Watts, who died of motor neurone disease (MND). Graeme's family wanted these funds to support research to improve the basic understanding of MND and the development of therapeutic strategies.

Linda was recruited to set up a lab to take forward a new programme of research and the Graeme Watts Laboratory is now at the forefront of research into MND and we continue to fund work there using funds from the endowment established in Graeme's name.

In 2019, we awarded a new programme grant to support a five-year programme of work focused on a cellular mechanism called the heat shock response, which protects cells under stress.

Targeting the heat shock response in ALS

Amyotrophic lateral sclerosis (ALS) is the most common form of MND. It is a fatal, rapidly progressing neurodegenerative disease in which motor neurones progressively die, causing muscle paralysis. It robs patients of their ability to walk, talk and eventually to swallow and breathe. There is no cure and patients with ALS typically survive only two to five years from diagnosis.

Early research in the Graeme Watts Lab led to the development of a drug called Arimoclomol, which prevented protein clumping in motor neurones, a key feature of MND. In early phase trials in the US, it has been shown to be safe and well-tolerated in patients with ALS, and appears to slow the progress of the disease. It is now being tested in a large international trial to establish its effectiveness.

Further research has shown that Arimoclomol acts by boosting the heat shock response, a mechanism that protects cells under stress. Because Arimoclomol was neither designed nor optimised to target this particular mechanism, Professor Greensmith wants to identify compounds that boost the heat shock response more effectively and take these forward towards trial.

Professor Greensmith and team have already made great strides in the quest to develop effective treatments for MND, and with this new programme of work they continue towards the aim of halting this devastating disease.





Fundraising highlights

Virgin Money London Marathon

▶ The Virgin Money London Marathon took place on 28th April 2019. We were thrilled to have our largest ever team with 150 runners as part of Team #BrainResearch. Together, an incredible £470,000 was raised to help accelerate the progress of neurological research.



◀ In October 2015, two years after diagnosis, Eloise's dad lost his life to the aggressive brain tumour, glioblastoma. Having always hated PE at school, she started to get in to running when she was 18, just after her

dad had his first brain surgery. He was very fragile at this time and did not understand a lot but he bought Eloise her first pair of proper running trainers, something that meant so much to her and even more so as she wore them in his memory to complete the London Marathon 2019. Eloise was extremely close to her dad, a real "Daddy's Girl", and wanted to raise funds in his memory for such an important cause. She raised a wonderful £1,796 through her participation in the marathon.

● In 1997, Jane was diagnosed with a cavernous haemangioma, a benign tumour, and needed brain surgery in Singapore. Since then, Jane's son has also been diagnosed with the same condition. Jane is a keen runner and has completed many marathons over the years. In 2019, she took part in the London Marathon with her sister, Kristina, and raised an amazing £7,559 for the charity.

▼ Suzanne's brother, Stuart, suffered a brain injury after a viral infection aged 9 that left him with epilepsy and additional needs.

"My brother suffered from a brain injury as a child which has impacted his, and all of our lives. He is lucky enough to now live in his own home, with support, but has had so many barriers and limitations placed on him because of his condition. A life changing injury could happen to anyone, at any stage in life. I want to raise awareness as well as funds for this cause. Other people being more understanding could make such a difference to people wellbeing and life."



Suzanne raised an amazing £4,392 through her participation in the London Marathon 2019.

▼ James is an eight year brain tumour survivor (Oligodendroglioma, grade 2) and has undergone brain surgery twice, in 2011 and 2014. With the view that there is a great need for more work to be done to understand brain tumours, James wanted to support Brain Research UK and raised a fantastic £1,942 in the London Marathon 2019.



▲ In April 2016, Sian was diagnosed with Tolosa Hunt Syndrome, a rare neurological condition that causes headaches, double vision and face numbness. Having previously been a keen runner, completing multiple half marathons and a full marathon in 2015, she had not run a single step since her diagnosis. However, towards the end of 2018, Sian decided to take up the challenge of the London Marathon 2019 giving her a focused goal and the opportunity to raise funds for her important cause.

● Charlie ran the London Marathon 2019 to support his mother, who has suffered from epilepsy her entire adult life as "she has experienced the successes of the work that is funded by Brain Research UK and other charities alike". Charlie raised an amazing £2,618 for the charity.





Fundraising highlights

Other runs and Challenges

▶ James Harkin is head writer of the BBC show QI and presenter of one of UK's most popular podcasts 'No Such Thing as a Fish'. Having lost a close friend to a brain tumour several years ago, he decided to raise funds for Brain Research UK through his participation in the Great North Run 2019. Despite an injury almost preventing him from running, he successfully completed the run and raised a remarkable £3,260.



◀ In November 2019, Claire and James ran the Conwy Half Marathon in memory of their friend, Karen who had passed away at the age of 33 from a sudden brain haemorrhage. This challenge was undertaken to mark the tenth year anniversary since Karen passed away and raised an admirable £917.

▶ India was diagnosed with a brain tumour in January 2016. Along with her parents and her sister, she took part in a charity skydive and raised over £7,000 for Brain Research UK. India died on December 11, 2017. To honour their friend's memory, Martha, Hayley and Charlotte took part in Tough Mudder in 2019 for their second consecutive year for the charity and raised a brilliant £385.



▲ Barley, a professional and talented figurative artist, was diagnosed with a Brain Tumour in 2011. Since then, he and his family have been much valued supporters of our work, raising significant sums over the last nine years.

Always remarkably cheerful, Barley refused to be defined by his condition. With his usual extraordinary zest and energy, he took the opportunity of riding tandem with his brother Tobias in the 2019 RideLondon-Surrey 100 race. Aware of the need for more research into brain conditions, an area that is currently woefully underfunded, the brothers again chose to support our vital work and together raised a fabulous £4,727.

We were greatly saddened to learn that Barley, aged just 30, died in December 2019, just a few months after completing the race. We are indebted to him and to his family who have pledged to continue their support in Barley's memory and we are extremely grateful to so many of his friends and colleagues for the £16,580 given in tribute since his death.

▶ In July 2011, Adam lost his mother, Sandra, to a brain aneurysm and subsequent haemorrhage. On what would have been her 56th birthday, he took part in The Scott Trial (one of the most challenging trial events in the world and an extreme motorcycle challenge in North Yorkshire covering 70-80 miles of rough terrain up waterfalls, rocks and hills) and raised a brilliant £280 for us.



▲ During the summer of 2019, Gus and Lissy undertook an amazing adventure and drove a battered old Fiat Panda 1.2l more than 9,000 miles in six weeks, travelling through southern Europe, across the Caspian Sea and on through the deserts of Turkmenistan, Uzbekistan, Kazakhstan and Mongolia. The car and its two occupants were challenged to the max on dirt tracks in 40-degree heat. Having lost close friends and family to brain tumours, they wanted to raise money for research so that, one day, others will not have to face the same pain and loss. They raised a marvellous £2,576 for the charity.

▼ In September 2019, colleagues Lucy, Izzy and Sophie, from Stone River Consultants, undertook their own Three Peaks Challenge in memory of their founder and mentor Sue, who died from a brain aneurysm. They organised the challenge to mark the anniversary of Sue's death and to support Brain Research UK, the charity chosen by Sue's family. Joined by Sophie's brother Oliver, they could not have chosen a better weekend as the weather was perfect and they managed to complete the challenge in 23 hours 54 minutes! The team raised a fabulous £2,512.





Fundraising highlights

Community fundraising



▲ Mandy died from sporadic Creutzfeldt-Jakob disease (CJD) in 2016. In 2017, her daughter Tasha organised a Memory Walk to remember Mandy and to raise money for brain research. Now an annual event, around 40 people joined Tasha for her third walk in June 2019 to share a special day, remember Mandy and raise money for Brain Research UK. In total, Tasha has raised an impressive £6,000 through these special events in memory of her mum.

● In December 2018, 18-year-old Guerlain passed away from a brain condition. One year later, the students of Hawking House at Chichester High School organised Twelve Days of Fundraising in her memory. Supported by their teacher and Head of House, Clare, they organised several different fundraising activities (including a sponsored haircut, a cheese and wine night, and a teacher vs student spelling bee) over the twelve days leading up to the Christmas break. The students raised over a staggering £3,000 for the charity.



▲ In October 2019, the Downham Market Young Farmers Club held a Cider, Gin and Sausage festival that raised £1,563 to be shared between two charities, one of which was Brain Research UK. We were also selected as their Charity of the Year and nominated because the girlfriend of one of their members had recently lost their mother to an aneurysm.



▲ Gary and Victoria walked the Camino de Santiago to raise funds for brain research in memory of their dear friend Bernadette, who was diagnosed with an aggressive brain tumour in 2017. Despite intensive treatment, which included chemotherapy, radiotherapy, surgery and participation in a clinical drug trial, Bernadette died in November 2018, just over a year after diagnosis. Inspired by Bernadette's strength and resilience during her illness, Gary and Victoria were determined to raise funds to help support brain research, in memory of their friend and in support of all those affected by brain conditions. They reached Santiago De Compostela on 4th June 2019, after 280 km and 13 days on the trail, raising an incredible £3,605.

● In October 2019, Noah raised £104 by taking part in the Bournemouth Half Marathon. He nominated Brain Research UK as one of the charities to benefit from his school's Christmas fundraiser, from which we received a wonderful £2,000.

● Gill, a professional coach and trainer, with more than 30 years of experience has written a book titled STUCK, Brain smart insights for coaches, and Gill kindly donated £250 from the proceeds of a 24-hour Kindle promotion.



▲ Sally Anne's father was diagnosed with the aggressive brain tumour glioblastoma in February 2006; he died almost exactly nine months later. Although her father lost his ability to read, to make coherent sentences, to walk and to care for himself, the essence of the person remained. Having decided to support research in to this devastating form of brain tumour in 2018, Sally Anne organised her second music recital to raise funds. Guests enjoyed bubbly and canapés prior to superb performances by internationally acclaimed musician siblings, David Quigley (piano) and Joanna (violin). Paintings by local artist Alfie Carpenter were on display for sale, with him donating 25% of sales on the night to the funds raised from the concert. The evening was a great success raising £1,918. "Dad would have loved tonight's concert. It is not in memory of him but, without him, it might well not have happened".



Thank you

A sincere and heartfelt thank you to each and every one of the thousands of people who have so kindly supported us.

Whether you generously donated or gave a gift, ran a marathon, took part in an event, volunteered your time or shared your story... for all that you have done, thank you.

It is only thanks to your valued support that we are able to accelerate the progress of brain research, improving the lives of people with a neurological condition.

With special thanks to the following for their valued support:

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Our performance



During the financial period, we have continued to refine our business model and implement operational improvements. This has included changing our financial year-end from October to March meaning that our financial performance on page 35 reflects 18 months of activity.

The Virgin Money London Marathon continues to represent our major fundraising stream with over £700,000 raised during the financial period, and we were pleased to be able to field our largest ever team in the 2019 marathon. We have also developed our capabilities in other fundraising events, which have raised £133,000 as well as an additional £123,000 raised from trusts.

As the 2017/18 financial period represented a year of consolidation for the charity, where we scaled back activity to make operational changes, during the 2018/20 financial period we have continued to build on this activity in order to capitalise on fundraising opportunities. This has been reflected in increased fundraising costs as we begin to imbed our new fundraising strategy. The impact of the pandemic on our fundraising operations has delayed implementation of some aspects of the strategy and we have had to revise some of our plans for next year accordingly. However, the principles of the strategy are still in place and we remain in a strong organisational and financial position to face the Covid-19 related challenges during 2020/21.

We were pleased to be able to spend the majority of our income on our charitable activities with expenditure of £2,462,000. This included direct research spend of £2,098,970.

Our objectives for 2020/21:

As a result of Covid-19, some plans have had to be postponed temporarily.

Our objectives for research activities:

- To run our annual national calls for applications for PhD studentships and project grants
- To complete an updated, meaningful Impact Report

Our objectives for fundraising:

- To develop further our event and challenge activities
- To develop further our major donor fundraising activities

The Trustees understand that the benefit of neurological research is long-term but believe that the knowledge gained from each research project funded is a step towards understanding how these diseases happen and how to treat them. Trustees also understand that measuring the impact of their donations is an important consideration for those who give so generously to support the charity's work.



Our finances

As the charity's year-end has been changed, the financial period reflects 18 months of activity from 1st October 2018 to 31 March 2020. The previous period reflects a 12-month financial period from 1st October 2017 to 30th September 2018.

	2020 £'000	2018 £'000
Our income		
Individuals	689	570
Trusts, corporates and major donors	174	145
Income from events	853	654
Legacies	104	454
Total donations income	1,820	1,823
Investment income	681	506
Total donations and investment income	2,501	2,329

	2020 £'000	2018 £'000
Our expenditure		
Raising funds	1,207	687
Charitable activities	2,462	4,031
Total expenditure	3,669	4,718

This summarised financial statement has been extracted from the full trustees' annual report and financial statement as approved by the trustees on 22nd July 2020. The full financial statements, which our auditors haysmcintyre have given an unqualified audit report, will be submitted to the Charity Commission and to the Registrar of Companies.

The auditors have confirmed that, in their opinion, this summarised statement is consistent with the full statement for the year ended 31 March 2020.

The full trustees' annual report and financial statement and auditors report may be obtained from Brain Research UK, BWB Charity Hub, 10 Queen Street Place, London EC4R 1BE or brainresearchuk.org.uk

Together we can accelerate the progress of brain research.
Please support us by donating, volunteering or fundraising.



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