



 **BRAIN**  
Repair & Intracranial Neurotherapeutics

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

 Ariennir gan  
**Lywodraeth Cymru**  
Funded by  
**Welsh Government**

**2021 - 2022**  
**Annual report**



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# Foreword

I am pleased to present our 2021-22 annual report, reflecting on the achievements of the BRAIN Unit despite ongoing interruptions due to the COVID-19 pandemic.

I am delighted to have welcomed new members to our team:

- Robert Spencer, a Clinical Research Fellow in Neuro-Oncology started on August 2021 and Ben Dummer, a Research Assistant in Neuro-Oncology started in September 2021, both supporting our ongoing collaborations with the Wales Cancer Research Centre.
- Lauren Griffiths, a Research Technician in the Swansea Neuroscience Research Group started in October 2021.
- Valerie Anderson, a Research Associate supporting an epilepsy clinical database and sample collections set up, who joined us in March 2022.

I am very proud of the team's significant successes in securing fellowship awards over the past 12 months (see page 9). These successes, along with several collaborative grants are contributing to building our reputation, bringing us closer to being a recognised centre of excellence and for every £1 invested in the BRAIN Unit, we have attracted a further £10 to Wales.

Our Advanced Therapies work continues to gain momentum and we were delighted to receive Research Wales Infrastructure Funding via Cardiff University, to work with key stakeholders and industry partners to hold focus group meetings to progress towards having a dedicated neurosurgical facility for the delivery of advanced therapies to the brain (see page 16).

I would like to thank all of the BRAIN Unit members, staff and administrative team for their commitment to the work of the BRAIN Unit and hope that you enjoy reading this report.



**Professor William Gray**  
BRAIN Unit Director



# The Team

## Director

Professor William Gray

## Deputy Director

Professor Anne Rosser

## Work Package Leads

Professor Neil Robertson

Professor Owain Howell

Professor Khalid Hamandi

Dr Emma Lane

Dr Cheney Drew

Peter Roberts

## Neuroscience Research Unit\*

Belinda Gunning

Dr Abuzeer Hanif

Dr Mohamed Mustafa

Dr Zin Min Htet

Cynthia Butcher

Alison Johnson

Rajimol Sibichen

Megan Voisey

Dympna McAleer

Ffion Davies

## Clinical Research Fellows

Dr Feras Sharouf

Dr Robert Spencer

Dr Ying Zhu\*

Dr Dmitri Sastin\*

## Laboratory Team

Dr Samantha Loveless\*

Dr Anne-Marie McGorrian\*

Dr Ben Dummer\*

Dr Chloe Ormonde

Dr Valerie Anderson

Dr Lauren Griffiths

Russell Khan\*

## Administration

Jo Baker

Clare Anderson

Victoria Saunders\*

Catrin Hopkins\*

Becs Parker\*

\*These posts receive funding from other sources

# Introduction

Funded by Welsh Government via the Health and Care Research Wales infrastructure, the Brain Repair and Intracranial Neurotherapeutics (BRAIN) is a research unit developing novel therapeutics and treatment delivery systems for neurological conditions.

BRAIN operates under the directorship of Professor William Gray with 24 principal investigators and collaborators, with a total grant income of over £47m since its inception in 2015.

BRAIN is a multi-disciplinary research unit with strong academic and NHS clinical leadership. Based in Cardiff, the Unit's all-Wales brief also involves groups of research excellence in Swansea University and Health Boards across South Wales.

The Wales Neurological Alliance (WNA) is a forum of not-for-profit organisations representing people affected by neurological conditions in Wales.

The WNA sit on both the BRAIN and BRAIN Involve executive boards, and continues to support BRAIN Unit activities with its far-reaching membership and input.



Wales Neurological Alliance

## Our Mission

It is our vision that the Brain Repair and Intracranial Neurotherapeutics (BRAIN) unit will be a Welsh and UK national centre of excellence, and on a path towards international leadership for:

- Delivering novel cell/gene/small molecules and other pioneering complex therapies to the human brain.
- Supporting translational research, underpinning disease modification and brain repair in patients with neurological conditions.

## Our Aims

- To develop new and refine existing systems for therapeutics delivery into the human brain.
- Develop appropriate infrastructure for:
  - Advance adult and fetal brain tissue resources, supporting translational research and therapy validation across neurological diseases
  - Bio-banking and bio-resource management using linked and deeply phenotyped clinical data.
- Consolidate and extend appropriate clinical trials and expertise, including refinement of appropriate methodologies for evaluating novel complex interventions.
- Embed into all BRAIN work, cross-cutting excellence in the relation to:
  - Public and Patient Involvement and Engagement
  - Industry and NHS Engagement and Collaboration.

# Work Packages and Cross Cutting Themes

## Cross Cutting Theme: NHS, Commercial and Industry Engagement



### Research Programmes

WP1	WP2	WP3	WP4	WP5
Intracranial Delivery	Providing human adult neural tissue to model disease + validate novel therapies	Welsh Neuroscience Research Tissue Bank (WNRTB) + Swansea Neurology Biobank (SNB)	Neurosciences Research Unit (NRU)	Patient and Public Involvement + Engagement



## Cross Cutting Theme: WP5 PPI and Engagement

## Glossary

- **Intracranial-** Within the skull.
- **Neurotherapeutics-** The treatment of disorders that affect the nervous system.
- **In vitro-** (Latin for “in the glass”) studies performed with micro-organisms, cells, or biological molecules outside their normal biological context.
- **Stem Cell-** Cells of the body (somatic cells) that can divide and become differentiated. When an organism grows, stem cells specialize, and take specific functions. For instance, mature tissues like skin, muscle, blood, bone, liver, nerves, all have different types of cells.
- **Advanced therapy medicinal products (ATMPs)-** are medicines for human use that are based on genes, tissues, or cells. They offer ground-breaking new opportunities for the treatment of disease and injury.
- **Striatum-** The striatum or corpus striatum (also called the neostriatum and the striate nucleus) is a nucleus (a cluster of neurons) in the subcortical basal ganglia of the forebrain. The striatum is a critical component of the motor (movement) and reward (pleasure) systems.
- **Hippocampus-** The hippocampus (Greek for “seahorse”) is a major component of the brain of humans and other vertebrates. Humans and other mammals have two hippocampi, one on each side of the brain. The hippocampus is part of the limbic system and plays important roles in the consolidation of information from short-term memory to long-term memory, and in spatial memory that enables navigation.
- **Cerebrospinal fluid (CSF)-** is a clear, colourless body fluid found in the brain and spinal cord.
- **Peripheral blood mononuclear cell (PBMC)-** is any peripheral blood cell having a round nucleus. These cells consist of lymphocytes (T cells, B cells, NK cells) and monocytes.
- **Neurogenesis-** is the process by which nervous system cells, the neurons, are produced by neural stem cells (NSC).
- **AMPAKine molecules-** A subgroup of AMPA receptor modulators currently being investigated as potential treatments for a range of conditions involving neurological and psychiatric disorders.

# Core Metrics

Reporting period: 2021/2022

**Health and Care  
Research Wales  
infrastructure award  
to the group**



Direct  
funding  
awarded  
**£210k**

Jobs created  
through direct  
funding



## Grants won during reporting period

Grants won	Led by group	Group collaborating
Number	<b>11</b>	<b>5</b>
Value	<b>£1.25m</b>	<b>£1.75m</b>
Funding to Wales	<b>£1.23m</b>	<b>£1.07m</b>
Funding to group	<b>£453k</b>	<b>£88k</b>
Additional jobs created for Wales	<b>9</b>	<b>6</b>
Additional jobs created for group	<b>6</b>	<b>0</b>



Number of publications



Number of public  
engagement events



Number of public  
involvement opportunities

# Intracranial Delivery

**Work package aim:** We are on the cusp of a new era of potential disease-modifying therapies for neurodegeneration, with many of the most promising requiring direct delivery into the central nervous system. Despite this, there are no optimised devices or protocols for delivering therapies directly to the human brain.

**Our objectives are to:**

1. Address this unmet need relating to delivery devices and expertise.
2. Establish Cardiff as a major international centre for delivering advanced therapies to the human brain.

**Work package leads:** *Professor William Gray and Professor Anne Rosser*

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In our last report, we announced that we were selected as one of five sites worldwide for the delivery of the UniQure Phase I/II gene therapy trial focusing on knocking down Huntington protein production within neurons in Huntington's Disease.

As well as being a cutting-edge Gene Therapy, its delivery is minimally invasive, with the complete operative procedure taking place within an MRI scanner so that the delivery targeting can be monitored and performed safely in real-time.

Delays related to COVID and other external factors delayed the start of this trial however, we are delighted to confirm that recruitment commenced in 2021/22. We have two participants through screening for ATMP gene delivery on the 12 and 14 June and two more procedures booked for July to complete the European arm of the trial (Cardiff 4 and Warsaw 4).

This gene therapy is potentially curative or significantly slowing disease progression in this fatal neurodegenerative disease.

As part of the work-up for this trial, we performed the first neurosurgical operation

in a diagnostic MRI scanner in the UK (deep tumour biopsy) in May 2022 using the Clearpoint stereotactic system.

This trial will allow people in Wales access to innovative Advanced Medicinal Therapeutic Medicinal Products (ATMPs), a core objective of Health & Care Research Wales and of our BRAIN Unit. Given the advanced nature of the neurosurgical techniques involved, this trial will be delivered via our Neurosciences Research Unit (NRU) at University Hospital Wales but will be open to participants across Wales and the UK.

Two of the four in the UK cohort are participants referred from University College London (UCL) as we are the only site in the UK with the MRI stereotaxis system.

We have received an extension for the ongoing TRIDENT trial to combat delays associated with COVID-19. This year we have had two planned transplants cancelled due to inadequate tissue quality and ongoing infection in the donor cells resulting in a lack of safe, transplantable material. The extension is until 31 December 2022



# Providing human adult neural tissue to model disease and validate novel therapies

**Work package aim:** To support and expand a previously funded unique human adult (hA) tissue facility to perform 2D & 3D culturing of primary brain tissue (Gray, Zaben), for disease modelling and extend this to developing 3D cultures to support brain tumour research.

**Work package lead:** *Professor William Gray*

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Work within our human tissue research lab is continuing to recover from the impact of the COVID-19 pandemic and recruitment of patients and harvesting of tissue post-Covid has started up again with tumour surgery patients. The epilepsy surgery evaluation programme restarted in November 2021 and the expansion to collecting tissue from patients undergoing epilepsy surgery due to commence in May 2022.

## This past year has been successful for collaborative grants using human and adult neural tissue including:

- **Professor Derek Jones' (PI) and Professor Gray's (Co-PI) MRC grant application "Making the Invisible Visible: a Multi-Scale Imaging Approach to Detect and Characterise Cortical Pathology" for £1.6M** which will use state of the art MRI, AI modelling and advanced microscopy to develop new MRI sequences to identify currently invisible cortical pathology, initially in epilepsy but extendable to many neurological diseases.
- **"Optimization of Cas9 for in vivo delivery and gene editing" grant was awarded to Professor Vincent Dion, Cardiff Dementia Research Unit for £200,000**, with Professor Gray as a collaborator. The BRAIN Unit will be supporting this grant to utilise human brain tissue cultures to examine the feasibility of novel genetic treatments for Huntington's Diseases and potentially other CAG repeat disorders.
- **The DRI cross centre iPSC microglia grant, "A framework for the use human iPSC-derived microglial cultures in translational platforms" was awarded to Professor Philip Taylor for £219,875 with Professor Gray as a collaborator.** The BRAIN Unit will be supporting this grant by providing fresh human tissue samples to characterise adult human microglia and validate iPSC derived microglia.

There have been some significant successes in fellowship awards in 2021/22, with Dr Ronak Ved receiving the Medical Research Council (MRC) Clinical Research Training Fellowship in the field of traumatic brain injury, utilising primary human brain tissue models developed in Cardiff.

Dr Malik Zaben has also been successful in securing a prestigious Guarantors of Brain fellowship to explore potential therapeutic approaches targeting neuroinflammatory pathways to limit brain damage after injury, and enhance repair.

We continue to work with the Wales Cancer Research Centre to produce primary living tissue and live tissue cultures for brain tumour research.

This work is closely allied to their priority research themes of Precision and mechanistic oncology and Immuno-oncology.



# Biobanking

**Work package aim:** To develop and expand our comprehensive bio-resources of clinical and biological data to facilitate translational, and clinical research across a wide range of neurological diseases, allowing efficient participant engagement and recruitment to study-ready cohorts.

**Work package lead:** *Professor Neil Robertson (Welsh Neuroscience Research Tissue Bank - WNRTB) & Professor Owain Howell (Swansea Neurology Biobank - SNB)*

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## Cardiff

During this reporting period, there have been 22 new recruits to the WNRTB and face-to-face outpatient clinics currently remain limited.

Epilepsy research remains remote only and there has been no access to healthy volunteers or non-inflammatory controls. The Neurosurgery cases remain our only direct WNRTB recruits.

Our other activity including applications for samples and recruitment to projects continues to recover. During this period nine new sample requisitions and 477 sample aliquots have been distributed to research.

The Multiple Sclerosis (MS) research project, SNOWDONIA, and the biobanking arms of the MS Clinical Trials (DELIVER and DECISIVE) continue to recruit with Cardiff acting as the central repository, all of which will enable samples to be transferred to the WNRTB at the end of each study, providing the participant consents to do so. COVID-19 disruption at external sites is now easing.

The COVID19 - DREAM dry blood spot (DBS)

study continues to be very successful with over 1700 dry blood spots collected to date.

The remaining DBS samples can be transferred to the WNRTB once the study is finished, providing the participant has agreed. Analysis from this study has led to one paper: [COVID-19 Vaccine Response in People with Multiple Sclerosis](#) and another is currently under review.

An application to the Cardiff University Research Infrastructure Fund to purchase a SiMOA platform and set up costs was successful. The equipment, installation, and training have taken place and the equipment is now in use. This is a cutting-edge laboratory equipment for use by numerous different research groups, to generate high quality, clinically relevant data on tissue biomarkers.

The Neurofilament light (NF-light) assays used in the SiMOA platform (to determine the level of NF-light in serum, plasma and CSF), are being carried out on biobanked MS and control samples, with data to be added to a biomarkers paper currently in progress, funded by the MRC.

### Examples of sample types collected

3207 total samples were collected for research projects by the WNRTB by the end of March 2022.



## Swansea

Without dedicated support for Biobanking, collections to the Swansea Neurology Biobank have been limited.

Nevertheless, the SNB research approval committee has approved new sample use for 2022, including a study aimed at improving diagnosis rates for patients with severe neurological disease through reanalysis of genomic data and piloting new testing techniques.

The SNB also continues to make significant contributions to ongoing studies of global reach.

For example, we have supplied approximately 400 patient DNA samples to two of the biggest global collaborations on epilepsy genetics research (epi4K and epi25k). Landmark publications continue to be generated from these collaborations, with 5 in the last year (2021-2022).

An important arm of SNB activities includes the novel use of public health records, which can be linked to biological data sets. In work partly funded by BRAIN (by employing a data analyst for six months), Dr Owen Pickrell and his team have developed new resources to link public health and clinical records to biobanked samples.

Dr Pickrell's work has been recognised by Health and Care Research Wales, which awarded funding to study the impact of COVID-19 on health equality and mortality in people with epilepsy in Wales.

Data analysis time, partly funded by BRAIN, has also helped with collaborative projects with Edinburgh investigating Rolandic epilepsy (funded by the Waterloo Foundation).

Two exciting new applications, using novel data analysis tools pioneered at Swansea including machine learning and natural language processing, designed to increase our understanding of epilepsy and develop world-leading epilepsy research resources, have recently been submitted to Epilepsy Research UK and the Rosetree's Trust.



## Biomarker discovery

BRAIN funding has supported biomarker discovery projects and new collaborative studies looking at the biological mechanisms underlying diseases such as Alzheimer's, Huntington's and multiple sclerosis.

Over the last year, BRAIN has helped support collaborations with Sorbonne Université (France) in the development of novel treatments for Huntington's disease, and with Duke University (USA) in investigating the role of cholesterol metabolism in the development of Alzheimer's disease.

We are using our mass spectrometry imaging technology to pinpoint specific areas of the brain where cholesterol metabolism is dysregulated.

Funding will also assist our collaborative work with Cardiff University investigating disordered cholesterol metabolism in schizophrenia and an ongoing study investigating the mechanisms of neurodegeneration multiple sclerosis (with Imperial College London and the UK MS Society Brain Tissue Bank).

These and other ongoing projects based at the Institute of Life Sciences, Swansea, have been presented at national and international conferences and form part of over £750,000 worth of funding requests submitted over the last 6 months, including a new two-year project supported by the Michael J. Fox Foundation to investigate central and systemic biomarkers of Parkinson's disease.

## Total samples collected

Sample collection continues to be impacted by the pandemic.

### Cardiff

As of March 2022, 493 samples have been issued for research and in total 814 participants have been recruited to WNRTB.

### Swansea

Collections to the SNB have been limited but new sample use has been approved and approximately 400 patient DNA samples have been supplied to two of the biggest global collaborations on epilepsy genetics research.



# Neurosciences Research Unit (NRU)

**Work package aim:** To achieve and consolidate financial sustainability through a combination of All Wales Research Delivery Funding, commercial trials, and research income.

**Work package lead:** Professor Khalid Hamandi

The Neurosciences Research Unit (NRU), based in Cardiff and Vale UHB, is led by Professor Khalid Hamandi (consultant neurologist) and Belinda Gunning (Nurse manager). Three additional studies to those listed below are due to open imminently with another four currently in the set-up process.

## Motor Neurone Disease studies



**Principal Investigator:** Dr Ken Dawson  
**Sponsors:** University of Edinburgh

*Motor Neurone Disease Smart: Motor Neurone Disease Systematic Multi-arm adaptive randomised trial*

- Opened in January 2022
- The first MND multi-arm adaptative randomised study in Wales, in a disease area with great clinical need and expanding therapeutic trials.

12

participants randomised so far and further **seven** booked in for screening

## Huntington's Disease studies



**Principal Investigator:** Professor Liam Gray  
**Sponsors:** uniQure biopharma B.V

*HD GeneTRX2: A Phase Ib/II Study to Explore Safety, Tolerability, and Efficacy Signals of Multiple Ascending Doses of Striataly-Administered rAAV5-miHTT Total Huntingtin Gene (HTT) Lowering Therapy (AMT-130) in Early Manifest Huntington Disease.*

3

patients in screening and **first surgery** planned for June 2022

## Multiple Sclerosis studies



**Principal Investigator:** Dr Emma Tallantyre  
**Sponsors:** Queen Mary University of London

*ChariotMS – A national (UK), multi-centre, randomised, double-blind, placebo-controlled (1:1) phase IIb efficacy trial with cost-utility analysis of cladribine tablets (3.5mg/kg over two years) in people with advanced multiple sclerosis (EDSS 6.5-8.5). Is cladribine superior to placebo in protecting upper limb function?*

4

patients screened since screening began in March 2022

# Patient and Public Involvement and Engagement (PPI)

**Work package aim:** To continue our work on PPI and engagement with patients, the public, the third sector, NHS and Industry.

**Work package lead:** *Dr Emma Lane, Dr Cheney Drew and Mr Peter Roberts*

Despite the continuous impact of the COVID-19 pandemic, we have been able to make a gradual transition to host limited face-to-face activities to engage the public.

Whilst not quite back to previous years, this transition period has given us time to reflect on our best approaches moving forward. One of our most significant successes was a public event at the Network for European CNS Transplantation and Restoration 'Parkinson's and Huntington's Clinical Trials - the Participant Experience' supported by Cure Parkinson's Trust.

We have supported online and in-person events with Parkinson's UK and other charity partners, alongside collaborations with associated research groups from the Cardiff University Dementia Research Institute to support their delivery of a small face-to-face engagement event for World Parkinson's Day. A joint event next year is planned for the same period.

The online regular meetings of BRAIN Involve have continued to be well attended, enabling us to have more inclusive opportunities in terms of accessibility and flexibility of our activities/events.

In response to feedback from the group, in addition to the built-in networking time, annual in-person events will enable our community to become better acquainted.

The meetings have provided the opportunity to update community members on projects across the BRAIN Unit, facilitate more public contributions, and support our contributors to build their knowledge of our activities, enabling them to feel confident working with us.

## Examples



### Public events

The Network for European CNS Transplantation and Restoration 'Parkinson's and Huntington's Clinical Trials - the Participant Experience', supported by Cure Parkinson's Trust, was hosted by **Emma Lane** this year. The hybrid event had two scientific speakers and four public contributors covering issues on cell and gene therapy from the perspective of the scientist, trial manager (**Cheney Drew**), carer, participant and prospective participant.



### BRAIN Involve

**Sophie Rowlands** and **Sam Loveless** joined a BRAIN Involve meeting to discuss the Wales Neuroscience Tissue Research Bank and South Wales Initiative for Fetal Transplantation/Cardiff Fetal Tissue Bank. This has supported discussions with BRAIN Involve around the proposed national network for use of Human Tissues for neurological research.



### PPI resources

Two of our PPI contributors were interviewed by **Emma Lane** and **Cheney Drew** to create a resource about their public involvement experiences. It has already been used in various events to promote both the benefits and good practice of PPI in clinical trials. This resource, along with others created this year, will soon be available on our website.

# Meet the Researcher



## Lauren Griffiths

Research Technician at Swansea University

**Our recent research has centred around cholesterol, its function in the brain and understanding its role in neurodegenerative diseases.**

Cholesterol is an essential molecule in the body, and especially in the brain, where it is the most common lipid and is essential for cell membranes, including the myelin sheath (the fatty substance that allows nerve signals to move quickly).

The synthesis and metabolism of cholesterol are regulated by enzymatic reactions, but what happens when this process goes wrong and how does it impact brain function?

## The research

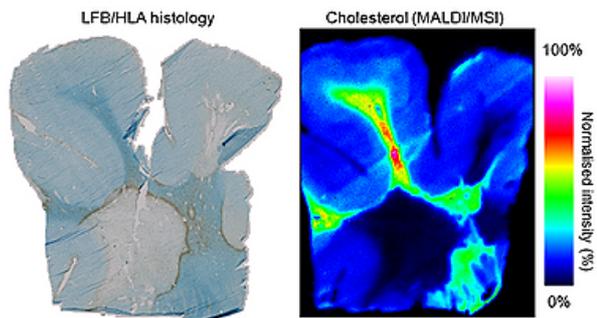
That was the question I wanted to answer when beginning my PhD almost four years ago, where, as part of the team that developed a novel imaging technique that, paired with mass spectrometry, allows us to accurately map and measure cholesterol across intact brain tissue sections.

This method of mapping and measuring cholesterol in the brain was the first of its kind and has come at a really important time where interest has turned to how cholesterol, and its derivatives, play important roles in neurodegenerative diseases like Alzheimer's, Parkinson's, and Huntington's.

We have recently applied our method of imaging cholesterol to human multiple sclerosis (MS) tissue and collaborated with the Brain Repair Group in Cardiff University (Prof Anne Rosser and Dr Mariah Lelos) to analyse cholesterol in the brain of Huntington's disease (HD).

These new experiments, partly funded by BRAIN, show that cholesterol metabolism is affected in the damaged as well as normal-appearing areas of the MS brain and revealed decreased cholesterol in the brain stems of HD mouse models.

These new findings are important, as there are drugs that can be used to alter cholesterol metabolism, which may prove to be a new avenue to treat these devastating diseases.



Visualising cholesterol in post-mortem human brain. (left) section of human brain revealing areas of grey and white matter. (Right) Cholesterol content resolved to 15µm<sup>2</sup> resolution. Cholesterol is reduced in areas of grey and white matter pathology.

## What next?

The next steps in our research journey with BRAIN are to analyse the cholesterol precursors and derivatives, the oxysterols, using another novel mass spectrometry technique. Oxysterols are important signals to protect neurons from dying and reduce brain inflammation.

One important oxysterol that we are now focussing on is 24S-hydroxycholesterol, which is linked to neuronal loss and when its synthesis is boosted can prevent neurodegeneration in animal models.

# Spotlight on Advanced Therapies



**Advanced Therapy Medicinal Product (ATMPs) offer significant promise for the long-term management and even cure of disease, especially in areas of high unmet medical need.**

Healthcare services are not currently configured to commission and provide these therapies as a mainstream treatment.

Translating the hope and potential of advanced therapeutics into reality can improve outcomes for the people of Wales.

## An Advanced Therapy Medicinal Product (ATMP) can be classified in the following way:

- **Gene therapy** - the transfer of genetic material into the cells of a patient's body to treat the cause or symptoms of a specific disease.
- **Cell therapy** - the transfer of intact, live cells into a patient to help lessen or cure a disease. The cells may originate from the patient or a donor.
- **Tissue-engineered product** - a regenerative medicine that replaces or regenerates human cells, tissues or organs to restore or establish normal function.

## Leading the way

Cardiff is rapidly becoming a leader in this field and ahead of the curve when it comes to the bespoke and unique combination of neurosurgical and trials expertise to deliver these therapies into the brain, for neurological conditions.

We have run a key first in Human trial in delivering ATMPs in Huntington's disease (HD) (Ionis/Roche) and are about to begin a First in Human trial of a gene therapy for HD with UniQure and another with AviadoBio for Fronto-Temporal Dementia, with further proposals in the pipeline.

The BRAIN Unit was awarded funding in 2021-22 from Advanced Therapies Wales. This funding will increase capability and capacity in the Advanced Therapies.

BRAIN was also awarded funds from the Research Wales Infrastructure Fund (via Cardiff University) to scope what infrastructure is needed to realise the ambition of becoming a Centre of Excellence in the delivery of Advanced Therapies to the brain.

## What's next?

We are delighted with the support from stakeholders such as the Welsh Government, Advanced Therapies Wales, Cardiff University, Cardiff and Vale University Health Board, and key industry partners to take this forward.

We are currently compiling a business case for a dedicated neurosurgical facility to support our ambition.

# Conclusion

Whilst the pandemic continues to impact on all our work, there have been significant strides forward in shaping the future of the BRAIN Unit's activities.

The next year will see us open several significant Advanced Therapies trials and planning the development of a dedicated facility to run these trials at maximum capacity.

We will also grasp the opportunities for exciting research in this area such as leading a research programme gathering data on patient experience of ATMPs across a range of neurological disorders, allowing the identification of factors which are fundamental to the success or failure of a novel therapy.

We also plan to set up a national network for supplying living brain tissue from neurosurgical operations in collaboration with the Society of British Neurological Surgeons, using the model we have set up in the BRAIN Unit.

We intend for this to be financially supported via an MRC Partnership Grant and this important national initiative will lead to further significant interactions within the UK neuroscience community.

We will also build on our unique human tissue facilities, supporting both academic and industry collaborative science, by providing direct supporting data for ATMP engagement in primary adult brain tissue as it significantly de-risks expensive pharmaceutical clinical trial investment.

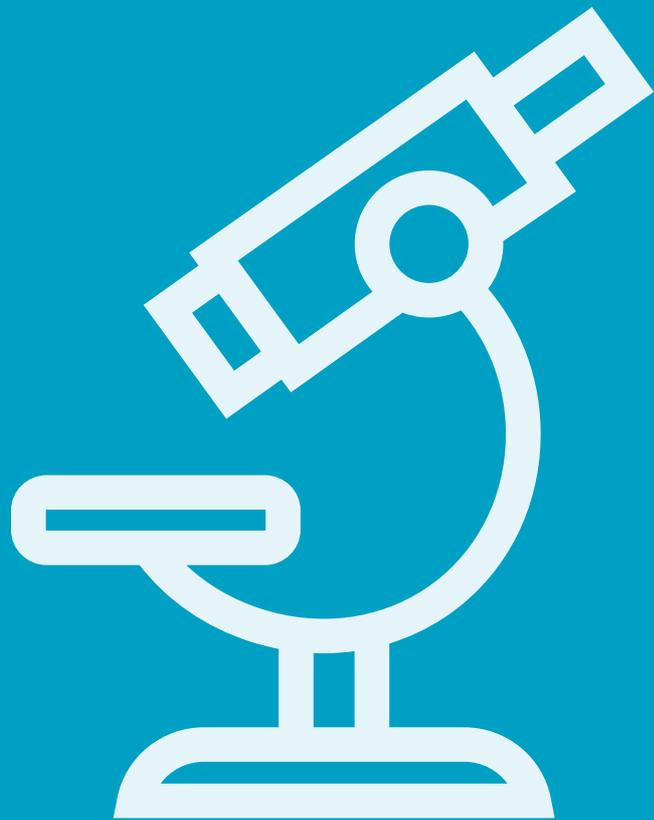


As the restrictions around the COVID-19 pandemic ease, we hope to be able to hold in person public engagement and involvement events this year and transition to a hybrid way of working with our research partners and disseminating our exciting research.

We continue to update our BRAIN Unit website, which is the best place to keep up to date on our activities as they happen.

We look forward to what promises to be a busy and exciting year ahead for the BRAIN Unit.

**Professor William Gray**  
BRAIN Unit Director





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