

brainWAVES



The Newsletter of the Brain Foundation

Winter 2021

This time last year I, along with the rest of the world, was struggling to come to grips with Covid and its impact upon the entire globe. The repercussions on the Brain Foundation were devastating as our donations and fundraising activities came to an abrupt halt. For the first time ever we were unable to award Research Grants to Australian researchers.

Although Covid is still very much with us and certain countries are in a dire position I am thrilled to report that the

Brain Foundation is in the privileged position to reactivate our Research Grants in 2021.

Sadly, no matter how much money the Brain Foundation raises each year it's never enough to fund all of the worthy and dedicated researchers who apply for our grants.

That's why we so appreciate every dollar that comes our way because there can be no research without the generosity of individuals, corporate sponsors and bequests.

"Thank you"... Just two words but they are most sincere from all of us at the Brain Foundation and its division, Migraine & Headache Australia.

A handwritten signature in blue ink, appearing to read "Trevor Thompson".

Trevor Thompson
CEO



OVER **\$9,000,000** HAS
BEEN GIFTED TO OVER **470**
RESEARCH PROJECTS
IN THE LAST **50 YEARS**

Celebrating over
50 YEARS
OF RESEARCH

• MAKING A DIFFERENCE SINCE 1970 •

\$5,000,000 IN **GRANTS**
GIVEN FROM 2010 TO 2019
WE CAN'T WAIT TO SEE WHAT THE
COMING DECADES HAVE IN STORE

Radio Daze during Brain Awareness Week



Brain Awareness Week (BAW) between March 15 and 21 saw our CEO, Trevor Thompson, inundated with requests for interviews from radio stations across the country.

"There were so many interviews during those 7 days it's all a bit of a daze now," jokes Trevor.

"ALL THOSE INTERVIEWS WERE A WONDERFUL OPPORTUNITY TO NOT ONLY EDUCATE PEOPLE ABOUT THE BRAIN FOUNDATION AND THE WORK WE DO, BUT ALSO ABOUT THE THINGS INDIVIDUALS NEED TO DO TO MAINTAIN AND ENCOURAGE A HEALTHY BRAIN.

Pardon the pun but it's really a no brainer - things like getting enough sleep, physical exercise, having a healthy diet, taking care of your general health and of course; stimulating your brain with new challenges and experiences." explains Trevor.

Trevor's golden tones could be heard on both city and regional stations

across Australia including Perth, Adelaide, Sydney, Newcastle, Grafton in northern NSW and Mount Gambier in South Australia.

The past 18 months have been some of the most challenging in the Brain Foundation's 50 year history with bushfires, Covid, floods, and new levels of unemployment impacting on our donations and fundraising activities.

As a result of Trevor's interviews our office has seen an increase in enquiries about the Brain Foundation. To everyone who has supported us over these difficult times, a very sincere 'thank you' from all of us at the Brain Foundation.



Contact the Brain Foundation

PO Box 579, Crows Nest NSW 1585

Telephone: 02 9437 5967 or 1300 886 660

Email: info@brainfoundation.org.au

Visit our websites brainfoundation.org.au and headacheaustralia.org.au



News

New compound discovered could reverse neuron damage in ALS

A research team at Northwestern University (USA) have identified a compound that reverses damage in diseased neurons in ALS (amyotrophic lateral sclerosis). ALS is a fatal neurodegenerative disease that causes paralysis, and it currently has no targeted drug or treatment.

The compound is called 'NU-9' and it was seen to restore energy and protein production when administered to upper motor neurons. These neurons control the initiation and modulation of movement, and they deteriorate very early in ALS. But within 60 days, degeneration had been halted so much that the NU-9 cells looked similar to healthy controls.

The researchers are hoping to start Phase 1 clinical trials after further safety testing.

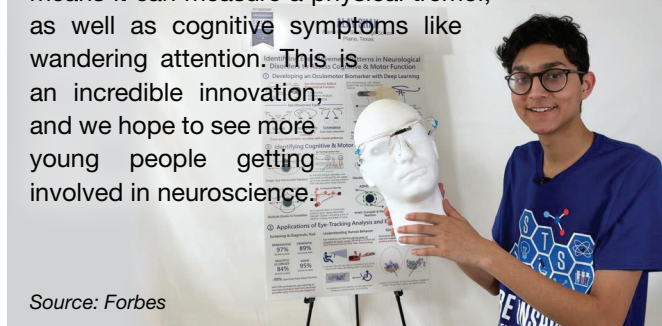


Source: Science Daily

High school student invents eye-tracking test to diagnose brain disorders

Alay Shah, a seventeen-year-old from Texas, has developed a headset that can recognise brain disorders including Parkinsons' disease, multiple sclerosis, ADHD, and dementia. Shah got the idea after seeing doctors perform quick eye tests to check for concussions at football games. He wanted to "democratise brain health care" and make diagnostic tests quicker, more affordable, and more accurate.

Shah learnt to build and code the device from scratch, then collaborated with a neurology clinic to conduct patient trials. His device tracks how the eye is moving and what the person is looking at. This means it can measure a physical tremor, as well as cognitive symptoms like wandering attention. This is an incredible innovation, and we hope to see more young people getting involved in neuroscience.



Source: Forbes

Research predicts 1 million Australians may have dementia by 2056

Dementia is the leading cause of disability for Australians over 56, with an estimated 472,000 cases currently. That number is now expected to double in the next 35 years. But despite the increasing prevalence, awareness about dementia prevention strategies is scarce.

This public health challenge will require a 'whole-of-community' approach, but researchers are emphasising the role of general practitioners. The primary preventive measures are maintaining normal blood pressure & cholesterol, staying physically and socially active, avoiding smoking, and not drinking to excess. GPs are able to assess many of these factors regularly, and can talk to patients about reducing risk factors after middle age. These recommendations will hopefully reduce the impact of this distressing disease on Australians.



Source: RACGP

Simple blood test could replace surgery for some brain tumour patients

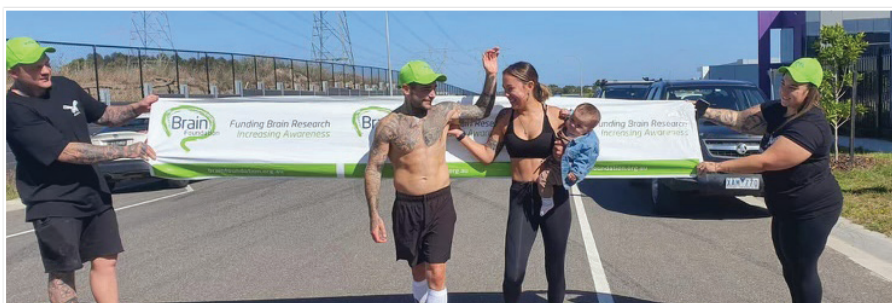
Meningioma is one of the most common brain tumours in adults. Currently, differentiating between grade I and grade II meningioma requires surgery, making it difficult to determine the best course of treatment. A research breakthrough has identified a biomarker for grade II meningioma, which could lead to a blood test for diagnosis.

Grade I tumours are more benign, often remaining dormant for long periods, while grade II are more likely to become cancerous. Around 70-85% of meningiomas are lower grade, and these patients could avoid the emotional stress, cost, and risks associated with surgery. This blood test is an exciting step towards more personalised treatment options for meningioma patients.



Source: University of Plymouth

Fundraisers



Josh Richards and his family

Marathon (Running for a cause)

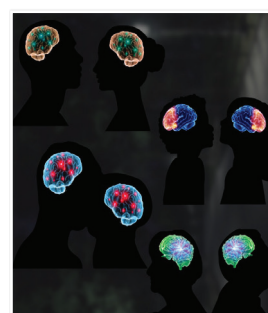
Congratulations to Josh Richards on completing a marathon in early March to raise funds for Huntington's Disease (HD). Like many people, Josh's life has been changed by brain disease, after his fiancée was diagnosed with HD.

We are always inspired by the dedication of patients and their families after receiving difficult news of a brain disease or injury. It's a testament to their hard work and community engagement that Josh was able to go above and beyond his goal - raising almost five times his fundraising target. We are so grateful for this donation, and the impact it will have on medical research.

This is not only a huge contribution towards finding a cure for HD, but also helped to educate people and raise awareness about brain diseases. Well done Josh!

NOX night sculpture walk

These sculptures were created by Francys Arancibia as part of an exhibition for UNSW Art and Design in mid-May. The light patterns on these brains show different types of brain activity, and it's beautiful to see a reminder of how incredible our brains are. She wanted to raise awareness for how little is known about the brain, and helped to raise funds for the Brain Foundation during the exhibition. Thank you Francys!



Your brain...

In conversation

While dreaming

In love

In pain

Rottneest Island Swim

If someone asked you to swim 19.7km (or 394 laps of an Olympic swimming pool!), you probably wouldn't be jumping in the water too quickly. But we are so thankful to have the support of Lucy, Harry, Ryan, and Iggy, who completed this marathon swim in a driven effort to raise funds for brain research.

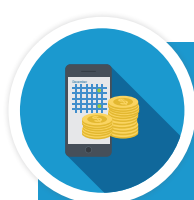
One member of the team works for a Perth-based craft brewery, and they were motivated to support brain research through the swim after the owner had a serious brain injury. Luckily, he has made a full recovery through rehabilitation, but this is one of many examples of how most people are affected in some way by brain diseases, disorders or injuries.

Congratulations to the swimmers and Nail Brewing on your incredible work, both in completing the swim and a successful fundraiser!



Cookies for PSP

After her mother passed away with progressive supranuclear palsy (PSP), Samantha Drew decided to put her passion for baking towards a good cause. She has been selling these beautiful custom sugar cookies to raise money towards brain research and finding a cure for PSP. We are so grateful for your support and donation - and don't those cookies look delicious?



Regular Giving

Would it suit you to make smaller but more frequent donations?

We can help you. Either sign up using our online Donation form – see our web site, or you can make a direct debit. Ring us for our bank details. Regular donations can be made to a specific area of research.

Migraine & Headache Australia Updates



Carl and Trevor

Migraine World Summit

This year's Migraine World Summit was the largest event yet, with tens of thousands of participants from around the world tuning in to learn from top doctors, experts, researchers and specialists in the field of migraine and headache.

Thank you for your support and participation in this event, which has raised over \$2,000 in donations to Migraine & Headache Australia.

If you missed the live event in March, there are still 9 different expert interviews available to view online.



Shades for migraine

Coming up soon is our next big activity for 2021 with Shades For Migraine in June. It's a global initiative designed to generate awareness and raise funds for people living with migraine.

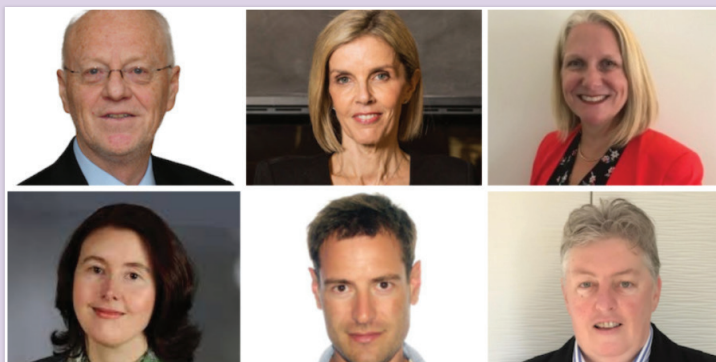
Here's how to prepare for the event:

- Put on your shades on (or around) June 21st to show you care for people living with migraine.
- Take a photo of yourself in your sunglasses and don't forget to get your friends, family and co-workers in on the fun.
- Post your photo with the hashtag #ShadesForMigraine #MHA and challenge 3 friends to take part too!

There will be some exciting prizes for the best photos. Stay tuned for more details.

Migraine & Headache Awareness Week 2021

Migraine & Headache Awareness Week is returning in 2021 from the **20th - 24th of September**. Like last year, we will host online webinars to bring you the latest research and treatment updates - so wherever you are in Australia, you can tune in. Make sure you're signed up to the Headache Register or our social media to receive updates about the speakers, topics, and session times.



Last year's speakers from top left: Dr Peter Goadsby, Sophie Scott, Dr Bronwyn Jenkins, Dr Elspeth Hutton, Dr Michael Eller and Jo Watson.

Doctor Directory

As many patients would know, a good doctor can make all the difference in managing your headache. Your clinician's interest and experience with these conditions will inevitably vary. Several members of the community have expressed an interest in a doctor directory that includes clinicians with an interest in headache. We are excited to announce that this doctor directory is now live. We've put together a list in partnership with the Australian and New Zealand Headache Society to share those doctors who are members of this specialist medical society in Australia. You can find it on our website at <https://headacheaustralia.org.au/doctor-directory/>.

New Treatment Updates: Emgality listed on the PBS!

In fantastic news for people with chronic migraine, the 2021-22 Federal Budget announced that Galcanezumab (Emgality®) for chronic migraine will be added to the pharmaceutical benefit scheme (PBS).

Emgality® is one of three calcitonin gene-related peptide monoclonal antibodies (CGRPs), the newest class of medication designed specifically to prevent migraine. This has been a long time coming, with submissions first called for CGRPs over 2 years ago and several calls for submissions since then.

Instead of costing \$6,800 a year, Emgality® will be available for \$41.30 per script or \$6.60 for concession card holders. This will be life-changing for many people with migraine, particularly those who do not respond to conventional preventive medications (i.e. antidepressants).

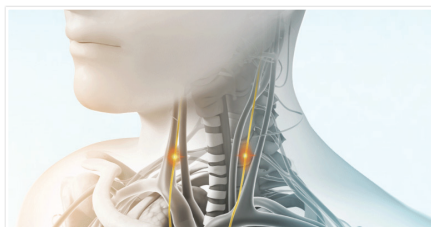
From June 1st, Emgality® will be available to around 10,000 patients. It is important to note that only a neurologist will be able to prescribe Emgality. PBS pricing will not be available from a local GP or family doctor. If you need to find a neurologist, please see our doctor directory.



Government inquiry into PBS approval processes (CGRP)

In other PBS news, Carl Cincinnato represented Migraine & Headache Australia and the patient community at a parliamentary hearing in March. The inquiry was into the approval processes for new drugs, and it was a unique opportunity for patient advocacy. We were one of only several organisations selected to be at the hearing out of over 100 formal submissions.

The testimony shared included a patient who had a life-changing response to CGRP antibodies but could not continue on the treatment because they could not afford it. Our patient community has shared many similar experiences in ongoing advocacy efforts, it's exciting to see a positive outcome in Emgality's PBS listing. We hope that the other CGRP recommended for PBS listing (fremanezumab/Ajovy™) will be listed in the near future as well.



gammaCore™ vagus nerve stimulator

A new nerve stimulation device has been approved for use by the Therapeutic Goods Administration (TGA), targeting the vagus nerve. Similar to Cefaly™ which targets the trigeminal nerve, these devices are a good option for patients who aren't able to take drugs for their migraine. They emit a signal to stimulate the nerves involved in migraine, adjusting neurotransmitter levels to help prevent an attack.

Currently, gammaCore is only available via prescription. You can ask your doctor about getting access to this treatment, or find out more at <https://medistar.com.au/>.



Triptans downscheduled to pharmacist-only medicine

In February 2020, the TGA published a recommendation that some migraine medications (two triptans) should be available from pharmacists without a prescription. In February 2021 this change was applied to sumatriptan, which can now be sold over the counter in lower doses (to help avoid medication overuse). The change has yet to be applied to zolmitriptan, but this is a win for patients. This will ease the burden of migraine when people are caught out by an unexpected attack. The TGA has published other reports suggesting triptans should be more readily available, as they are in other countries. We will keep you updated about any further developments in this area.

Disclaimer: Migraine & Headache Australia is not a medical office and cannot offer medical advice. We encourage you to discuss any issues you have with your medical practitioner.

Join the support group on Facebook & follow us on social media to connect with other patients, keep up to date with news, and discover upcoming events



Facebook.com/groups/headacheaustraliasupportgroup/



@migraineandheadacheaustralia

Understanding Concussion

A 'bump on the head', or something more serious?

MYTH #1 Concussions only happen after a direct blow to the head.

MYTH #2 You need to lose consciousness to have a concussion.

MYTH #3 If you don't have symptoms immediately, you don't have a concussion.

MYTH #4 You have to keep someone with a concussion awake.

MYTH #5 You can return to playing sports as soon as you feel better.



Concussion is a mild brain injury caused by some kind of trauma to the head. It is common in contact sports (i.e. AFL, rugby) and activities in which falls are common, such as horse riding, skiing and cycling.

You might recognise some of these myths about concussion. The most important thing to remember is that concussions can be treated, but they can also be serious, and medical help is essential.

What actually happens to your brain during a concussion?

The brain normally floats in a protective cerebrospinal fluid within the skull. In a concussion, something causes your brain to hit the inside of your skull. This doesn't have to be a huge impact, and can even happen without hitting your head. Direct blows are commonly the cause, but it can also occur due to a sudden change in direction or 'whiplash' movement

(like in a car crash).

The impact causes inflammation, damage to neurons, and a change in your metabolic state. Your brain suddenly releases neurotransmitters that either overstimulate or inhibit brain function (which is why symptoms are quite varied).

Recognising a potential concussion

Only 10% of concussions include loss of consciousness.

Symptoms to look out for include:

- Loss of consciousness
- Confusion & trouble focusing
- Dizziness, vertigo & imbalance
- Headache
- Nausea and vomiting
- 'Seeing stars', blurred or altered vision
- Sensitivity to light & noise
- Drowsiness
- Temporary memory loss
- More anxious, sad, & emotional in general
- A blank or vacant look

Symptoms will usually present immediately or in the first few hours following a head knock. Asymptomatic concussions are far less common, but they do happen. Even if a patient 'feels fine', it's important to avoid sports after being diagnosed with a concussion. A second impact can be even more dangerous as it exacerbates the existing inflammation.

If the person is unconscious, repeatedly vomiting, experiencing neck pain, having a seizure, or exhibiting particularly rapid changes in cognitive function or behaviour, an ambulance should be called for help. Milder symptoms can usually be assessed by an on-site medical professional (at a sports game) or the patient should be taken to the nearest GP.

Treatment & recovery

A medical professional can check for more serious traumatic injuries such as bleeding in the brain, spinal damage, or increased intracranial pressure. Once these concerns have been cleared, the patient can safely go home to rest and recover. Contrary to popular belief, the patient can sleep once they've been cleared - it would only cause complications if there is bleeding in the brain, which is rare in concussion.

Recovery timeline (if symptoms are stable)

0-24hrs	Rest physically and mentally; avoid excess screen time or study; low to moderate cognitive activity is fine.
24-48hrs	Slowly reintroduce light physical activity (i.e. walking); return to work or school but avoid hard tasks (exams, pitches, major meetings)
3-5 days	Continue to scale up activities with caution; athletes follow return-to-play guidelines.
5 days	Cognitive function should be at normal capacity; athletes return to play.
7-10 days	Most patients will be clear of metabolic abnormalities and inflammation.

Complete recovery from concussion should be within two weeks, but patients could experience post concussion syndrome. Headache is the most common post-traumatic symptom, along with a range of physical, cognitive & behavioural symptoms (which are similar to those listed above). Many people recover from post concussion syndrome in the following weeks or months, but in some patients it becomes persistent.

Developments in concussion research



After concussion: long-term impacts

The risks of repeated head trauma have been studied for decades, since forensic pathologist Harrison Martland noticed neurological changes in professional boxers and coined the term “punch drunk”. His 1928 article described cognitive and physical slowness, tremors, and ataxia & dysarthria (slurred speech, stumbling, incoordination).

This is now known as chronic traumatic encephalopathy (CTE). CTE causes the tau protein to malfunction and build up in the brain, which kills brain cells - a process similar to some dementias. In addition to the symptoms described by Martland, CTE causes significant behavioural and emotional changes. Patients become more prone to mood swings, violence, depression, anxiety, paranoia, and suicide. It is still very rare, but CTE has been found in rugby players and military veterans, which has prompted further research into the risk of repeated concussions.

Women and concussion

A lot of research about concussion and CTE has been centred on men and male-dominated sports. However, some research now suggests that women may be more susceptible to concussion.

Researchers from Michigan State University found that symptoms will differ between men and women as well - men are more likely to experience amnesia, while headaches, mood changes, and mental fatigue are more likely in women. They might also have more severe symptoms, and take longer to fully recover from concussion, increasing the risk of cumulative injuries. This is due to a complex combination of physiological factors - hormones, body composition, and more.

Despite these early findings, researchers are cautious about over-emphasising sex differences. This could lead to women being discouraged from sport, or men feeling as if they aren't at risk. Concussion is a serious concern for any professional athlete, and this research will inform better aftercare for all genders.

In the AFL

A study published in January 2021 compared blood samples from AFL players at two, six, and 13 days after a concussion. Researchers focused on a blood biomarker which can indicate brain cell damage, and found that there was still evidence of damage after 13 days - even once players stopped noticing symptoms.

This has huge implications for return-to-play guidelines in sport. Scientists haven't identified any ‘tipping point’ for CTE, but it's been well-observed that head trauma on top of an existing injury can have severe consequences. The AFL has tightened regulations about returning to play after a concussion, and hopefully further research will allow players to be more confident in their recovery timelines.



Angus Waters

Sources:

Brain Foundation, 2021. <https://brainfoundation.org.au/disorders/concussion/>

Colangelo, A, 2021, “Study reveals longer-term damages from concussion”. *The Age*.

Healthdirect, 2020. <https://www.healthdirect.gov.au/concussion>

Mullaly, W, 2017. <https://doi.org/10.1016/j.amjmed.2017.04.016>

Robson, D, 2020, “Why women are more at risk from concussion”. *BBC*.

Living with Locked-In Syndrome

Tracey's personal story



The Stroke Foundation awarded Tracey the Courage Award in 2020, recognising her resilience in recovery and her commitment to educating people about stroke & communication. You can see more about Tracey's story on her Facebook page, Tracey Gibb Living Locked-in.

Locked-in Syndrome (LiS) is a rare neurological disorder usually resulting from a lesion to a region of the brainstem called the pons. It can also be caused by a stroke, tumours, infections, certain nerve disorders, or amyotrophic lateral sclerosis (ALS). It acquired its name because patients lose most or all of their motor function, facial control, breathing, swallowing and speaking abilities. However, consciousness and cortical functions are preserved. Tracey Gibbs spoke to us about her experience living with LiS.

How did you become 'locked-in'?

Tracey: When I was 19 years old, I was having trouble for a week or two with severe headaches. This was out of the norm for me, because I simply didn't get headaches. I told my doctor this but he kept treating me for migraines, even after I went back several times. A friend took me to his own doctor for a second opinion, but it was too late - the unexpected stroke I had been having was too far gone. The doctor sent me straight to the hospital that afternoon, but in the early hours of the next morning, I was found unconscious. After getting an MRI, we were told that I had experienced a brainstem stroke, caused by an abscess on the brainstem pons. It wasn't until months later, after meeting Professor Ted Freeman, that I knew just how rare my type of stroke was (a non-blood-related stroke).

It has been 28 years now that I have been "living locked-in".

I understand that there is an initial period of trying rehabilitation to regain some motor function. What was that like, and how have you managed LiS in the long term?

Well, that may be so, but initially I didn't receive any kind of rehab - I didn't respond to the usual treatment, so I found myself put into the "too hard basket" for quite some time. It wasn't until several years later that I was given a new physiotherapist, and she worked with electrical stimulation. She explained all about the device and what it does, and I was very much intrigued. I was so glad when she asked me if I wanted to give it a try - I had a really good feeling about this treatment. After just a few sessions, I was starting to feel a difference in my arms. Just maybe, I had finally found a treatment that actually got a great response from my body. Years went by, and I was still responding well. As slow as the treatment was, it didn't bother me, considering how long it took to find.

What was the most helpful thing when adjusting to how your life has changed?

I wouldn't exactly ask 'what', but 'who'. For years, I only had my mum and the staff at Highgate Park. When I had my first stroke, all my friends suddenly disappeared. The only ones who stayed were family friends, and only my mum visited. I have some great new friends now, but my mum is still my main visitor. It has been great to reconnect with a lot of old high school and primary school friends on Facebook. I have also made friends with people from all over the world. I love it! Until 2006, I just had my TV - mum got me hooked on Days Of Our Lives and other daytime TV programmes. Since I was introduced to social media, everything changed. The world was in my room, and I was no longer "alone".

LiS is quite different to other disorders of consciousness - do people generally understand this?

I can't really speak for other survivors of LiS, but because I had a brainstem stroke my face was severely paralysed. It was pulled to the left and my body had extremely low tone. I went out a few times, but people would often stare at me. I tried to ignore it, but I couldn't handle it. So I hid from the world. I believed that if I couldn't handle the way I looked, then how could the world? It wasn't until I started to feel muscle activity in my face that I started to go out again.

When we go out now, if they ask my mum or carer what is wrong with me, they often still have a puzzled look on their face - even after seeing us communicate, and having everything explained. I have found people just don't get it until they have actually tried to communicate with me.

Well, years have passed and I am feeling more and more like myself every day. This feeling might not be visible to others, but one day I hope it will be!

A novel biomarker for insight into ALS disease mechanisms and progression

RESEARCH TEAM:

Chief Investigator:

Dr Fleur Garton,

Institute for Molecular Bioscience, University of Queensland

Co-investigators:

Prof. Naomi Wray

Institute for Molecular Bioscience, University of Queensland

Assoc. Prof. Noah Zaitlen

University of California, San Francisco

Research

ALS is typically a fast-progressing disease but most people with the condition will experience a relatively slow, 12-month long diagnostic process. There is no single biological marker that can distinguish the condition to avoid this issue and support early multidisciplinary interventions and clinical trial enrolment. In 2016, Prof Wray's (Australia) and Assoc. Prof Zaitlen's (USA) teams were collaborating on other projects and came up with a relatively new idea to investigate cell-free DNA (cfDNA) as a biomarker for ALS to address this problem. cfDNA is simply the product of cellular turnover, in which DNA gets released into the circulation. Given the progressive, changing condition of someone with ALS, we hypothesized that the blood cfDNA profile would be unique compared to someone with a different condition, or a healthy control. We started to develop methods to profile the cfDNA detected in blood to determine where the cfDNA was coming from (the originating tissue/cell) by comparing the detected cfDNA with references of known tissues markers. Our question was to determine if an ALS specific cfDNA signature could be detected, ultimately leading to a blood test that could be used for diagnosis or tracking disease

progression. The technology to extract cfDNA is routinely used in clinics around the world for other purposes, in particular non-invasive prenatal testing, and so we knew that if this was successful, then the typical hurdles to practice would not be an issue.

Outcome

Thanks to initial funding support from the Brain Foundation, we have been able to progress our preliminary idea, results and methods to determine if a unique profile of cfDNA in ALS patients can identify and track disease. Our methods were to profile cfDNA, predict that cfDNA in blood originates from a variety of tissue/cell-types, and that it may consist of a higher proportion from skeletal muscle in ALS cases compared to controls (with small numbers of samples analysed using an unbiased, whole-genome approach). The methods and preliminary findings have been made publicly available (bioRxiv/Github) and are now peer-reviewed in a well-regarded genomics journal Nature Communications. Assoc. Prof Zaitlen and his team at the University of California are now preparing an efficient, high-throughput capture to profile the tissue-informative regions of the genome. This will allow us to efficiently profile a large number of ALS samples, alongside other neurological cases and controls for sensitivity testing and further profile refinement. This is running across two international clinics, here at UQ and in parallel at UCSF, to ensure the methods and techniques are robust. We are excited that the project has now been rapidly increased in size with subsequent funding received from FightMND to support the additional sample collections and profiling for outcomes to be produced by 2022-end. We look forward to sharing these results with the community and very much hope that this will make significant inroads into improving the diagnosis and tracking of those with ALS.



You probably already know that problem solving and puzzles can help 'exercise' your brain (as well as adding a bit of fun to our newsletter). But following Brain Awareness Week earlier this year, we wanted to talk about what else it takes to maintain brain health. Like most neuroscience, it's a little more complex than doing a few sudokus each weekend!

As we age, our cognitive abilities such as processing speed and memory start to decline. This is a normal process that occurs with the loss of connective structures between neurons, called synapses. Just like any muscle, synapses need to be challenged in order to stay strong. But as we age, we settle into routines and spend more time in 'autopilot', reducing the amount of synapses required to function.

This cognitive decline can be slowed down if you continue to use your brain in different ways throughout life, increasing neuroplasticity. Neuroplasticity is the brain's ability to adapt the function or structure of neurons – allowing us to learn new information and new ways of thinking. This is most obvious in young children, when everything is a new experience.

However, using different parts of your brain doesn't just mean doing something difficult - it means approaching things from another angle, learning a different skill set, and taking out those 'autopilot' shortcuts. Encouraging neuroplasticity might mean that an artist learns to play chess, rather than learning a new art style.

Some simple things to try include:

- Taking a new route when driving to a familiar location
- Learning a new language, sport, or skill
- Avoid using calculators
- Swap TV for mind games or a book
- Play games that involve memory (bridge) or thinking ahead (chess)
- Even simply recalling what you did the previous weekend can have benefits

Brain function is also closely linked to your overall health, and it's important to take care of your body as a whole to safeguard your mind. Some of the significant conditions that impact brain function are diabetes, obesity, head trauma, psychiatric disorder, sleep apnea, and alcoholism. You can keep this in check by seeing a doctor for regular check ups, eating a healthy diet, and making sure you get enough sleep and exercise.

Brain Games

Sudoku

Medium

	1		3					6
	9	4	7			8		1
			8	9				
4	7	2			3			8
6		8		5			9	7
					8		1	
5				6		7	3	
	2			7	9			5

Hard

5		9						
	7				6			1
6				9				4
					9		5	
	4				3		8	
	5	8		7			2	
	6		2				4	
	8				7			3

Solutions on back page

Ballet, ballroom, brain health?

There has recently been some interesting research into the connection between dance and neuroplasticity. Dance involves creativity, dexterity, rhythm, emotional responses, communication, and the ability to synthesise sound and music. This activates many parts of the brain, creating new neural pathways. One research team compared dancing to other cardiovascular exercise, and found that the dancers actually had a measurable increase in their brain matter at the end of the study!

Word Scramble

How many four- and five-letter English words (no proper names or abbreviations) can you find in the word **NEUROSCIENCE**?

Find a piece of paper and write down as many as you can.

Hint: there are 83 four-letter words, and 106 five-letter words.

Healthy Brain Tip

You can try this challenge with any word
- most words have dozens of words 'inside' them,
or can be rearranged completely (in an anagram).
Brain games like this can exercise your vocabulary,
memory, and problem solving.



Danielle Cerullo

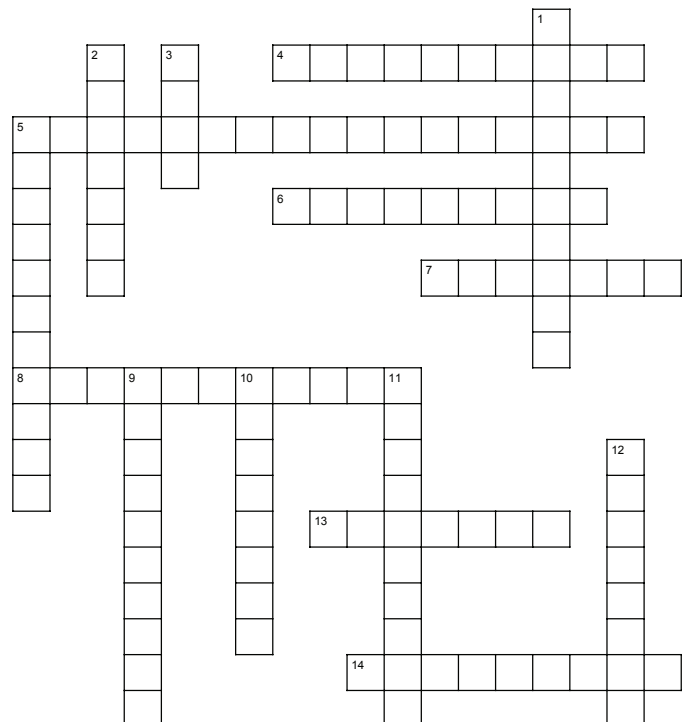
Brainy Crossword

ACROSS

4. One of the most prevalent neurodegenerative disorders that greatly reduces a person's memory.
5. The general name for the chemicals that are released by one neuron and taken up by another.
6. The branches of a neuron that receive electrical signals from other neurons.
7. You have more than 100 ____ neurons. (spell out the number).
8. An area of the brain located deep inside the brain and involved in memory.
13. What does the "I" in MRI stand for?
14. The part of the brain that connects directly with the spinal cord and is responsible for some of the automatic functions of the body.

DOWN

1. The tennis-ball-sized area at the back of the brain that regulates motor movements; it is responsible for balance and involved in motor learning.
2. The nerve cells in the brain.
3. The long, tail-like branch that extends from the neuron cell body and transmits electrical information to other target cells.
5. The exploration of ethical issues surrounding advances in neuroscience.
9. The brain's ability to change and rewire its synaptic connections.
10. The area of the brain involved with emotions, especially fear, anger, and happiness.
11. The pathway for nerve signals to travel to and from the brain (two words, no space).
12. The junctions where neurons form connections with one another.



Source: Dana Foundation

Solutions on back page

Get Involved

Fundraise for Research

We are often asked "what can we do to fundraise?"

Well, there is no one answer to that question. With the help of fundraising platforms **My Cause, Go Fundraise** and even **Facebook**, you can do just about anything you like.

These sites can direct you to a community event such as a fun run or a swim. These are easy to enter and you can choose to support us. You could also hold your own fundraising event, such as a trivia night. You can speak to our office to get a trivia pack and any information you want to give to friends. If you're using Facebook, you can make a fundraiser through a news feed post at any time - simply select 'Raise Money' then search for Brain Foundation in the list of charities.

If you use any of the platforms mentioned above, all donations and receipts are taken care of for you. Easy!



Thank you for supporting
brain research through the
Brain Foundation

To make a donation please visit our website
brainfoundation.org.au/donate
or use the donation form on the letter enclosed.



IN MEMORIAM

A big thank you to the families and friends of the following who donated in memory of their loved ones.

Sharon O'Donnell

Sandy Richards

Ostap Kurlak

BEQUESTS

Our sincere thanks go to the estate of
Margaret Anne Brien

Did you know that you can remember your loved ones and make a donation to a specific category of research? Please phone if you would like more details or see our online donation form.

**PLEASE CONSIDER
US WHEN NEXT
LOOKING AT YOUR
FINAL WISHES**

Please contact our office if you would like to have a further discussion or to receive one of our brochures to discuss with your legal representative.

Healthy Brain Solutions

medium

8	1	7	3	4	5	9	2	6
3	9	4	7	2	6	8	5	1
2	6	5	8	9	1	4	7	3
4	7	2	9	1	3	5	6	8
9	5	1	6	8	7	3	4	2
6	3	8	2	5	4	1	9	7
7	4	6	5	3	8	2	1	9
5	8	9	1	6	2	7	3	4
1	2	3	4	7	9	6	8	5

hard

5	3	9	4	1	2	7	6	8
8	7	4	3	5	6	2	9	1
6	1	2	7	9	8	5	3	4
1	2	3	8	6	9	4	5	7
7	4	6	5	2	3	1	8	9
9	5	8	1	7	4	3	2	6
3	6	7	2	8	1	9	4	5
2	8	5	9	4	7	6	1	3
4	9	1	6	3	5	8	7	2

crossword



Word Scramble - top 50 words
(the rest of the list is on
www.dana.org/pdf/in
'Successful Aging Puzzles')

Coin	Sour	Scorn
Cone	Sure	Scour
Core	User	Since
Corn	Cries	Siren
Cure	Crone	Snore
Ices	Curio	Union
Icon	Curse	
Iron	Ennui	
Neon	Ensur	
Nice	Inner	
Nine	Niece	
None	Noise	
Nose	Nurse	
Nuns	Occur	
Once	Ounce	
Rein	Resin	
Rice	Reuse	
Rise	Rinse	
Ruin	Risen	
Rune	Rouse	
Ruse	Scene	
Seen	Scone	