

BRAIN

Repair & Intracranial Neurotherapeutics



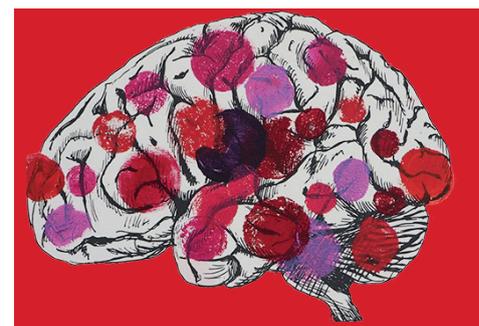
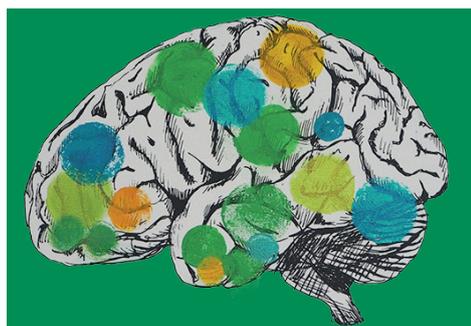
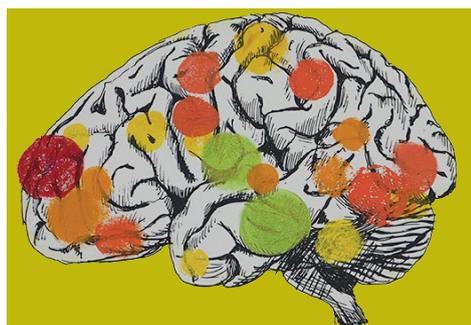
Ymchwil Iechyd
a Gofal **Cymru**
Health and Care
Research **Wales**



Ariennir gan
Lywodraeth Cymru
Funded by
Welsh Government

2016-17 Annual Report

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Contents

Page 3	Foreword
Page 4	Introduction
Page 5	The Team
Page 6	Work Packages
Page 16	Public Involvement
Page 17	Public Engagement
Page 18	Key Achievements
Page 19	Conclusions

Foreword



It has been another exciting and rewarding year for the BRAIN Unit. Our key achievements are listed on p.18, all of which are due to a very substantial team effort, and I would like to thank everyone in BRAIN for their dedication and hard work in making our unit a success over the past year.

With our expanding clinical Neurosciences Research unit, our increasing grant income and our exciting patient and public involvement supporting and informing our research, we are making substantial progress in translating Wales' excellent neuroscience research into clinical care for patients with neurological conditions.



Director, Professor William Gray

The next year will bring stimulating challenges as we begin our programme of neural transplantation for Huntington's Disease, further integrate our new clinical research database systems and refine and evaluate our novel patient monitoring technologies to bring them into clinical practise.

I hope you enjoy reading our report and if you would like to get 'BRAIN Involved' - just get in touch!



*BRAIN Unit Director,
Professor William Gray*

Introduction

Funded by Welsh Government through Health and Care Research Wales, The Brain Repair and Intracranial Neurotherapeutics (BRAIN) is a Research Unit within the Infrastructure (see Figure 1), developing novel therapeutics and treatment delivery systems for neurological conditions.

The Unit operates under the directorship of Professor Gray with 31 principle investigators (PIs) and collaborators, with a grant income of over £14million since the Unit's inception in 2015.

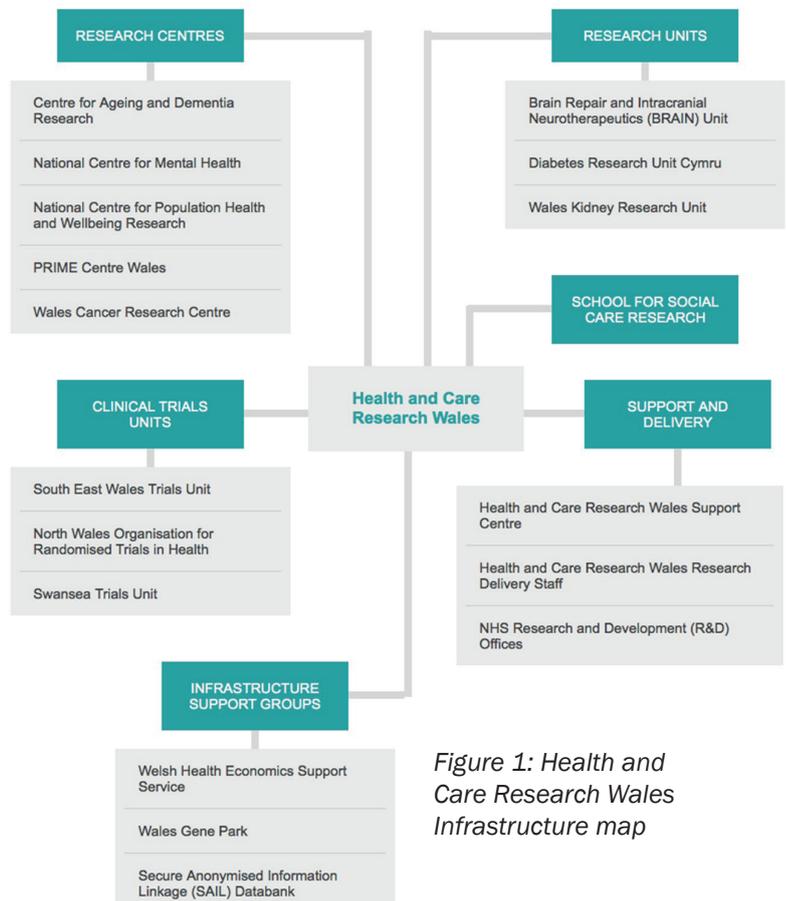


Figure 1: Health and Care Research Wales Infrastructure map

Our Mission

It is our vision to make the BRAIN Unit top-5 worldwide as a pre-eminent centre for international leadership and a Wales and UK national centre for excellence in:

1. Delivering novel cell, drug, growth factor and other complex therapies to the human brain
2. Supporting translational research underpinning disease modification and brain repair in people with neurological conditions

BRAIN Structure

BRAIN has nine work packages (WP) designed to take novel surgical interventions for brain diseases through to clinical application, and provide a robust evidence base supporting their adoption into clinical practice.

With input from BRAIN Involve, the Unit focuses on four chronic neurological conditions including Multiple Sclerosis (MS), epilepsy, Huntington's disease (HD) and Parkinson's disease (PD), as these form a large core of long-term disorders with significant unmet clinical needs.

Who are we?

The Team

Director

Professor William Gray - Professor of Functional Neurosurgery at the University Hospital of Wales (UHW), Cardiff

Deputy Director

Professor Anne Rosser - Professor of Clinical Neurosciences & Consultant Neurologist at UHW



Administration

Research Manager: Dr Laura Bunting

Neuroscience Research Unit

Research Nurse Manager - Belinda Gunning
Research Nurses - Joanne Bagshawe & Andy Davison

Research Associates & Fellows

Imaging Research Associate - Dr Erini Messaritaki
Computer Programmer/Research Associate - Dr Mark Postans
Clinical Research Fellow - Dr Joseph Merola

Research Technicians

Biobank Officer (Cardiff) - Dr Samantha Loveless
Biobank Officer (Swansea) - Arron Lacy, Alice Francis, Beata Fonferko-Shadrach
Stem Cell Technician - Dr Chloe Ormonde
MRI Physicist - Shirin Davies

Principle Collaborators & Partners

BRAIN is a multi-disciplinary research unit with strong academic and NHS clinical leadership. Based in Cardiff, the Unit's all-Wales brief involves key research excellent groups in Swansea and Bangor.

The Wales Neurological Alliance (WNA) is a forum of not-for-profit organisations representing people affected by neurological conditions in Wales. WNA sits on both the BRAIN and BRAIN. Involve executive boards, and continues to support BRAIN Unit activities with its far-reaching membership and input.

In year 2, the chair of WNA stepped down from her role within BRAIN and appointed disease specific representatives from the organisation. We now have three WNA members who sit at board level within BRAIN (Barbara Locke; Ann Sivapatham; David Murray).



Novel Technologies

Therapeutic delivery

Work package aim: Refine existing systems for effective delivery of cell therapy and other therapies into the human brain

Year 2 key highlights:

- Having been gifted a Renishaw Neuromate Surgical robot (via a charitable donation from the Oakgrove Foundation) in Year 1, BRAIN successfully delivered the first ever robot-assisted Stereo EEG electrode placement for epilepsy neurosurgery in Wales, conducted by Prof William Gray at UHW in March 2017.



Progress in Huntington's disease (HD):

- Secured funding to undertake neural cell transplants in three people with HD in Cardiff by March 2018 using the GMP facility through the Life Sciences Bridging Fund Pathfinder Grant.
- A second application is under review, which would fund critical research into trial design to deliver five further transplants in HD.
- Our PIs and a BRAIN Involve member participated in an international workshop in London to debate the ethics/trial design requirements for stem cell transplant in HD.
- In December, we appointed Dr Joseph Merola as the BRAIN Unit's Clinical Research Fellow. Dr Merola is a Neurosurgical trainee who will be involved in setting up and delivering the cell transplantation trial in HD.

Key investigators: Professor Gray, Professor Rosser, Dr Joseph Merola (Clinical Research Fellow) and Renishaw, a world-leading engineering and scientific technology company.

- Integrating this new robotic equipment into routine clinical care within UHW will enable us to perform state-of-the-art investigations and increase precision and safety of neuro-procedures.

Patient perspective

The BRAIN Unit climbed to the BBC's 'top five most read stories' of the week when patient Denise Casey, who was diagnosed with epilepsy at 31 and has suffered up to six fits a day for the past 20 years, appeared in a BBC Wales video interview praising Prof Gray's epilepsy procedure as 'wonderful'.

Denise has not suffered epileptic fits since the two robot-assisted procedures, which are far more accurate at placing probes into a patient's brain than traditional methods and reduces the operating time significantly.

The news generated 3,490 impressions and 84 engagements on social media.



Above: Denise Casey on BBC Wales

Novel Technologies

Imaging and tissue modelling of cell and therapeutics delivery to the brain

Committed to improving the understanding and performance of drug delivery systems to the brain, BRAIN collaborates with the Cardiff University Brain Research Imaging Centre (CUBRIC), which sports a 'microstructural' MRI scanner (second of its kind in the world).

Work Package aim: To utilize high resolution and microstructural PET scans to support accurate modelling of cell and drug delivery to the brain.

Year 2 Key highlights:

Accurate delivery of drug therapies to the brain requires a confident understanding of how the drug will work and its impact once delivered. Current model drug delivery systems are poor, often due to a lack of understanding regarding brain tissue microstructure and the quality of data obtained from brain scanners.

Dr Messaritaki has developed a novel formalism for dealing with the mathematical and computational modelling of convection-enhanced drug delivery to the brain, that takes into account diffusion orientation information from MRI scans (rather than simply the diffusion tensor) to predict the drug spread in the brain at an individual patient level. In addition to presenting her research at an international conference, Dr Messaritaki spent time talking to sixth form students attending the 2016 ESRC School Event about how she is developing and testing these complex computer models.



Left: ESRC 2016 Schools Event

Key investigators: Professor Gray, Professor Jones, Shirin Davies, Research Associates Dr Messaritaki and Dr Mark Postans, and Renishaw technology company

New staff

We are delighted to welcome Shirin Davies to the team as an MRI physicist who will be supporting the translation of CUBRIC's advanced imaging to support patient care and evaluation for epilepsy surgery with Dr Hamandi and Prof Gray. Shirin will focus on integrating advanced multimodal imaging datasets into a common dataset for evaluating brain function and structure in patients undergoing evaluation for surgery.



Going forward...

Through work conducted in Year 2, BRAIN will attain its target for the first microstructural MR imaging of human striatum and hippocampus in people with HD and temporal lobe epilepsy retrospectively.

We will begin validating models of drug and cell delivery to the human brain by scanning patients with neurological conditions to test and adapt our CFD models to better predict the accuracy of drug and cell delivery in different disorders.

Novel Technologies

Therapeutic generation

Work Package aim: To support the generation of pre-clinical grade cell therapies, drug development, and evaluation of biologically active molecules for potential therapeutic use.

Year 2 Key highlights:

- The Neuroscience Research Unit (NRU) was selected as a site for the first ever commercial trial using a 'gene silencing drug' in people with Huntington's disease (see NRU 'Key Achievements' on page 15 for full details of the trial).
- We hosted a collaborative meeting with Zebra Biologics (pre-clinical stage biopharmaceutical company, Boston, USA) to discuss potential collaborations concerning the development and testing of novel agents such as Trk-B (involved in central nervous system synapse strength and plasticity).
- We are working to increase the development of new sources of donor cells for cell replacement therapies.
- New research areas aim to improve the diagnostics and prognostic outcome of people with our key neurodegenerative disease areas.

FLAME

- Supported and run via the NRU, the Fluoxetine, Learning and Memory in Epilepsy (FLAME) project is the first neurological clinical trial of its kind to take place in Wales.

"By testing the clinical effectiveness of a cheap, widely available and well-tolerated drug, FLAME addresses an important unmet clinical need in working to combat learning and memory problems in people living with temporal lobe epilepsy (TLE)."

- Dr Mark Postans, Research Associate



Key investigators: Professor Gray, Professor Rosser, Professor Barde, Professor Li, Professor Rees, Professor J Morgan, Professor J Morgan and Dr Chloe Ormonde (Stem Cell Technician)

Researcher perspective

*Dr Chloe Ormonde,
Stem Cell Technician*



Dr Chloe Ormonde joined the BRAIN Unit in October as a senior research stem cell technician.

Coming to BRAIN with over nine years of laboratory experience, Chloe has already set-up and organised the main tissue culture laboratories at UHW, purchasing the necessary equipment and generating laboratory protocols to enable the collection and processing of human tissue.

"With pioneering research underway, it is an exciting time to join the BRAIN Unit," said Chloe.

"My first project has been assessing changes in neurogenesis (the creation of new brain cells) in brain tissue from people with mesial temporal lobe epilepsy undergoing neurosurgery."

Having completed the Human Tissue Act (HTA) training and courses on Clinical Research Regulations, Chloe is now looking forward to working on the neural cell transplantations starting early next year.

Novel Technologies

Therapeutic generation: Pam Thomas' case study

By successfully securing funding from the Life Sciences Bridging Fund Pathfinder Grant to undertake the first cell transplantation trial in Wales for three patients with Huntington's Disease (HD) by March 2018, the Unit aims to provide hope to families affected by this currently incurable condition. BRAIN Involve member Pam Thomas, 74, shares below what HD research means to her family.

'Shattering'

Pam was married with two children when she discovered the hereditary neurodegenerative condition ran in her family, a diagnosis which triggered fears of inheriting and passing on the faulty gene.

"My mother's elder sister Sylvia was diagnosed with the disorder when she was in her 50s," Pam recalled. "My mother Grace also showed signs of odd behaviour but not as obvious as my aunt.

"Cardiff University's Professor Harper tracked down other members of our family while setting up a database to monitor the hereditary nature of HD – a forerunner of the University's 'Enroll' project."

'Dark cloud of worry'

"The news was shattering," Pam continued. "I made the decision to be sterilised. Knowing a hereditary incurable illness may exist in our genes cast a shadow of uncertainty over our lives. Life decisions that should be exciting such as having future children suddenly become an issue of careful consideration.



"I decided not to take the HD test, meaning I'm still most likely classed as 'at risk', but as more time passes the dark cloud of worry lessens."

'BRAIN Unit's research is so important'

"The BRAIN Unit's research is so important for investigating the symptoms and potential therapies of HD to promote accurate, early diagnosis for patients.

"Working with BRAIN Involve team helps us find a purpose in our experience of this debilitating condition. It is the hope that, someday, these pioneering researchers will make groundbreaking discoveries that can save and improve the lives of future generations suffering with HD."



Novel Technologies

Clinical Research data systems

Clinical databases are critical for capturing information to support effective patient care. BRAIN is developing and beginning to implement a distributed clinical research database system that supports clinical care and is integrated with the Unit's biobanks and NRU.

Work package aim: To develop clinical research database systems that capture routine and enhanced clinical data at point of contact.

Year 2 key highlights:

- Developed an Electronic Patient Record system (EPR) supporting clinical care and deep patient phenotyping in MS (Cardiff and Vale, and Aneurin Bevan Health Boards), PD (Abertawe Bro-Morgannwg Health Board) and epilepsy (Cardiff and Vale Health Board).
- EPR now hosts a secure NHS internet server allowing researchers to securely collaborate and contribute patient-level datasets.
- New multi-disciplinary module for the epilepsy surgery programme.

Key investigators: Professor Gray, Professor Robertson, Dr Wardle, Dr Hamandi and Dr Postans (BRAIN Computer programmer Research Associate)

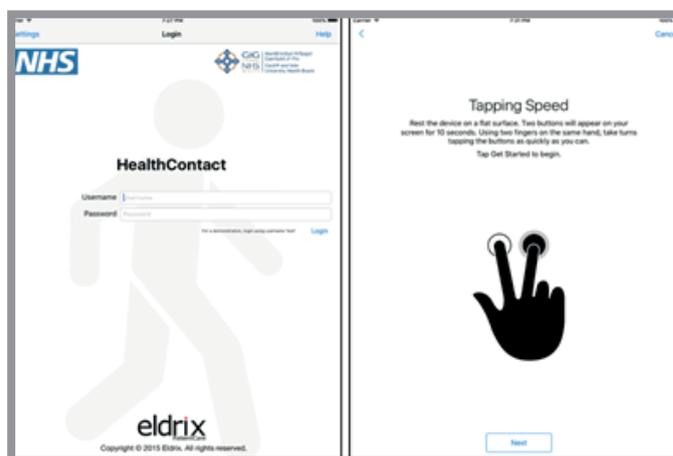


Figure 3: Apple Research Kit-based iPad application

Mobile devices

- EPR currently supports both patient-held and clinic-based mobile devices (e.g., iPad or a mobile phone), with a specific focus on patient monitoring tests in PD clinics.

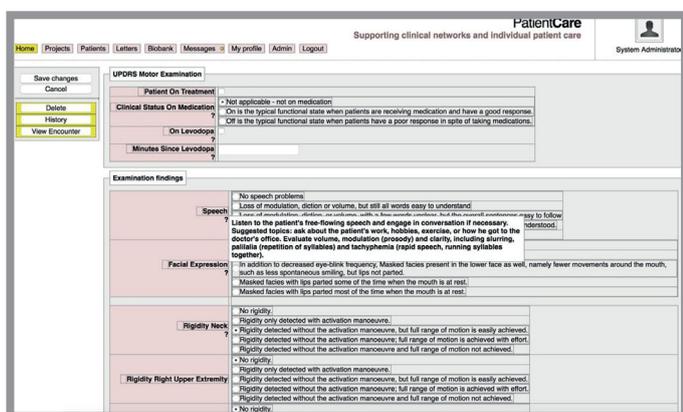


Figure 2: Electronic Patient Record (EPR) system

Scanning database development

Dr Mark Postans joined BRAIN in Year 2 working on database projects within the Unit. He has created a normative database of hippocampal volumetric data based on MRI data that was available for 450 healthy volunteers via CUBRIC.

This data can be used to detect and quantify hippocampal gray matter atrophy in individual patients with mesial temporal lobe epilepsy.

BRAIN has produced a companion stand-alone programme to help researchers interact with the database in order to quantify hippocampal atrophy effectively in their research patients.



Above: Dr Postans delivering Brain Wars game

Novel Technologies

Patient Monitoring

Good progress has been made by BRAIN in developing effective ways for patients (and/or their carers) with a range of complex neurological conditions to accurately evaluate their own situation, functioning, cognition and needs.

Work package aim: Develop more accurate and reliable testing of mobility and cognitive dysfunction across trials by creating novel methods of clinic-based and remote monitoring (e.g., smart devices and wearable technologies).

Key investigators: Professor Busse, Professor Rosser, Dr McLauchlin, Dr Eslambochilar, Dr Wardle, Dr Lane, Dr Hamandi, Dr Postans (BRAIN Computer programmer Research Associate) and Professor Gray

Year 2 key highlights:

- Secured a number of grants to explore the value of cognitive training as a non-pharmaceutical interventional in neuroscience.
- One grant has seen Dr Emma Yhnell join the Unit as a Health and Care Research Wales Research Fellow to set-up and run a clinical trial that evaluates whether a personalized computer based cognitive training task can help people with HD.
- Pilot-tests underway for a novel touchscreen-based working memory task designed to be sensitive to hippocampal pathology, such as that which occurs in mesial temporal lobe epilepsy.
- In Year 3, BRAIN aims to use this task in suitable patient groups to assess whether the task may also be sensitive to improvements in cognitive performance following novel drug and cell therapies trials. If confirmed, the task will have numerous potential applications for clinical research.
- BRAIN Connections meetings provide a forum to discuss the development of novel cognitive assessments for a range of neurological conditions, showcasing the work of our Early Career Researchers.
- A RfPPB grant is currently under review to assess the value of wrist-worn monitors for tracking seizure patterns in epilepsy patients.



Figure 4: C3T mobility assessment prototype

Mobility test prototype



The Clinch Token Transfer Test (C3T test) was designed and produced by Susanne Clinch and Professor Busse as part of Susanne's PhD studentship to monitor a patient's mobility and cognition in complex dual-tasking scenarios.

Initially created for HD, BRAIN is currently involved in the re-design of the test to enable the expansion of this project application to other neuro-diseases. In addition, we successfully secured funding from the MRC to test the C3T in people with epilepsy and Parkinson's disease.

Core Infrastructure

Biobanking

BRAIN's comprehensive and quickly growing database of patient samples and statistics educates our research and serves as a valuable resource for our collaborators.

Work package aim: To collect biological samples from patients with neurological conditions.

The availability of genetic material, brain, cerebrospinal fluid (CSF), serum and lymphocytes in conjunction with high quality clinical data has been pivotal in supporting the internationally leading translational research programmes in these conditions across Swansea and Cardiff.

Key investigators: Professor Robertson, Professor Rees, Dr Loveless (BRAIN Biobank officer, Cardiff) Mr Lacey, Ms Francis and Ms Fonferko-Shadrach (BRAIN Biobank Officers, Swansea)

BRAIN is supporting the Welsh Neuroscience Research Tissue Bank (WNRTB; Cardiff University and the University Hospital Wales, Cardiff) and the transient loss of consciousness (TLOC) biobank (Swansea University).

Biobanking in figures



15,092
samples collected



Exceeded target (750 samples) by consenting **868** people into the biobanks



New gene discovery contributing to consortiums **6**



3,000+

aliquots dispatched for local and (inter)national MS & epilepsy studies



Plans to exceed **300** participants per year (WNRTB) and 200 for Swansea Neuroscience Biobank



37
sample requests



Also... Nursing support is now in place for Swansea sample collection, enabling BRAIN to increase the biobank's efficiency.

Set-up all processes ready to start collecting brain tissue for the Wales Neuroscience Research Tissue Bank.



Welsh Neuroscience Research **Tissue Bank**

Core Infrastructure

Cardiff GMP Facility

Co-funded by BRAIN, Cardiff University and the Medical Research Council, the Good Manufacturing Practice (GMP) laboratory is a dedicated clean environment based at Cardiff University.

Work package aim: Provide a Human Tissue Authority licensed facility to prepare and deliver cell therapies for human use in clinical trials for neurodegenerative diseases.

Key investigators: Professor Rosser, Professor Dunnett and Professor Li

Year 2 Key highlights:

- The facility successfully passed a Human Tissue Authority inspection in November 2016.
- Funding continues to cover everything from the daily running costs of the clean room to maintaining the licenses required to continue to undertake the Unit's pioneering work.
- Undertaken validation work for preparation of cells ready for cell delivery in HD.
- Having secured funding from the Life Sciences Bridging Fund, BRAIN will be the first in Wales to transplant cells into three people with HD in Cardiff by March 2018 using GMP's fetal tissue and assisted by Renishaw's Neuromate Robot at UHW.

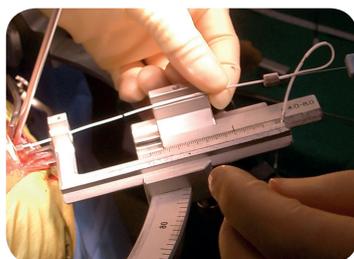


Figure 5: Renishaw's Neuromate Robot

Future research

Studies are already underway to assess the safety and efficacy of freezing cells prior to transplantation and examining the potential to amplify primary cells prior to transplantation.



Core Infrastructure

Neuroscience Research Unit



GIG
CYMRU
NHS
WALES

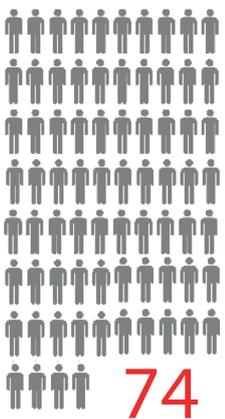
Bwrdd Iechyd Prifysgol
Caerdydd a'r Fro
Cardiff and Vale
University Health Board

Providing safe, high-quality facilities for commercial and non-commercial clinical trials in collaboration with Cardiff and Vale University Health Board. The Neuroscience Research Unit (NRU) is a 4-bed clinical research facility available for hire to run both commercial and non-commercial clinical trials.

Work package aim: To establish a fully functional clinical research facility at the University Hospital Wales.

NRU Staff: Dr Hamandi (NRU Director), Belinda Gunning (BRAIN Research Nurse Manager), and Research Nurses Joanne Bagshawe and Andy Davison

Year 2 Key highlights:



74
Participants recruited



4-bed

unit on C4 Neurology
established



14

clinical trials



NRU access

for sample collections
supports biobanking

Nurse profiles



*Research Nurse
Manager,
Belinda Gunning*

Belinda is based at University Hospital Wales and played an instrumental role in setting up the NRU.

*Research Nurse,
Joanne Bagshawe*

Joanne assists with the setting up, management and running of clinical trials.



*Research Nurse,
Andy Davison*

Andy also assists with the delivery of clinical trials, often providing direct support to patients involved with the IONIS trial.



Key Achievements:

In collaboration with Cardiff and Vale University Health Board, BRAIN funds the Research Nurse Manager post for three years and an additional research nurse post (Joanne appointed in January 2016 and beginning work in April 2017).

Having demonstrated the value and increasing demand for use of the NRU, Cardiff and Vale Neurosciences Directorate agreed to fund an additional nurse (Andy) appointed in year 3.

This development will enable BRAIN to build a stronger foundation of core infrastructure for future years and enhance direct patient support.

Core Infrastructure

Neuroscience Research Unit



GIG
CYMRU
NHS
WALES

Bwrdd Iechyd Prifysgol
Caerdydd a'r Fro
Cardiff and Vale
University Health Board

Key Achievements - IONIS clinical trial

A significant milestone for the BRAIN Unit has been the selection of the NRU for the first ever commercial trial using a 'gene silencing drug' in people with Huntington's disease, which commenced in March 2017.

Huntingtons disease study

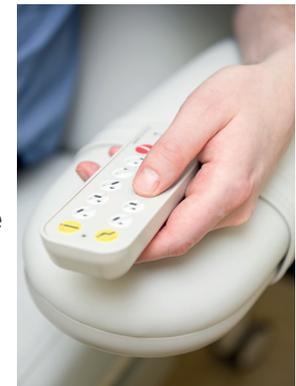
Led by University College London, this novel trial of an innovative drug, developed by Ionis Pharmaceuticals (based in the USA) aims to reduce production of a toxic protein that causes the devastating brain disease, Huntington's disease.

Having identified the NRU as an appropriate and well-equipped centre to expand the recruitment to this the trial, IONIS Pharmaceuticals company launched this landmark project in Wales in March 2017.

The pioneering HD clinical trial features an intrathecal delivery of a huntingtin-lowering drug – sometimes called a 'gene silencing drug' – which prevents the production of huntingtin protein in the hope of slowing down the progression of symptoms in HD.

Overcoming challenges

The trial's intensive nature requires the NRU to ensure sufficient night provisions and staffing are in place to cover the project's 12-hour shifts.



Led by Professor Anne Rosser and the Cardiff University's Huntington's Disease Research Nurse Rebecca Cousins, our new three-strong nurse team will be instrumental in creating the conditions and care services necessary to deliver the procedures in a safe manner without compromising on yielding accurate results.

Below (L-R): Rebecca Cousins, Professor Gray, Andy Davison and Joanne Bagshawe

"Our growing nurse team is empowering us to deliver a more personal service which is valued by patients."



- Rebecca Cousins,
Huntington's
Disease
Research
Nurse



Core Infrastructure

Public Involvement

BRAIN Involve is a public involvement group that brings together patients, carers and academics to shape our cutting-edge research into neurological and neurodegenerative diseases.

BRAIN *involve*

At the heart of all our research activities are the needs and priorities of the people we serve and are always working to help.

The BRAIN Involve group is made up of people who are, or have been, directly affected by neurological diseases such as epilepsy, HD, MS or PD. Through members bringing their personal experiences to the research table, they contribute enormously to BRAIN's wider work by helping to inform and develop research ideas.

How to get involved

- Become a member or for more information, please email: brainunit@cardiff.ac.uk.

Supporting the public

Members are offered training and support via the Health and Care Research Wales Involving People Network.

We work closely with other organisations to encourage and support members who wish to get involved with public engagement events (e.g. travel costs), attending research events or providing feedback on grants.

In September 2016, BRAIN hosted a Parkinson's UK training event at Cardiff University which involved 10-15 members of the public affected by PD attending a lunchtime meet-and-greet with researchers followed by a Public Involvement workshop.

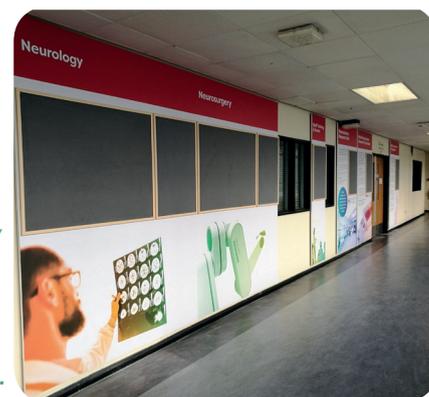
Key Achievements:



Supporting the researcher

The vast majority of requests for use of the panel arise from our research activities aimed at recruitment to clinical studies involving human participants. Feedback from training events (e.g. WNA's 'The Good, the Bad and the Ugly of Co-production') resulted in us running a focus group with nine Unit members. We are currently analysing this data with plans to publish the outcomes in a high-impact journal.

BRAIN's newly designed corridor at UHW linking to the NRU highlights research activities and opportunities (such as our epilepsy study day) available for researchers, clinicians and the public to get involved.



Core Infrastructure

Public Engagement

Below: BRAIN Unit Manager Laura Bunting delivering the Splodge activity at Scouts Night (November 2016)



Peter's story

BRAIN Involve member Peter Roberts recently put his personal understanding of epilepsy to good use by delivering talks at CUBRIC and putting 'A Spotlight on Epilepsy' for postgraduates to stress the importance of research into neuro-conditions.

"My original motivation for getting involved with BRAIN Involve was actually my mother having Parkinson's disease," Peter explained.

"The last three years of her life were hell. This is one of the many reasons why the BRAIN Unit's research is so vitally important. If there is anything at all I can do to support or progress BRAIN's treatments in PD or epilepsy – I will do so!"



Splodge on the Brain! (October 2016 - ongoing)

One of our most successful engagement activities has been involving the public in making artwork to display at UHW. People were asked to 'splodge' colour on a part of the brain, which led to the BRAIN Unit winning 'best interactive stand' award at the Health and Care Research Wales conference.

Engaging with young people (November 2016)

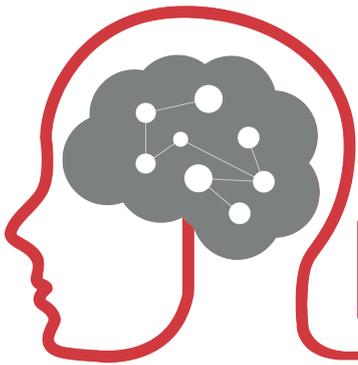
BRAIN featured interactive stands at educational events such as the ESRC Schools Week and Scouts Nights to inspire a love of neuroscience in young people. Workshops, including a surgical and scanning task at Cardiff University's Brain Games festival (March 2016), were attended by over 3,000 children.

BRAIN Connections (December 2016)

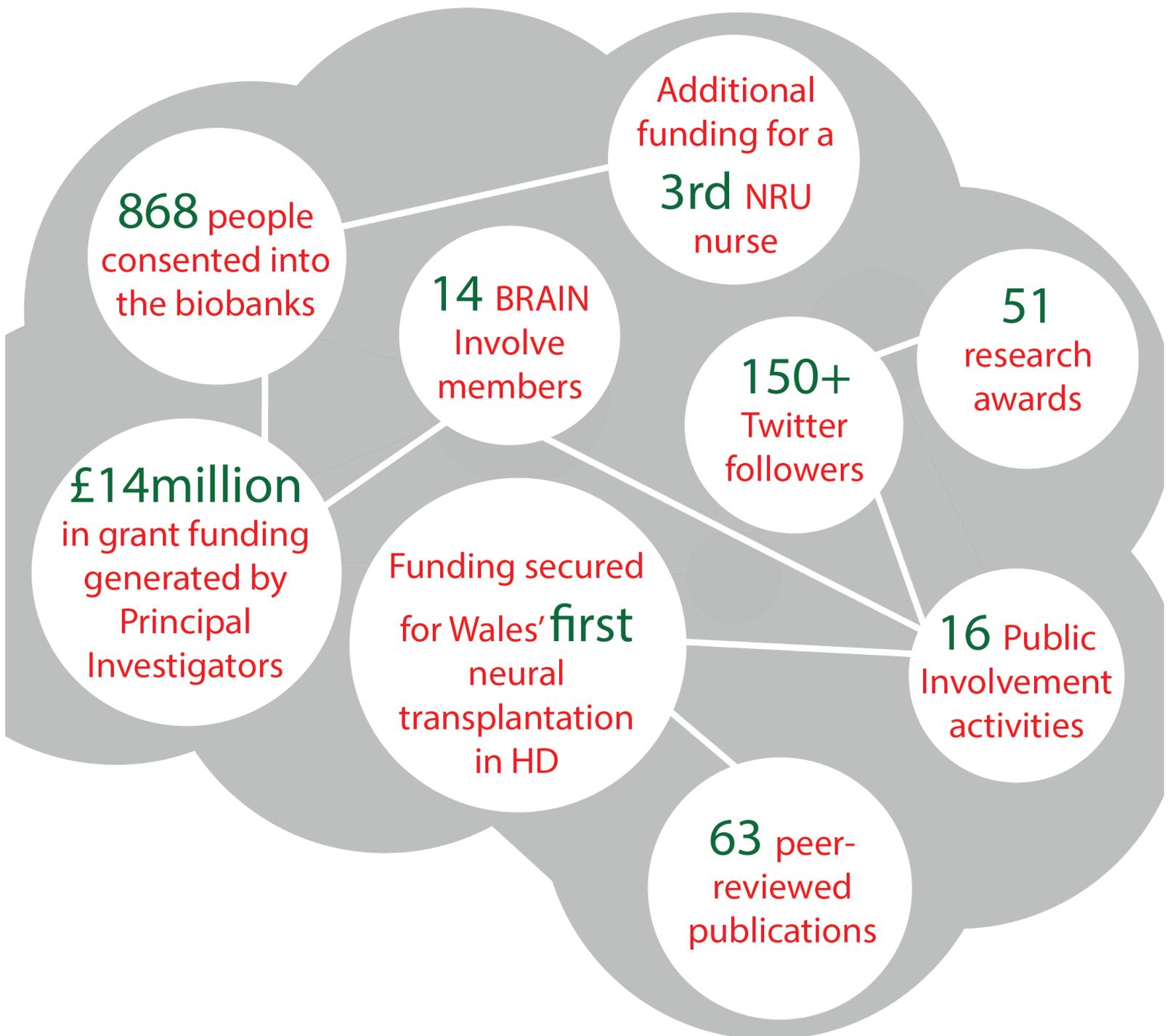


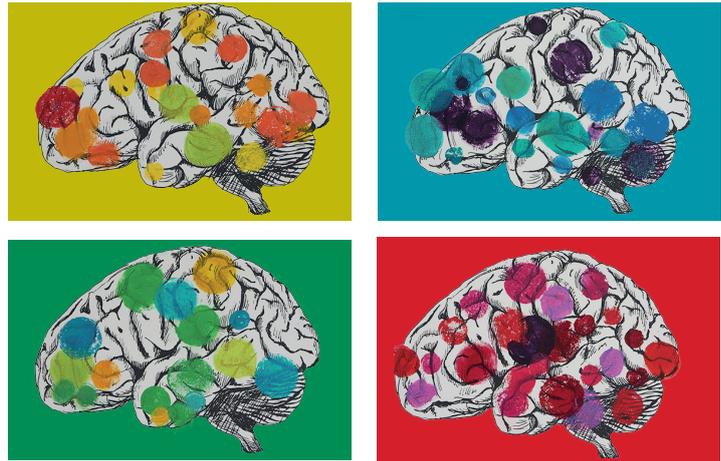
More than 50 people attended the launch of the event series, which brings together clinicians, academics and BRAIN Involve members to discuss and explore research opportunities for mutual benefit of anyone interested in the Unit's work. Sessions are gaining in popularity at UHW.





Key Achievements





Conclusions

In the two years since the BRAIN Unit's inception, we have seen a significant development in BRAIN Involve members, nurse staffing, novel therapeutics and core infrastructure that have led to pioneering stem cell transplants in epilepsy with promise of similarly landmark treatments in HD before March 2018.

BRAIN's collaboration with Renishaw to use their robot in performing StereoEEG epilepsy neurosurgery has resulted in assessments and deep brain biopsies that would otherwise not have been possible. So far, two SEEG patients have been operated on successfully in Cardiff.

We hope that now having secured this high-technology piece of equipment, further patients will be able to benefit from its use within clinical practice.

A tangible impact in Year 2 has been the establishment of a dedicated neurosciences Clinical Research Facility at UHW allowing high-end and invasive Phase 1 and 2 trials in neuroscience.

In our MS Clinics, the deployment of an electronic patient record has resulted in services becoming less reliant on paper records and permitted a more responsive service. Meanwhile, BRAIN's work in the PD clinic has shown that it is possible to combine clinician-derived data with quality of life and disease-specific outcome measures using smart devices - even in groups of patients who are not familiar with such technology.

We are delighted rehabilitation research in HD has resulted in international guidelines for exercise in HD, and the rollout of rehabilitation interventions are being explored through the PACES grant.

A key focus going forward into our third year will be to ensure the careful planning we put in place in Year 2 is implemented in the most cost-effective and efficient manner while keeping patients always at the heart of our work.





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