Geoffrey Jefferson
Brain Research Centre

Annual Report 2022/23

MANCHESTER 1824
The University of Manchester

NHS
Northern Care Alliance
NHS Foundation Trust

Working in partnership with Manchester Cancer Research Centre,
The Christie NHS Foundation Trust, and Royal Manchester Children's Hospital.

Geoffrey Jefferson
Brain Research Centre

Foreword from our Directors

Since the launch of the Geoffrey Jefferson Brain Research Centre (The Jeff) in April 2021, we have established a clear brand and embedded ourselves in the translational research landscape across Manchester.

Already, we have celebrated many successes within the Centre and continue to grow and foster further collaborations that are key to our development and growth in the coming years.

We have expanded the Centre with the addition of two new themes and look to support other emerging themes in their development, ensuring they fit with the ethos and strategic aims of the Jeff. To further raise our profile, we will organise engagement events across Northern Care Alliance, The University of Manchester and other partner organisations, as well as for the wider public.

A critical measure of future success is to increase our funding. This will be a major focus over the next phase in our development, allowing us to continue to push forward translational research and improve patient outcomes.

Stuart Allan and Andrew King

Directors of the Geoffrey Jefferson Brain Research Centre

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www.gjbrainresearch.org

@GJBrainResearch

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Five-year strategy 2023-2028

Strategic priorities and key outcomes

Create an identity for translational neuroscience research in Manchester

Raise the profile of existing research excellence in translational neuroscience. Support emerging themes.

Ensuring the needs of patients are central to our research

Establish a patient-led research design panel and enable and support patient-driven fundraising.

Provide a network for clinicians and scientists, supporting rapid translational research

Facilitate bed to bedside collaboration. Build capacity in translational research.

Deliver enabling core infrastructure to increase research output and excellence

Implement a funding model with key strategic partners. Secure sustainable infrastructure funding.

Centre highlights from 2022/23

Themes

Two new themes were successful in applying to be part of the Centre: Nanotechnology and Parkinson's Disease.

Publications

140 publications arising from the Centre.

Funding

Charity and Philanthropy funding secured to contribute to the strategic development of the Centre.

Grant income

£3.1 million new grant income from applications and projects associated with the Centre.

Fundraising

Over £5,750 raised through patient driven fundraising.

Charity

Appointment of Manchester's first ever Brain Tumour Charity Chair of Translational Neuro-Oncology.

Commentary on our performance, our strategic priorities, and key outcomes

Create an identity and focus for translational neuroscience research in Manchester

Over the past year, we have focused on growing the presence of the Jeff across Manchester, engaging clinicians, non-medical allied health professionals (NMAHPs), scientists, patients, carers, and the wider public. Building the brand and vision of the Jeff with these key stakeholders is critical to ensure they feel a sense of identity with the Centre and want to play an active role. A key aspect in this respect was ensuring we had an up to date and interactive website, which launched in Summer 2022. The Jeff has also developed a presence across different social media platforms, such as LinkedIn and X (@GJBrainResearch) which are used to disseminate information, good news, and key updates.

The Jeff Centre Manager (Alisha Patel) and Administrator (Gillian Burns) have participated in multiple external engagement events to raise the profile of the centre and spread awareness and information across a range of groups including the public.

Engagement events were held across Northern Care Alliance NHS Foundation Trust (NCA) sites to provide information to patients and staff through leaflets, QR codes, roller banners, and branded merchandise such as pens and lanyards.

We also took part in the Brain Health Day at Manchester Central Library; an event focused on demonstrating the breadth of Neuroscience research across The University of Manchester and NCA with a specific focus on the Stroke IMPaCT study (see Research Highlights section).

The Jeff was created in April 2021, and it has taken some time to fully create the Centre's identity however, with the ongoing engagement events and the opportunities to speak at specific theme away days, there is growing recognition of the Centre as a hub for translational neuroscience research in Manchester.

An aim specific to this strategic objective is to ensure we support new and emerging themes. In this respect since the Jeff has launched two new themes, Parkinson's Disease and Nanotechnology, have joined the Centre. Applications have also been received from other research themes wishing to join the Centre. Though these themes have not yet reached the expected benchmarking criteria we continue to work with them to build towards achieving these targets.

Overall, excellent progress has been made to ensure a strong identity and focus for the Jeff across Manchester and more widely.

Commentary on our performance, our strategic priorities, and key outcomes

Ensure the needs of our patients are central to our research

A key strategic priority of the Jeff is to ensure that the needs of our patients are central to our research projects and research agenda. Most funding bodies now require specific patient, public and carer involvement and engagement (PCPIE) input on grant applications, from initial idea to project co-design. PCPIE is key to ensuring the research being funded will positively impact the patient population associated with the project. Developing a PCPIE strategy along with key partners is therefore critically important for the Jeff.

To embed PCPIE in the Jeff we have appointed Ann Bamford to our core team as our PCPIE lead. As a stroke survivor Ann brings lived experience and has been extensively involved in PCPIE prior to being appointed to this role. Ann co-ordinates PCPIE input into any grant applications which come via the Centre, and to-date has provided support for five grant applications and four ethics applications since joining the team. From this input, projects have been amended; whether that be number of visits, burden on patients, or proposed length of visits. This input has had a hugely positive impact on these studies and will hopefully improve participation and retention rates.

Ann has been instrumental in supporting other individuals who are interested in becoming involved in PCPIE work and we are planning to establish a Hyperacute Stroke PCPIE panel over the coming months. This work will link with the Manchester Biomedical Research Centre (BRC) and will ensure that every Hyperacute stroke study has been reviewed by PCPIE members.

The longer-term objective is to create a trans-diagnostic PCPIE panel to ensure that every grant and ethics application has a specific and applicable PCPIE review. We are developing a process towards meeting this aim within the next twelve months. To further support this strategic priority, Ann and the core team will work together to develop training resources and materials for researchers undertaking research projects, ensuring PCPIE is used valuably and accurately. Materials will also be developed for individuals interested in becoming PCPIE members to encourage transition from interest to becoming a confident voice that advocates for the needs of patients within their diagnostic field.

Another aim within this strategic priority is to facilitate and encourage patient led fundraising and philanthropy. To-date we have raised over £5,750 in patient driven fundraising. To achieve this, the Centre has formed a partnership with the NorthCare Charity at NCA, with the Centre Manager becoming a charity champion. We have ensured a streamlined process to ensure every patient wishing to fundraise has appropriate support and contact from both the Centre Manager and NorthCare. Patient driven fundraising communications are led by NorthCare and these are also disseminated via the Jeff's social media and newsletters. Within our financial plan, we have developed a pathway for a rolling programme of community fundraising who, together with NorthCare individuals, will be fully supported in their fundraising, with some committing already to annual challenges.

Commentary on our performance, our strategic priorities, and key outcomes

Provide a network for clinicians and scientists, supporting rapid translational research

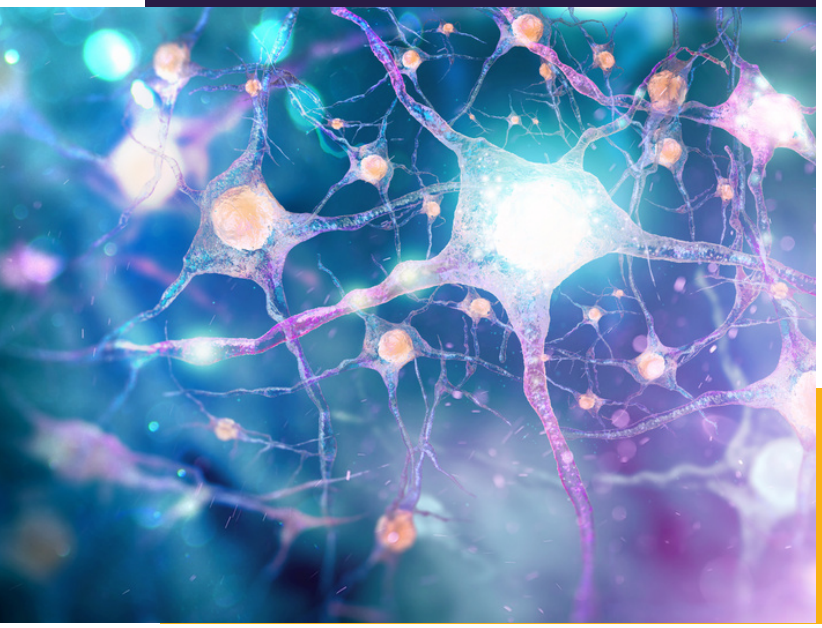
Fostering a collaborative and collegiate environment to enable effective communication between clinicians and scientists and implementing a 'Team Science' approach is critical if the Jeff is to deliver on its key goal of rapid translational research. Establishing strategic partnerships with key stakeholders, for example charities, is an important part of this goal. The Centre has therefore worked hard over the past year to help build this approach to ensure health care benefit for patients.

An exemplar in supporting rapid translational research across the patient pathway is demonstrated in our Brain Tumour theme, through the improvement of lives for people with Neurofibromatosis type 2 (NF2).

Provide a network for clinicians and scientists, supporting rapid translational research. Continued....

NF2 affects around 1 in 30,000 people and causes a tumour to grow along the cranial nerves, causing deafness, vision loss and loss of mobility. In 2009 Manchester were the successful lead applicants for a highly specialised national NF2 service. Centrally funded by NHS England at £7 million per annum, Manchester is one of only four specialist nationally commissioned centres in England. In December 2020 findings from a 30 year follow up study of 353 patients who accessed the NF2 service were published. This provided definitive evidence on the improvement of survival since the inception of this service, with a further paper demonstrating improvement in quality of life.

Developing the next generation of researchers is critical for the future success of the Jeff and we are greatly encouraged by the buy-in from our early career researchers (ECR) to the vision of the Centre. The ECRs have been fantastic ambassadors for the Jeff, being the quickest to use our specially designed logo, PowerPoint templates and lanyards, all of which are key in raising the profile of the Centre and creating an identity, internally and externally. We encourage individuals across all areas of the Jeff to do the same.



Building on the outstanding clinical service Manchester has a world leading NF2 tumour research programme, which has identified a central role for inflammation in the microenvironment of schwannoma in NF2. To rapidly progress this initial work across the translational pathway the Jeff has established a transatlantic partnership with the patient led charity, NF2 BioSolutions. NF2 BioSolutions have provided funded for two PhD students (Grace Gregory and Adam Jones) to further investigate the role of inflammation in NF2 and how existing anti-inflammatory and immune-modulating drugs can be repurposed to benefit patients with this currently incurable condition. Grace and Adam are supervised by Prof Omar Pathmanaban, the Centre's strategic lead, Prof David Brough, the Centre's neuroinflammation theme lead and Prof Kevin Couper, lead for neuroimmunology within the Lydia Becker Institute of Immunology and Inflammation, a key strategic partner of the Jeff.

Provide a network for clinicians and scientists, supporting rapid translational research. Continued....

Moving forward we will work with our ECR community to appoint an ECR lead to join the Jeff Board and to run workshops, seminars and other activities that they feel will be of benefit. Importantly, participation across disciplines will be encouraged, with events designed for both clinical and non-clinical ECRs to attend.

Building capacity requires funding and the Jeff has been extremely successful in securing PhD studentships from flagship schemes at the University, attracting a number of students from the BHF, MRC DTP and Wellcome Trust ImmunoMatrix PhD programmes. We have also worked closely with the Division of Development and Alumni Relations at the University to provide PhD funding through a bespoke Stroke Appeal, and secured support from NF2 BioSolutions as described earlier.

Academic neurosurgery within the Jeff has the largest academic neurosurgical training scheme in the UK. Data from the NIHR showed that, from 2015-2019, Manchester had more neurosurgical Academic Clinical Fellows and and as many Academic Clinical Lecturers as any other centre in the UK. Over the past 10 years we have trained 8 Academic Clinical Lecturers (post PhD senior training posts) and 7 Academic Clinical Fellows (junior training posts, generally pre-PhD). Of these academic trainees, two went on to be awarded Wellcome Fellowships (Wellcome 4Ward North), one a CRUK Fellowship and one an MRC Clinical Research Training Fellowship followed by a NIHR Clinical Scientist Award. Another Academic Clinical Lecturer become the first ever UK clinician to be given a prestigious research and clinical fellowship at the Memorial Sloan Kettering in New York, focussing on immunotherapy in brain cancers. Moving forward we aim to build on this strong track record of success.

Commentary on our performance, our strategic priorities, and key outcomes

Deliver enabling core infrastructure to increase research output and excellence

To ensure long term viability and stability of the Jeff, it is vital to ensure core infrastructure that will enable and support researchers in the best possible way in carrying out their research, leading to high quality outputs, leveraged funding and ultimately more rapid translation and improved patient outcomes.

The Jeff has been successful in securing funding from NorthCare Charity and other sources for the Centre Manager and Administrator for a further two years, posts which are essential in continuing to drive the Centre forward and achieving our vision.

The Stroke & Dementia and Brain Tumour themes are now part of the Manchester Biomedical Research Centre (BRC), which was awarded £59.5M in December 2022 to support experimental medicine across Greater Manchester and the North-West over the next five years. This is a major breakthrough with Stroke & Dementia sitting in the Inflammation cluster as part of the Cardiovascular Theme. Being part of the BRC brings key infrastructure funding as well as access to expertise, resources and additional support for experimental medicine, an area critical for rapid translation. Funding from the Cardiovascular Theme has contributed to the employment of a Research Manager (Josie Thomas) to provide strategic support for grant applications, progression of projects and to improve overall efficiency and productivity within the Brain Inflammation Group and more broadly across the Stroke & Dementia theme.

Deliver enabling core infrastructure to increase research output and excellence. Continued....

Through the Rare Diseases theme, funding for a Senior Experimental Officer (Mike Haley) has been secured to maintain expertise and continue to develop capabilities in Imaging Mass Cytometry (Hyperion), an integral part of ongoing and future research activity within the Jeff. Manchester is in a unique position with the expertise that Mike has established in Hyperion over the last few years, a cutting-edge technique offering significant research opportunities to attract future funding.

Use of the Hyperion technology in brain tumours and stroke is particularly valuable when combined with the high volume of clinical excellence at the Manchester Centre for Clinical Neurosciences (MCCN) at NCA. This combination of new technology in a large cohort of patients allows rapid acquisition of novel data, supporting innovative research and leading to high quality publications.

A key appointment was made on the 1st of September 2022 of Professor Petra Hamerlik. Professor Hamerlik is the first ever Chair of Translational Neuro-oncology starting at the University of Manchester, within the Manchester Cancer Research Centre (MCRC) and Jeff. This important new post is funded by The Brain Tumour Charity and University of Manchester and Petra aims to build an exciting research programme, including the development of pre-clinical patient-derived xenograft models to inform on brain tumour biology and to discover novel targets for drug and immunotherapy treatment.

Commentary on specific research highlights within 2022-2023

There are several exemplar projects within the Jeff that showcase collaborations across Manchester, raising our profile and positively contributing towards our strategic goals. These projects have demonstrated the benefit of providing a network for clinicians and academic researchers to deliver rapid progression across the translational pathway and demonstrate improved health outcomes for our patients.

Development of a non-invasive skin swab test for Parkinson's disease. Led by: Prof Monty Silverdale (NCA) and Prof Perdita Barran (UoM) Theme: Parkinson's disease

Researchers at UoM and NCA have used cotton swabs to sample people and identify compounds present in their sebum using mass spectrometry.

The sample is taken by non-invasive sampling of skin from the upper back, with 90% accuracy. The research used a sample group of 79 people with Parkinson's disease, compared with a healthy control group of 71 people.

The study arose from the observation of Joy Milne who discovered she can distinguish Parkinson's Disease in individuals from a distinct body odour before clinical symptoms occur.

Professor Monty Silverdale (pictured below) is the clinical lead for this study and said, "This test has the potential to massively improved the diagnosis and management of people with Parkinson's disease."

At present there is no clinical method for confirmation of diagnosis, and there is no diagnostic test, making it difficult to provide an early diagnosis.

The publication arising from this project is 'Paper Spray Ionization Ion Mobility Mass Spectrometry of Sebum Classifies Biomarker Classes for the Diagnosis of Parkinson's Disease and is available here.

A major grant application to the Development Pathway Funding Scheme at the Medical Research Council will be re-submitted to continue this work, with the outcome anticipated early 2024.

Commentary on specific research highlights within 2022-2023

Stroke IMPaCT (Immune Mediated Pathways and Cognitive Trajectory)
Led by: Prof Stuart Allan (UoM) & Prof Craig Smith (UoM & NCA)
Theme: Stroke & Dementia

Stroke IMPaCT is a ground-breaking prospective clinical study of post-stroke dementia. This is a $6 million Leducq Foundation Transatlantic Network of Excellence (European Co-ordinator: Prof Stuart Allan; Manchester clinical lead: Prof Craig Smith (pictured right) and $3.2 million NIH funded programme (Manchester lead: Dr Laura Parkes) aimed at understanding how immune/inflammatory mechanisms and blood-brain barrier dysfunction contribute to the cognitive decline seen in ~30% of stroke survivors.

This is a multi-site international programme, the clinical study being in collaboration with Stanford University and Columbia University in the United States, both world leading centres of stroke research. Manchester recruited the first participant to this project through the Hyperacute Stroke Unit at NCA in August 2021, with over 150 patients now enrolled.

Follow up investigations will take place 6-, 18- and 30-months post-stroke. Participants undergo detailed cognitive tests with blood samples taken at every time point, plus detailed MR imaging to evaluate blood-brain barrier dysfunction and other brain changes at 6- and 30-months post-stroke.

The ultimate aim of the project is to discover novel treatments to prevent/slow the post-stroke cognitive decline. Importantly, improving cognition in stroke survivors is identified as a top priority from the Priority Setting exercise completed by the Stroke Association/James Lind Alliance in 2022 (Top 10s of priorities for research | James Lind Alliance (nihr.ac.uk)).

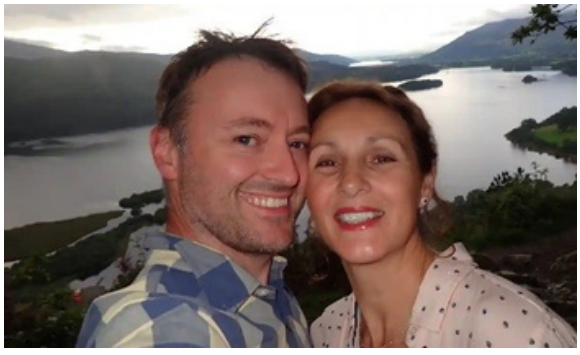
Commentary on specific research highlights within 2022-2023

POBIG: PreOperative Brain Irradiation in Glioblastoma
Led by: Dr Gerben Borst (The Christie) and Dr Mueez Waqar (UoM)
Theme: Brain tumours

The POBIG trial challenges current practice and aims to assess whether the tumour is likely to respond better to radiotherapy pre-operation. This would have a huge impact on the standard of care pathway for brain tumour patients and may contribute to improved survival times.

"The order of radiotherapy and surgery should be challenged, and this could be the breakthrough we have been working towards for decades."
Dr Gerben Borst, Study Lead" (pictured above right)

The first patient (pictured below) recruited to the study has now progressed through the trial protocol, and the study team are pleased with the patients progress and how they have responded to the treatment. Early results suggest this early intervention could provide long term benefits for patients with glioblastomas. This innovative research has been described in The Guardian.



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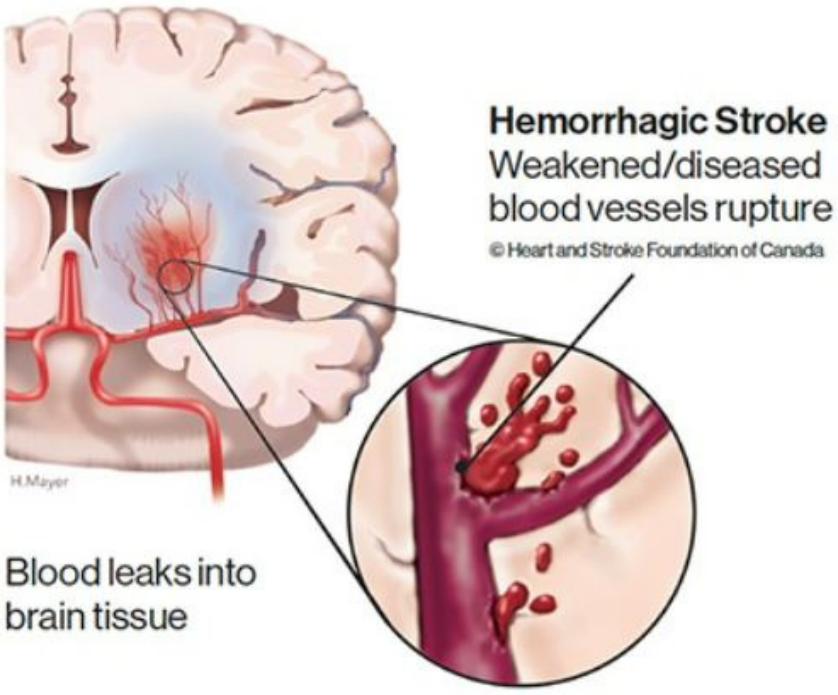
Stroke Acute Bundle of Care of Intracerebral Haemorrhage
Led by: Dr Adrian Parry – Jones (UoM & NCA)
Theme: Stroke & Dementia



Implementation of the ABC-ICH care bundle at the Hyperacute Stroke Unit reduced the number of deaths at 30 days by one third.

The ABC-ICH care bundle consists of guideline recommended interventions, namely:

- Rapid Anticoagulant reversing
- Intensive Blood pressure lowering
- A Care pathway for prompt neurosurgical referral

This project led by Dr Adrian-Parry Jones (pictured above) has been scaled up and is currently being delivered across the North-West of England. If results obtained at Salford are replicated in this scale-up then the ABC-ICH care bundle could be adopted nationally and possibly internationally, having a profound and direct real world impact and improvement for those who suffer an intracerebral haemorrhage.
Adrian and others in the ABC-ICH team were recent winners of the 'Emerging Impact' Making a Difference Award in the category 'Outstanding benefit to society through research' at UoM, featured recently in the Manchester Evening News.

Expansion & Initiation of collaborative partnerships in 2022-2023

To ensure continued expansion, visibility and recognition of the Jeff, collaborative partnerships are key. In this regard there are many new and emerging partnerships that have led to training and funding opportunities within the centre, highlighted below:

Manchester BRC

The new £59.5M funding award to the Manchester BRC includes a Cardiovascular and Rare Disease theme. This is hugely positive for the Centre as it provides core funding to our Stroke & Dementia and Brain Tumours themes, as well as access to expertise, resources and support for experimental medicine research. This has enabled developments in the enabling core infrastructure, supporting our 5-year strategic aims. A key performance indicator for the Jeff is to have a standalone theme in the next Manchester BRC (2027).

Natalie Kate Moss Trust (NKMT)

We are delighted to continue our close partnership with the NKMT to support our ground-breaking research into intracerebral haemorrhage. The partnership started 11 years ago and to date the NKMT has generously provided £452k of research funding to UoM, the most recent £300k supporting the recruitment of a Research Fellow (Katie Murray) back from Yale University in the United States, with Katie taking up her new position in August 2023. The NKMT has recently re-branded and is working closely with the Jeff (Adam Greenstein in our Stroke & Dementia Theme) to raise awareness of the importance of keeping your blood pressure controlled, to prevent intracerebral haemorrhage and other complications.

Manchester Metropolitan University (MMU)

We have an established collaboration with researchers at MMU and industry partners to improve diagnosis and therapy in Parkinson's disease. We have several collaborative grants which are currently under review by the MRC, if awarded these will strength collaborations and lead to long-term embedding of the Centre at MMU.

INBRAIN Neuroelectronics

In 2022 we launched an exciting new collaboration with INBRAIN Neuroelectronics to bring graphene electrodes to a 'first-in-human' clinical trial at the Neurosurgery Unit, Manchester Centre for Clinical Neurosciences, NCA. This could be a pioneering new technology for patients with glioblastoma, Parkinson's disease and other neurological conditions and is a collaborative effort between our Brain Tumours and Nanotechnology for Brain Disease Themes.

NF2 BioSolutions

We have established a strategic partnership with this charity, including direct funding of two PhD students, which works to accelerate new therapies to find a cure for NF2.

Expansion & Initiation of collaborative partnerships in 2022-2023 Continued...

Innovate Manchester Advanced Therapy Centre Hub

We are proud to be part of this Centre, which aims to improve access to advanced therapy medicinal products. This will also allow the development of educational materials across the NHS to give the understanding required for these ground-breaking treatments and sharing best practice across industry and the NHS.

Brain Matrix Consortium

A new partnership between the Jeff and the Brain Matrix Consortium began in 2022, providing a platform for trialling precision medicine in the UK, in the UK. Along with molecular profiles, this enables future rapid translation of experimental treatments.

2022-2023 Financial Summary

Since inception, a major focus has been to secure substantive longer-term funding, ensuring stability of the Centre. Securing such funding is no easy task and has consumed a lot of our energy over the last year. To achieve our strategic aims, overall vision and drive forward our key outcomes it is imperative to establish a funding stream for our core staff.

Although the Jeff features on many grant applications, and many of these are led through the Centre, we have struggled to establish a model in which core funding is costed on these applications. We will continue to work with colleagues in the NCA and UoM to find a solution to this important issue. In the meantime, there is a need to explore alternative funding sources, including philanthropy and charity.

The Jeff has worked closely with NorthCare Charity, part of the NCA. NorthCare have supported the Centre in its fundraising activity and supported patients to fundraise for the Centre.

This has led to several patients and their family members, as well as NCA fundraising over the last year, with a total of £5,750 raised to date. This may appear a modest amount, but we believe it is a crucial first step, with significant potential to raise much greater amounts over the next few years. Indeed, further fundraising is planned for the rest of 2023 and we will work closely with NorthCare in building this aspect of our funding portfolio. Below we showcase a few of our patient fundraising stories.

Summary of financial achievements

Over £5,750 in patient fundraising with further fundraising planned for 2023.

£135k secured from NorthCare for core infrastructure.

Support for Senior Experimental Office in Hyperion Imaging

Support for Research Manager post within Stroke & Dementia theme

£125k donation to establish strategic research fund

Patient fundraising stories

“Without Omar and his team I wouldn’t be here, never mind doing what I’m doing, I’ll be forever indebted to Salford Royal.”

Paul Metham (pictured right) was just 37 when he suffered a dissection of his carotid artery whilst out running.

Prof Omar Pathmanaban, the Centre’s strategic lead, operated on Paul. The surgery took place during the height of the Covid-19 pandemic, when family were not allowed in, however the surgical team kept Paul’s wife updated throughout the operation.

The surgery was difficult, and it was uncertain if Paul would make it through, with the team being unsure of what deficits Paul may be left with. Paul recalled a conversation post-surgery where he said, “I’m never going to run again, am I?”, the nurse looking after him told him he would, and she turned out to be right.

Paul took part in the Wilmslow half marathon in March and raised an incredible £2,320 for the Centre.

Patient fundraising stories

“I’m doing this because of the amazing treatment and care my wife Vicky received from the team.”
Mark

In January 2023 the centre was successful in obtaining funding of

£135,000

Vicky Lewis and her husband Mark (pictured below with Centre Manager Alisha Patel and Centre Co-Director Prof Andy King) are also fundraising for the Jeff. Vicky had a vestibular schwannoma which was operated on by Prof King. Vicky wanted to give something back after the care she received, so her and her husband looked to fundraise for the Jeff. Mark plans to take on a challenge of a 24-hour continuous bike ride while Vicky plans to hold a charity auction in July 2023, with any funds raised being split between the Jeff and The British Acoustic Neuroma Association.

Alongside patient and colleague fundraising, the Centre has also worked closely with NorthCare to apply for their charitable funding calls.

In January 2023, the Centre was successful in obtaining funding of £135,000, to secure the salary of the Centre Manager (Alisha Patel) and Centre Administrator (Gillian Burns) for a further 2 years. We greatly appreciate this generous support from NorthCare.