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WAYS TO FUTUREPROOF YOUR BRAIN



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WELCOME TO OUR SPECIAL ON BRAIN HEALTH

YOU are not stuck with the brain you have. That is the most important information to take away from the experts who share their approaches to brain health over the following pages. The old idea that your brain power peaks in your teens or twenties and then gradually slides into an irreversible decline no longer holds true.

Science now tells us that the brain is an adaptable, dynamic and renewable organ. It responds to what we do, what we think about, what we eat, and what we expose it to — whether that is environmental pollutants or happy thoughts.

In the US and UK a number of experts have taken this a stage further and have developed programmes to enhance brain function, to identify early warning signals or to help reverse the signs of cognitive decline.

Chief among them is Dr Dale Bredeesen, Professor of Neurology at the David Geffen School of Medicine UCLA, president of the Buck Institute for Research on Ageing and author of a fascinating book, *The End of*

Alzheimer's (Vermilion, €20.99) which was published last year and has already been translated into 26 languages.

Some people, he says, show the first signs of cognitive decline as early as their forties and fifties. As a result, Dr Bredeesen recommends that

everyone over age 45 goes to their GP for what he calls 'a cognoscopy' — a series of simple blood tests that will show markers for various conditions that could raise your risk of Alzheimer's. He also recommends taking one of the many free online cognitive assessments, such as Sage.

"That will give you an idea of where you stand," he says. "One of the problems is that you can have cognitive decline sneak up on you."

Dr Bredeesen has developed a

comprehensive 36-point protocol to tackle Alzheimer's — including simple lifestyle changes — that he claims can prevent and even reverse some of the symptoms of cognitive decline associated with the disease.

To date, he has conducted a study of 10 patients which showed significant improvements in the symptoms of nine of them within three to six months. Dr Bredeesen is now poised to conduct a larger trial of 50 people and is about to publish a paper documenting improvements in a further 100 people who followed the programme.

"Times are changing dramatically," he says. "This idea that there is nothing you can do to prevent or reverse Alzheimer's is out of date now — that is 20th century medicine. There's a lot you can do and people

are showing this repeatedly."

Those who follow his protocol benefit in all sorts of ways: "Many end up being able to stop their hypertensives, their anti-diabetic drugs and their statins, because when you do the right things, you actually don't need them."

But you needn't necessarily be suffering from cognitive decline to want to build a better brain — as we show over the following pages.

Dr Daniel Amen is qualified as both an adult and child psychiatrist in the US, has published 10 *New York Times* bestsellers and specialises in brain disorders. He is also a firm believer in optimising brain health at any stage of life.

"I know it sounds weird but a lot of the risk factors actually happen before people are 25, so taking a whole-life approach to keeping your brain healthy is essential."

He points to the impact of technology on the brain. "With the internet, the human attention span has shrunk so low that a lot of people are complaining about memory. If you think about it, because of your

mobile phone, you don't have to remember numbers like you used to."

Technology, he says, is even influencing the stage at which dementia and Alzheimer's are diagnosed. "In the past, the family would call up and say: 'My mum got lost in the city she's lived in for 30 years and she's hysterical. Something's wrong.' Now that same woman, whose memory is deteriorating, all she has to do is ask Siri to take her home. We're not actually diagnosing people until later in the process, when it's harder to do something about it."

He has developed an approach to optimising brain health in his book, *Memory Rescue: Supercharge Your Brain, Reverse Memory Loss, and Remember What Matters Most* (Tyndale, €14.99) with advice on how to address risk factors.

"If you want to keep your brain healthy or rescue it if it's headed for trouble, you have to prevent or treat the 11 major risk factors that steal your mind," he says. He shares some of his key interventions over the following pages.

Meanwhile, this preventative ap-

JUST BREATHE
You might think you've been breathing perfectly well for years, but experts believe that many of us over breathe, that is take short, sharp breaths rather than breathe into the diaphragm to get the right balance of oxygen and carbon dioxide. When this is chronic, it can lead to panic attacks, depression, insomnia and hype up our stress levels. The message? Breathe into your tummy rather than your chest, and slow down to five or six cycles of inhale:exhale per minute.

200 ways to futureproof your brain

1

What to eat and when

Why intermittent fasting builds a better brain



Banish all thoughts of a Lough Derg-type starvation diet. Intermittent fasting is no more drastic than delaying or skipping breakfast altogether. "One form of intermittent fasting is 'time-restricted eating', which essentially involves eating within a relatively contained window each day," explains Dr John Briffa. "So if you were to eat breakfast at 8am, you'd be finished by eight in the evening. The rest of the time all that is being consumed is water and perhaps some black coffee or tea. Some people then gradually extend the fast to 14 or 16 hours, usually by delaying breakfast or skipping it altogether."

For those packing children off to school or rushing to get out themselves in the morning, it has other benefits. "On a practical point, skipping breakfast is often not socially disruptive as many individuals eat breakfast on their own, certainly during the week."

Why is intermittent fasting helpful? "It ultimately stimulates the body to break down fat which forms a fuel source called ketones," says Briffa. "This is the origin of the word 'ketosis'. Ketones provide ready fuel for the body and brain. But the level of ketones in so-called 'nutritional ketosis' is much lower than those seen in what is known as 'ketoacidosis', which occurs in uncontrolled Type 1 diabetes.

It appears to bring body-wide advantages. "Intermittent fasting has other benefits too like improving insulin function and increasing 'autophagy' which is like an internal clean-up process, including in the brain.

"Clinically it tends to work like a charm," says Dr Briffa. "Not everyone can do it but the majority can, and when they do they usually feel energised, stable and 'with it'. The reality is while it's usually said that 'breakfast is the most important meal of the day', this is actually nonsense for many people. There is nothing wrong with someone subsisting off their own fat stores through the morning. In fact, it's a good state to be in. People

generally do much better this way than with a traditional breakfast of cereal or toast which can destabilise blood sugar levels and tends to be inflammatory in nature."

DO A CLEAR-OUT

Drugs, alcohol and environmental toxins such as carbon monoxide are all bad for the brain, says Dr Daniel Amen. "Limit your exposure and then support the organs of detoxification. For your kidneys — drink more water. Support your gut — eat more fibre. Support your liver — kill the alcohol. Support your skin by sweating — exercise and take saunas."



proach is also taking root in the UK. Dr John Briffa, a practising doctor, wellbeing expert and author of nine health books including *A Great Day at the Office* (Fourth Estate, €12.60), has spent many years writing and practising in this area and shares his expertise with us.

More recently, he has developed the Brain Health Programme, a series of six workshops, in association with Cytoplan, who provide science-based nutritional supplements. He launches it in Ireland on October 11.

"The programme is designed for anyone seeking to optimise their brain function or mood, or who wants to take proactive steps to ensure against a decline in their mental function as they age," he says.

The workshops cover all the factors important to brain function and mood, including nutrition, exercise, stress and sleep, and it aims to equip people with an armoury of weapons they can use day to day.

For those of us who can't remember where we left the car keys, the following pages might just be a good place to start looking.

The information contained in this supplement is not intended to replace the advice of your health practitioner. Before you make any changes to your lifestyle or diet, it is always best to discuss your options with your health care provider.

■ **Dr John Briffa will give the opening talk on the Brain Health Programme at the Talbot Stillorgan Hotel Dublin at 7pm on October 11. Tickets: €10 (all proceeds to charity), refreshments from 6.30pm. Six workshops cost €250. For more information on dates and venues see thebrainhealthprogramme.co.uk/events**

■ **If you or someone you know are worried about dementia, the HSE, in partnership with the Alzheimer Society of Ireland and Genio, is running the 'Dementia: Understand Together' campaign to improve our understanding and build support for those with the condition. See understandtogether.ie or call Freephone 1800 341 341. For the Alzheimer Society of Ireland, contact alzheimer.ie**

ME AND MY BRAIN

Brent Pope



'Take risks in your life — know that you have a choice'

RUGBY pundit Brent Pope, 56, is a well-known media figure, but what many people mightn't have realised until recently is that he has suffered from mental health issues since he was a teenager.

Earlier this year, he wrote *WIN: Proven Strategies for Success in Sport, Life and Mental Health* (Hachette Books Ireland, €16.99) with Jason Brennan, which shares his strategies for better emotional health.

"As I've gotten older, I've possibly got more anxious about my life," he says. "That's certainly something that comes with age. Older people get anxious about different things: the thought of getting older, regrets in your life. Maybe things haven't worked out the way that you thought they would, or there could be elements of uncertainty — you may have suffered the loss of a job or a partner, a bereavement. In my mid-forties I started getting more worried about my health and where I was in life — Was this job going to continue for 10 years?"

As such, it is crucial to build up what Brent refers to as a tool box — strategies that you know will help to deal with anxiety or whatever other mental health issues may arise.

"A lot of people look for rocket science," he explains, reflecting that there is, in fact, no quick-fix solution. "We see ads for gyms every January, and people are quite okay with getting their bodies right, but when it comes to getting your

mind right, people are not so open to change."

It's something he works on now as a speaker on the subject, often talking to men of his generation who express their fears around delving too deeply inside their own emotional psyche.

Moving outside your comfort zone is, Brent explains, hugely empowering. "Take risks in your life; know that you have a choice. I think 'choice' is a word that is very liberating for people of a certain age. When you look at things that you want to do, know you have a choice. That may come with consequences which may be good or bad, but you have a choice. Do you want to stay in a job?"

In an effort to outweigh the negative with the positive, he keeps a daily gratitude journal.

"Every night I write three or four things that I really enjoyed that day. I look at that journal each morning and think, 'Yesterday was a pretty good day; today could be a better day'. It's all about the way I talk to myself. I try to look at the good things in my life, or the positive aspects of my personality, rather than the negative."

Having a network which can act both as a support system in times of stress, and combat loneliness, is crucial, he says. Age can be of huge benefit to our mental health. The muscle of resilience will grow over time, as will the knowledge that you can cope. "With age comes the wisdom that you can change," explains Brent. "That's a huge thing. Because I didn't

think that I could. Learning that I had tools and people to help me, I now know that I can get through things — that I've got through it before."

There also comes a sense of self-confidence. "As you get older you care about judgment less. With age I think, 'I am who I am. People are going to like me or they're not going to like me'. So I'm more comfortable in my skin now at 56 than I was at 36."

Liadan Hynes

Brent's tips for brain health

■ **Practise mindfulness, and mindfulness speaking in the way you talk to yourself. Love yourself and give yourself a break sometimes. Everyone makes mistakes. Talk to yourself in a loving way, the way you would to a small child.**

■ **Look after your mind like you look after your body. Put the work in. Adopt a good diet. Go for a walk or to the gym. The saying 'healthy mind equals healthy body' does apply.**

■ **Know that however tough it is, however bad it becomes, you are the person who can change things. With determination and positive self-speak, you can change any situation for the better. You can decide to be happy — that is a decision.**

2 Get sweaty

The joy of saunas

Research from Finland (no surprise there) points up the relationship between saunas and brain function. One 2017 study found that men who had four to seven saunas

a week were 66pc less likely to suffer from dementia than those who had one a week. In fact, saunas seem to have a hugely positive impact on every aspect of health from depression to lowering blood sugar. The theory goes that saunas help your body to detox via the largest organ, your skin, flushing out accumulated toxins that can cause cognitive problems. According to Dr Daniel Amen, "The concentration of most toxins — including arsenic, lead and mercury — is two to 10 times higher in sweat than in blood, which indicates that sweating is an effective detoxification process." Working up a good sweat by exercising is one way to achieve this, but a spell in a sauna can be even more effective. Aim for 20 to 30 minutes, as often as you can.

SEEING RED if you don't fancy steam and heat, you could try an infra-red sauna instead. This form uses dry infra-red radiation to heat you rather than steam and claims to aid detox, help boost the immune system and your circulation. Test it out for yourself at thegreenhouseproject.ie



3 Boost your blood flow

"Low blood flow is the number one brain imaging predictor of Alzheimer's disease," says Dr Amen, who has taken more than 130,000 SPECT scans — a test that creates a 3D image and provides information about the function of your brain. "Anything that negatively impacts blood flow damages your brain — hypertension, heart disease, stroke, erectile dysfunction. If you have blood flow problems anywhere, they are everywhere. There is a Harvard study that showed 40pc of 40-year-olds experienced erectile dysfunction, which likely means 40pc of 40-year-olds have brain dysfunction; 70pc of 70-year-olds have erectile dysfunction, which means 70pc of 70-year-olds probably have brain dysfunction." How to improve blood flow? The key is lifestyle. Exercise, he says, is crucial. "Sitting is the new smoking. If you're not active, then you have some serious problems." Next, clean up your diet, lose weight if your BMI is over 25, quit smoking, tackle stress and address your cholesterol or blood pressure issues with your doctor, if needed.

4 Feed your gut grow your brain

We're always talking about gut instinct. Well, the idea of the gut as a second brain has been confirmed by science.

In the average adult, the diverse population of bacteria known as your microbiome weighs about 1.5kg, says Professor Ted Dinan, head of psychiatry at University College Cork and principal investigator at APC Microbiome Ireland. "There are far more bacteria in that kilo-and-a-half than there are cells in our body, so we're talking about an enormous number of cells with an enormous amount of DNA and a lot of that DNA produces molecules that our bodies require."

In one study that Dinan points to, mice that were born and raised in a sterile bubble — so they had no gut bacteria — showed differences in learning, memory and social capabilities. They even had a different stress reaction. Furthermore, their brains showed important differences in neurotransmitters such as serotonin, which is associated with mood.

Your microbiota produces three-quarters of your neurotransmitters and contains two-thirds of your immune tissue. Not only does it produce certain vitamins, including the B vitamins essential to brain health, but it has a big role to play in metabolising the good fats found in fish.

The connection between mind and body is so deep, that Dinan even published a paper called 'The Collective Unconscious'. While the title was tongue in cheek, he says: "A point I was making was that a lot of our behaviour is actually, at a subconscious level, controlled by our microbiota."

He gives an example: "I've a sweet tooth and I often wonder is it my brain that is telling me I want apple pie or is it my microbes — because if you eat a lot of sweet things, you end up with a lot of bacteria that feed off sweet material.

So if you don't eat sweet material they are going to shrink and die off, so they must have their way of maintaining their existence as well.

"Without us the microbiota wouldn't be fed. So we feed these microbes and in return they produce molecules that we require.

"The evidence would suggest that maintaining diversity in the microbiota is essential for healthy ageing. For people who lose diversity in the microbiota, frailty follows on very quickly. If the gut biota, for whatever reason" — often poor diet — "becomes less diverse, you will have poorer cognitive function."

Some strains of bacteria may work as psychobiotics that enhance cognitive function. For example, Prof Dinan mentions a study he conducted on *Bifida bacteria longum* strain 1714, that was found to improve healthy brain function. However, he points out that, "If somebody is overweight, maybe has Type 2 diabetes, is hypertensive, they get no exercise, they smoke, then they are at high risk of developing dementia. No probiotic or psychobiotic will alter that fact."

What should we eat to support our gut microbes? Fibre. In particular, he says, inulin, which is a specific type of fibre that we can't digest but bacteria can. "It promotes the growth of good bacteria like *Bifido* bacteria. You'll find it in foods like chicory, Jerusalem artichoke, potatoes, bananas, onion and garlic. They all have reasonably high concentrations of inulin and so would promote the growth of good bacteria." Other good sources are the polyphenols found in nuts, seeds, coffee, dark chocolate, red wine, olive oil and berries, and fermented foods such as miso and kombucha.

While certain food and lifestyle choices support a rich gut microbiome, says Dinan, the reverse is also true. Trans fats and fast food, for example, as well as too much stress and lack of sleep, will reduce diversity.

SHARING IS CARING

Keep a pet. Apparently, it can improve the diversity of your microbiome. One study estimates that you and your pet will share 99pc of your microbiome. Love me, love my dog.

NOT SO SWEET

According to a paper just published in the journal, 'Molecules', artificial sweeteners found in zero-calorie drinks and many processed foods were found to be toxic to the gut microbiome. The study looked at six popular sweeteners including aspartame, sucralose and saccharine. This comes after a University of Sydney study suggested using artificial sweeteners can actually stimulate hunger and make you eat more.

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ways to futureproof your brain

7

Don't be a damp squib Check for household moulds

There is plenty of evidence to show that household moulds and damp can affect respiratory health, but Dr Dale Bredesen believes the damage doesn't stop there. According to his research, chronic exposure to various forms of mycotoxins often found in damp and moulds contributes to a particular variant of Alzheimer's disease that affects up to 500,000 Americans. Whereas other forms of Alzheimer's typically begin with loss of memory, he says: "This type of Alzheimer's tends to start earlier, in the late forties and fifties, and the main complaint is not loss of memory, but loss of executive function. They have trouble organising, they have trouble calculating. One woman told me she couldn't calculate a tip anymore — that was the first sign. These are the people who actually have more trouble quickly and often get fired from their jobs because they can't bring things together and organise them."

The second sign may be that they develop depression, he says. "Next, they often have word-finding problems, trouble speaking and trouble with visual recognition, often with recognition of faces, which is called prosopagnosia." This is the tip-off that the problem stems from some sort of toxic exposure, "and it's often the biotoxins from the moulds". Physically, the symptoms may include

asthma, rashes, headaches and fatigue.

"If you have a house that has ever had water damage, or has mould, that really should tip you off. Please look further into this," says Dr Bredesen. "There are now tests you can get for mycotoxins in your urine, so you can look at that. And get your house tested."

There are a number of options for anyone concerned that their home may be affected. To check whether biotoxins from spores may be affecting your health, you can use a kit obtained from mycometrics.com in the US, who will analyse the results and give you a risk score. Closer to home, UK-based Buildings Forensics (buildingforensics.co.uk) will visit to assess your risk and how to tackle the problem, while Irish company Quigley Preservation (quigleypreservation.ie) treat mould and damp. You can also contact the architect's representative body in Ireland, riai.ie for details of an expert in assessing your home.

Those in rentals or who can't stretch to the measures needed to address mould and damp, can invest in a HEPA air filter such as the Dyson Pure Cool. But, warns Bredesen, "You really have to be careful because as long as you're exposed to this stuff, you are damaging your brain."

5 Water, water, everywhere

"Hydration," says Dr John Briffa, "is very important. It's been found that relatively mild dehydration, as little as 1pc, is enough to cause problems around concentration and mood.

"A lot of people will recommend two litres, or eight glasses of water," continues Dr Briffa. "All of this is nonsense really because the amount you need to drink varies enormously between people and how much they're sweating, or what the weather is doing. You need to be drinking enough fluid to keep your urine pale yellow; if you're doing that, you're almost certainly well hydrated. Thirst is a pretty poor and late indicator of dehydration."

6 The new frontier Your nasal microbiome

Move over gut microbiome, the new buzzword is the rhinosinal microbiome in your nose and sinuses. Just as there is an optimal balance of bacteria in the gut, so there is in your nasal cavities — and, in the same way, the microbiome can tip out of balance.

"As any cocaine user will tell you," says Dr Bredesen, in his book *The End of Alzheimer's*, "the quickest way to the brain is through the nose. Microbes have also figured this out." Often these are mould species and bacteria that dig in and cover themselves with protective shields called biofilms that make it difficult for antibiotics to destroy them. Not only do they have access to the brain but they secrete byproducts that can destroy molecules in the brain that support neurons and synapses, he says.

If you have chronic sinus problems, using a nasal spray, such as Xlear Xylitol and Saline Nasal Spray (€13.65; available at thehopsack.ie), to help clear nasty bacteria will help. Dr Bredesen recommends restoring good balance with protective probiotics, such as Probio Max and Restore, however, nasal probiotics are not yet available in Ireland.

Losing your sense of smell may be an early indicator of the onset of Alzheimer's. Researchers have found that ability to smell is linked to loss of memory, language and executive function.

8 Up in smoke?

The debate rages on about legalising cannabis but, in the meantime, what is its impact on the brain? Dr Daniel Amen has just published a study that examined 62,454 SPECT scans to discover the factors that cause premature ageing. Schizophrenia was number one. "The next worst surprised us," says Dr Amen. "It's marijuana." He supports legalisation, but "let's not say its good for us."

9 Inflammation

When your system is on fire

The same process that leads to an increase in the risk of cardiovascular disease, high blood pressure, premature aging and other conditions, surprise, surprise, also affects brain health and links directly to Alzheimer's. "This is the key reason why people have long-term brain health issues but also short-term issues," says Dr Briffa. "It can upset the chemistry of the brain in a way that causes anything from brain fog to depression."

Inflammation is the result of an immune system that has become permanently switched on, and can sometimes lead the body to attack its own tissue as an auto-immune condition.

How do you know if your body is in an inflammatory state? "If you have pain, you're more likely to have inflammation," says Dr Amen. "If your gut is not right, you're more likely to have inflammation. If you don't eat fish or have low omega-3 fatty acids, you're more likely to have inflammation. If you eat a lot of processed foods, you're more likely to have inflammation."

There are also simple blood tests that your GP can carry out to check markers for inflammation, says Dr Bredesen. Ask for your high sensitivity C-Reactive Protein (hs-CRP) to be tested. Ideally, says Dr Bredesen, it would be less than 0.9mg/dL. Routine blood tests usually include the ratio of albumin to globulin (A/G ratio), another measure of inflammation, which is best, he says, if below 1.8. Other good measures are the ratio of inflammatory omega-6 to omega-3s in your red blood cells, which he advises should be less than 3 but above 0.5.

If you find your inflammatory markers are higher than you would like, you may want to clean up your diet — reducing sugar, reducing simple carbs that are high GI, such as breads, pasta, flour-based products, processed foods, alcohol and bad fats including trans fats. Replace with anti-inflammatory foods such as green, leafy veg, brassicas and beetroot. Fish oils are hugely helpful. Aim for 1g daily of EPA from fish oil, krill or algae, suggests Dr Bredesen. And brew teas or use spices and herbs such as ginger, cinnamon, cloves, turmeric and thyme as often as possible. Tackle stress, and check your oral hygiene and gum health. If, when you retest, your markers are still high, then ask your doctor to delve a little deeper to check for any chronic infections, for example.



THAT'S NUTS
Eating nuts regularly strengthens the brainwaves related to memory, learning, healing and cognition, a 2017 study found. And different nuts stimulated different types of brain frequency. Pistachios, for example, generated the strongest response linked to processing, perception and memory.

10 Check your homocysteine

The amino acid homocysteine is a reliable marker for inflammation and also for poor nutritional status and can be checked by your GP. One UK study showed that as homocysteine levels creep up, so does brain shrinkage — the higher the levels, the greater the impact on cognitive function. The effect stopped as soon as homocysteine came down to optimal levels.

Dr Bredesen says that having enough B vitamins, in particular B6, folate and B12, will help reduce your homocysteine to below 6mol/L. You'll find these vitamins in foods such as wholegrains, dark leafy greens, legumes, almonds, sunflower seeds, fish, eggs and poultry. Alternatively you could supplement with a B complex vitamin that uses the active form of the vitamins — P5P, methylfolate and methylcobalamin.



11 Watch your carb intake

"The general view," says Dr Briffa, "is we need carbohydrates because we need glucose for brain fuel. That's not strictly true. A lot of carbohydrates, including starchy carbs, are quite disruptive of blood sugar levels so you can have highs of blood sugar and then lows a couple of hours later." This has a short-term impact on brain function, killing your concentration and motivation. "And with a lot of glucose in the system from all these carbs, you make a lot of insulin, and we've got pretty good evidence that insulin resistance is a major underlying factor in cognitive decline."

Sandwiches for breakfast, pasta for lunch and a pile of potatoes in the evening is generally not so good for brain health — both in the short term and long term. Instead, choose the most nourishing carbs, and choose the ones that are not particularly disruptive to blood sugar. That really means vegetables, advises Dr Briffa. Add healthy wholegrains and legumes to bulk up your meals if needed.

ME AND MY BRAIN

Olivia Tracey



'I really don't mind what number I am in years'

MODEL Olivia Tracey, 58, works in an industry considered terminally ageist, but she kept modelling long past the norm. "The fact that I am still modelling has been a nice surprise," she reflects. "Because when I was in my twenties it never occurred to me that I would be modelling at over 30, let alone over 50."

She attributes her long career to the fact that she moved to America. "When I was in my twenties the model agent Eileen Ford came to Dublin and she wouldn't take me on because I was too old; I was 26 at the time. And then fast forward years later, Ford sought me out in America. They represented me in Los Angeles for over 10 years."

Olivia stopped colouring her hair, letting it to turn its natural shade of grey. It became her trademark look and one that still wins her major hair campaigns.

"I was in my forties after I let my hair turn silver," she explains on the phone from America, where she has added actress and producer to her portfolio. "That put me into a whole new 'mature woman' category and there's a big market for that out here. In

Ireland as well; I've been home recently shooting a couple of campaigns, including the new campaign with Kildare Village, which I loved. They embraced women of all different ages. I love the diversity that the industry has welcomed."

Her take on ageing is one of equanimity. "I don't consider ageing a problem. It's a natural flow of life and as long as I am healthy and happy I really don't mind what number I'm at in years."

It's an attitude that has withstood the pressure of living in a city which would seem to worship at the altar of eternal youth. "I would say that LA is a very young town. And yes, being youthful here is definitely a plus. But personally I have never felt like, 'Oh God, I wish I could turn back the clock 20 or 30 years.' I've never felt that way. I am quite happy with where I'm at."

In fact, if anything, LA seems to help her to be upbeat. "LA is generally a very positive place to live and they're very tuned in to thinking positively about things. Like remembering that even when things are not good, always believe that they will get better. And that you can't just sit and wait for it to get better. You have to help yourself."

Certain habits and routines

are in place that help to keep her mentally fit.

"I have my little exercise routine, yoga stretches really. I do it as a physical thing but it also benefits me mentally. Even if I'm in a hurry I will try to squeeze in a 20-minute workout if I can't do the full half hour. Just to do that little bit of stretching — switching off mentally and breathing into the exercise — is, I find, very relaxing."

Liadan Hynes

Olivia's tips for brain health

■ I bought two Rosetta Stone language courses, Spanish and Italian. It's a great way to keep the mind sharp.

■ It's good to hang out with younger people — they're fun and you can learn from them, particularly when it comes to technology.

■ Sometimes I will try to remember phone numbers rather than using speed dial. My father was an accountant so I'm actually not bad with figures. On occasion I add up in my head instead of going straight to the calculator.

12 Don't retire Challenge your mind

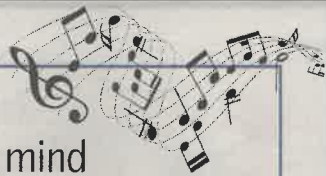
If you're watching in despair as the official age at which you can cash in your pension drifts further and further towards 70, there is a silver lining. The later you retire, the more you help your brain. "When you stop learning," says Dr Amen, "your brain starts dying." He points to a study conducted with 500,000 people which showed that for every additional year of work, the risk of dementia was reduced by 3.5pc.

However, it is probably safe to say that if your job doesn't challenge your grey matter, this protective effect may not apply. "You want to be doing new and different things," says Dr Amen. "If you're a master chef, learning new recipes is not going to help you. You want to pick up things that you don't know or you're not good at. Humans hate that because we hate feeling inadequate."

When it comes to brain training with crosswords and sudoku and the like, he says: "Just doing crosswords is like going to the gym and doing a right bicep curl. It's sort of dumb." He favours a business practice called 'cross training' where two workers in the same company learn how to do each other's jobs for a period. "It's good for the business and it's good for the employee."

"When it comes to new learning, think of it this way: you want to work out your whole brain, not just, say, the language part of your brain. Some really good whole brain exercises are learning new dance steps with a partner (see Loretta Yurick, right, for more). There's all the social-skill stuff that goes along with dancing with a partner and you're learning coordination. Exercise to music."

How does he challenge himself? "My favourite game is table tennis — you've got to get your eyes, hands and feet to work together while you think about the spin."



Waking in the middle of the night? Check your carb intake, especially for fast-releasing pastas, breads and pastries. "It can also disrupt sleep," says Dr Briffa, "and is a major cause of why people wake in the middle of the night."



HOW I FIXED MY SLEEP

Until a few years ago, writes **Michelle McShortall**, a good night's sleep gave me a great sense of restoration. But then I began waking up feeling exhausted even after a full night's sleep. I was also grinding my teeth. I realised that my go-to reboot remedy had slowly come undone.

To put it all into context, a few years before, I had suffered two herniated discs and as a result had switched from side sleeping to back sleeping. One morning my husband Mark mentioned that I had been snoring. I presumed he was describing an occasional light feminine purr. Women don't really snore, do they?

Then another pattern began to emerge. Mark was waking earlier and earlier. Somewhere in the back of my mind I knew it had to do with my *alleged* snoring. So feeling a bit guilty, I decided to check it out.

The first eye-opener was the news, via the National Sleep Foundation in the US, that my snoring could be on the way to a fairly serious sleep disorder, sleep apnoea, a condition where your breathing repeatedly stops and starts during the night. If untreated it can lead to high blood pressure to heart disease and other health nasties.

I needed to find out if I was snoring. And of course, there's an app to help. SnoreLab (snorelab.com) records and tracks snoring. It records four different grades, from Quiet to Light to Loud and what they call 'Epic'. I plugged in my smartphone, activated the app and nodded off.

The next morning, my dashboard graph showed that I was summiting those Epic peaks enthusiastically. SnoreLab had literally caught me in the act.

I began to research ways to combat the problem. I tried Neti pots — where you rinse your sinus with salty

water — the Buteyko technique, which focuses on nose breathing and relaxation techniques, and oral exercises in case I had a flabby tongue.

I deduced I was a nocturnal mouth breather. Dr Mark Burhenne, author of *The 8-Hour Sleep Paradox: How We Are Sleeping Our Way to Fatigue, Disease and Unhappiness*, became my guru. He explains that nasal breathing is important because of nitric oxide. You don't want to miss out on this clever, colourless gas which, he says, improves memory and learning, regulates blood pressure, reduces inflammation, improves sleep quality, increases endurance and strength, and improves immune function. Twenty-five per cent of our nitric oxide comes via nose breathing. Mouth breathing leaves us short.

Grinding your teeth, which I had thought was stress related, is, says Burhenne, an instinctual response to reopen our airways and help us survive.

So what do you do about it? Happily Dr Burhenne offers a solution, one that can be found in every first aid kit and will cost you about 2c per night. Mouth taping. Every night before I go to sleep, I place a piece of microporous surgical tape (Micropore) over my lips and tape my mouth shut. This forces me to breathe through my nose during the night and has opened up my nasal airways in a way I would not have believed possible.

Now I wake refreshed and restored. I feel my memory and concentration has improved and my SnoreLab score shows my snoring has dropped dramatically. For me, mouth taping is the all-time super sleep hack.

Of course, it does look strange. But hey, it's win win all round, and I think my sleep partner would vouch for that.

13 What did you say?

Hearing loss and brain power are linked, according to studies conducted at John Hopkins University in the US. One study showed that those with hearing loss were 24pc more likely to develop Alzheimer's, while in another, the greater the hearing problem, the

higher the risk of dementia. One possibility is that the extra cognitive stress of processing sound diverts energy that would otherwise have gone to memory and other functions. But there's good news too. If you find yourself lip reading at parties, a French study gave a cohort of people with deafness in at least one ear cochlear implants and rehab; 80pc showed brain improvements within the year.



EYES RIGHT
If you're spending long hours in front of a computer, consider investing in blue light filter glasses to offset the impact on your sleep hormone. Ambr Eyewear filters over 55pc of blue light and 95pc of UV light, €56; ambreyewear.com

14 Brain stealers What's keeping you awake?

It's in our forties and fifties that many of us begin to notice changes in our quality of sleep. Anything from wakeful children, to stress, to alcohol intake can start to interfere, while falling progesterone levels can be a factor for menopausal women. So can sleep apnoea, a condition where you periodically stop breathing for anything up to 80 seconds.

According to Dr Amen: "When you have sleep apnoea it steals your brain. It damages your brain. If you're not sleeping seven hours a night, you will have low overall blood flow to your brain."

Dr Bredesen agrees, and recommends that anyone who is overweight or who snores, men over 40, those with short, thick necks, or even those who wake up exhausted should get tested with a pulse oximetry test. This is a device fitted to your finger overnight that records the oxygen saturation levels in your blood and will tell you whether you need to take action. There are also some simple DIY tests and solutions (see case study above).



15 What do brains love?

Optimise your sleep, says Dr Amen. "A number of years ago, we figured out that while you sleep your brain cleans and washes itself. So, if you don't sleep, trash builds up and leads to cognitive impairment." It's also the time when your brain heals and produces new supportive brain cells, as well as processing and packing away memories. In fact, there are few cognitive processes that aren't affected by sleep.

Dr Briffa adds: "When people aren't getting enough sleep it can lead to all sorts of mental problems — everything from slowed thinking and errors of judgment, right through to mood issues such as anxiety, low mood

or even full-blown depression. Sleep debt also depletes willpower, which makes doing the right thing — rather than the easier thing — harder. Running short on sleep makes life more difficult in a number of ways."

How do you know if you're getting enough sleep? Dr Briffa says that everyone has different requirements, "but if you are regularly waking to an alarm, that's normally not a good sign. If you were properly rested from sleep you would wake naturally, feeling rested."

"A lot of people wake up feeling they wish they hadn't, and would like another hour or two of sleep. That's a pretty sure sign of sleep debt. One way this manifests is through use of the snooze function."

He is not a fan of sleep scheduling — the idea that you rigidly follow, for example, a 10pm to 6am bedtime routine. "This is just not practical for most people."

Instead, he suggests trying to catch up on sleep by going to bed earlier when it's practical to do so. Sleeping in a bit when the occasion allows is another way of topping up. Naps are also helpful.

"These can really restore mental energy, but we just need to be careful about timing. Ten to 20 minutes usually works well, but 30 or 40 minutes tends not to." Shorter naps allow you to dip in and out of relatively shallow REM sleep that can be very restorative. Longer naps risk you dropping into deeper sleep and waking from that can be tough. "Some people do take naps during the working day," he says. Maynooth University and Nike HQ have all installed sleep pods in their offices, but most companies are not yet recognising the benefits of a well-rested work force.

Until that happens, the rest of us may just have to follow the example of one of Dr Briffa's patients: "He goes to a quiet toilet in his office and naps there."

16 Why exercise is about more than just weight

We know that physical activity is crucial to age-proofing your brain because it lowers your BMI and weight — two risk factors for cognitive decline. But the latest science shows that exercise actually boosts brain power directly. Dr Briffa explains: “It stimulates blood supply to the brain and stimulates something called BDNF (Brain-Derived Neurotrophic Factor), which is good for the brain, protects it from damage and even stimulates the production of brand new brain cells.”

BDNF is manna for the brain. Higher levels increase the volume of the hippocampus, the part of the brain involved in making and storing memories. One study showed that women with higher levels of BDNF not only scored better on their BMI, but had higher scores on memory tests. Low levels are linked to accelerated ageing, depression, even schizophrenia.

Intense exercise is the key to stimulating BDNF and its positive effects. And it seems likely that the greater the intensity and the more often you exercise, the more BDNF you produce. Dr Bredesen suggests combining aerobic exercise with weight training, preferably at least four or five times a week, for 45-60 minutes in total each day. Aim for 30 minutes to within 60-70pc of your maximum heart rate.

If you don't immediately notice the benefits, don't give up — one study showed that you need to keep exercising for at least five weeks to produce higher levels of BDNF. If you're low in motivation, think about investing in a fitness tracker such as a Fitbit or Garmin to set targets and help track your heart rate and monitor your progress.



17 Check your hormones

Your hormone levels are crucial to your brain's ability to function well as many of them support the making and maintenance of the brain's synapses. However, as we age, levels of the sex hormones oestrogen, progesterone and testosterone tend to drop, while thyroid hormones can often get out of kilter.

Optimal thyroid function, says Dr Bredesen, is crucial to cognitive health. Your thyroid function sets your metabolism, your heart rate and your mental sharpness. It can also affect your sleep and whether you become depressed. Low thyroid function is commonly found in those with Alzheimer's.

There's an easy way to test it — take your basal body temperature with a thermometer under your armpit for 10 minutes before you get up in the morning. It should read between 97.8F and 98.2F; any lower and you may have low thyroid function. If so, Dr Bredesen recommends asking your GP to test your complete thyroid panel of TSH (thyroid stimulating hormone), T3, T4 and reverse T3.

He also suggests supporting your thyroid if your TSH levels are more than 2.0microIU/ml (a level a good deal lower than that considered in the normal range of 4.25microIU/ml in Ireland).

When it comes to oestrogen, Dr Bredesen acknowledges that hormone replacement therapy is controversial. “There are side effects [to supplementing hormones] and so you have to be very judicious with your use of hormones,” he says.

However, he cites studies from the Mayo Clinic that show that women who have had their ovaries removed by the age of 40 and don't have HRT may face double the risk of Alzheimer's.

Secondly, the ratio of oestradiol (a form of oestrogen) to progesterone is important. Too high and you will experience ‘brain fog’ and poor memory. Symptoms many menopausal women will identify with. “There are multiple studies that show that optimising your oestradiol is helpful for your cognition.”

Before you approach your GP about boosting your hormones, Dr Bredesen suggests trying lifestyle approaches first. “You may not need to take hormones. You may improve your own production just by improving your metabolism and improving your levels of inflammation (see page 5). As long as you have systemic, ongoing inflammation, you're going to damage your ability to make your own hormones.”

If lifestyle interventions fail, and you wish to try hormone support, Dr Bredesen stresses that it is crucial to work with a practitioner expert in hormone therapy and cognitive function who can help you weigh up the risks and benefits of hormonal support.

ARE YOU IN MENOPAUSE?

Optimal levels of testosterone — which both women and men produce — help to maintain the neurons in your brain. “Testosterone is not just about libido,” says Dr Amen, “It's also memory, mood and strength.” Studies show that men in the lowest 20pc of testosterone levels have a higher risk of Alzheimer's.



'With dance, you learn new sequences for the brain'

ARTISTIC director of Dance Theatre of Ireland, Loretta Yurick, trained as a dancer in the US and has toured internationally. Not surprisingly, for Loretta, dance is the secret to a healthy brain. “The physical and social connection that I have, focusing on movement and breath and other people, I find all of these things mean it's not possible to hold onto your problems. You have to let go, and it puts your mind completely on what you're doing in the moment. I find dancing to be a great stress reliever in that sense.”

Along with her fellow artistic director, Robert Connor, Loretta has developed a programme called Well-Dance for Seniors, a programme of contemporary dance for people of 55 years and older. “It's a creative process as much as a physical one,” explains Loretta. “We're not just repeating movement, we're creating as well.”

Dance for Loretta is a form of mindfulness. “As you become acquainted more deeply with your own body, dance incorporates a mindfulness technique: awareness and sensitivity to your own body in stillness and in movement. Within that there is a great release — you have to suspend all other thoughts and you learn to focus.”

Learning new moves is essential for brain health, she believes. “With dance, you learn new sequences for the brain, new co-ordinations, new motor memories, new cognitive skills. You have to make quick decisions. In Well-Dance you create [new moves] and while doing this, you're also using and developing your memory and your muscle memory. Those two things support brain plasticity.”

Loretta also teaches classes for those with Parkinson's disease and their carers, in conjunction with Move 4 Parkinson's.

Loretta's tips for brain health

- There are four factors which serve to keep the brain young and offset ageing — a green diet, social connection, exercise, and learning new things. Of these, social connection is the most important thing to ageing well, and dancing encompasses exercise, social connection, and learning co-ordination.

“The cerebral cortex is remarkably plastic, and it can rewrite itself,” she says. “So our brains are constantly rewiring their neural pathways as needed. If our brain doesn't need to do this, then it won't; the saying ‘use it or you lose it’ applies to the body as well as the mind.”

Loretta cites an analogy she came across from a Stanford scientific study, which found that dancing makes you smarter. “That

analogy was, the more stepping stones there are to cross a creek, the easier it is to cross in your own style. For you to find as many alternative paths as possible is a parallel and creative process; you're doing more than one thing at a time. But as we age, parallel processing becomes more critical. Now it's no longer a matter of style, it's a matter of survival. Getting across the creek at all. So randomly dying brain cells are like stepping stones being removed one by one.”

If you are constantly developing only one well-worn path of stones, that path will eventually be blocked when the stones (or your brain cells) are removed. Those who constantly try different routes will still have several paths left. “Studies show people who remain active and keep generating new pathways maintain the complexity of our neural connection.”

Liadan Hynes

ME AND MY BRAIN

Loretta Yurick



Photo: Mark Condren
Make-up: Hayley McDonald at Brown Sugar; brownsugar.ie

18 Bring me sunshine

The role of Vitamin D



FEELING BLUE
Artificial light, particularly the blue light of our digital devices, suppresses the sleep hormone melatonin and can impair sleep. Luckily there is software to help. Those using Apple devices can switch on Night Shift which mimics nature's light cycle, while Android users can download the Twilight app. Flux (justgetflux.com) is a free downloadable programme for your desktop. However, the best advice is to put your devices away an hour before bedtime to allow levels of melatonin to rise.

One key factor in cognitive function is Vitamin D. "Low levels are associated with cognitive decline," says Dr Bredesen. Yet, approximately 25pc of Irish people over the age of 50 are deficient in Vitamin D in winter, according to research carried out for the TILDA study at Trinity College Dublin. And there are wide variations across the country with those in the north and west most likely to be low in the vitamin.

"Vitamin D does appear to be a mood enhancer so it certainly has some role to play in the production of serotonin," says Dr Briffa. "There is a bit of work in this area but what I've found is that when people optimise their levels of vitamin D, they have either no, or far fewer, issues around mood through the winter. They feel a lot better mentally and they also get fewer infections."

That is because Vitamin D also boosts immunity which, says Dr Amen, is crucial to brain function. He cites an editorial by 33 clinicians and researchers published in the *Journal of Alzheimer's* in 2016 that expressed concern that the role of viruses, bacteria and fungal infections was being overlooked as a major cause of cognitive dysfunction and Alzheimer's. Other studies have found the oral bacteria associated with gum disease (*Porphyromonas gingivalis*) repeatedly in the brains of those with Alzheimer's. They suggest that these infectious agents remain latent in the brain and

can be reactivated when the body is under stress or the immune system weakens with age. In these cases, believes Bredesen, Alzheimer's can be seen as the brain's protective response to the pathogens.

"The simple thing to do," says Dr Amen, "is boost your immunity to get your body to want to fight infections and the way to do that is to optimise your Vitamin D levels."

Vitamin D is made in the body when your skin is exposed to UVB rays. Of course, we're all aware now of the dangers of sun exposure and the need to wear sun protection, but Dr Amen points out that dermatologists have "made us afraid of the sun". "Low levels of sun exposure are as harmful as high levels of sun exposure. So I don't want you to get burned, but I want you to know your Vitamin D level and to optimise either with more sun in a sane, healthy way or by taking Vitamin D3."

Your GP can run a blood test to determine your levels, normal is estimated as between 20-50ng/ml, but both Dr Bredesen and Dr Amen recommend optimising levels at between 50-80ng/ml. Retest regularly, though, as too much Vitamin D can be toxic.

SUPERFOOD

Prepare yourself for the latest smart drug — whole coffee fruit concentrate has been shown in a preliminary study to improve blood levels of BDNF, the growth hormone that sparks new neurons, by 143pc.



19 What's your waistline?

In Ireland, we're fast on the way to becoming the fattest nation in Europe with one in four adults now classed as obese, and 70pc of men recorded as being at an unhealthy weight. Not only does obesity increase the likelihood of sleep apnoea (see page 6), but it can lead to a cluster of conditions such as increased blood sugar, high blood pressure, fat around the middle and high cholesterol levels that together are known as metabolic syndrome and increase your risk of heart disease, stroke and diabetes. The dangers don't stop there. Studies show metabolic syndrome also has a big impact on your cognitive function and the risk of developing Alzheimer's.

On the plus side, if you tackle it, says Dr Bredesen, not only are you age-proofing your brain but you may find you no longer need medication for blood pressure, statins or Type 2 diabetes, "because when you do the right things, you actually don't need them."

There's no one silver bullet that tackles metabolic syndrome. The first step is to ask your GP to test for Haemoglobin A1c, which

Dr Bredesen advises should be below 5.6pc. If it is over that, there are umpteen resources to help you change your lifestyle and improve your risk factors, including the many pointers given here.

20 Mind your head

A few weeks ago, Leicester rugby player Dominic Ryan announced his retirement from the game at just 28

years of age. The reason? The damage that years of hard tackles and concussion had done to his brain. It's a familiar story to Dr Daniel Amen who has treated many National Football League (NFL) players in the course of his career. His functional imaging SPECT scans measure blood flow to the brain and, he says, clearly identify the physical damage that head injuries — even without concussion — cause to the brain. His findings are supported by a study carried out by the Mayo Clinic that found that 32pc of men who played contact sports, even at amateur level, had chronic traumatic encephalopathy (CTE) or what's known as 'football dementia'.

"Your brain is soft — about the consistency of soft butter. Your skull is really hard and has multiple sharp bony edges. Repeated hits to the head can devastate the brain long term," he says.

He will not, he says, be recommending that his own grandchildren play football or rugby or soccer. "If you're going to play, then you need to be rehabilitating your brain all the time. Not just when you're symptomatic 10 years after you retire."

Dr Amen has devised a protocol to treat patients with brain trauma that addresses a number of factors including nutrition, sleep, and a therapy known as hyperbaric oxygen treatment (see below) and claims to have improved brain trauma in his patients. However, the general rule is that prevention is definitely better than cure.

What is hyperbaric oxygen treatment?

The therapy involves breathing pure oxygen (95-100pc) in an airtight pressurised metal tank for approximately one hour per 'ride'. The theory is that the combination of increased pressure and high levels of oxygen increases the amount of oxygen delivered to damaged tissues and speeds up repair, especially to areas with low blood flow.

The National Hyperbaric Centre in Dublin (one of 10 in the country) sees

many sports professionals hoping to speed up recovery times for sprains and soft tissue injuries, which may be why rugby player Gordon D'Arcy's signed Leinster jersey hangs on the wall. But Dr Amen is an advocate of using the therapy to treat brain injuries. It is still controversial and while there are studies that support its use, others claim it is ineffective. Over the last few years, however, an increasing

amount of research has found it helpful for cognitive function. A 2017 study from Tel Aviv University, for example, suggests it may help relieve symptoms of Alzheimer's. Another in the *International Journal of Neuroscience* found it increased blood flow and metabolism in chronic brain injury. Side effects? Yes, they are rare but rupture of the middle ear, sinus or lung damage, and seizures have been known.

ME AND MY BRAIN

Ian Robertson



'Feeling hassled or stressed depletes your brain's reserves'

BEST-SELLING author Ian Robertson is co-founder of the Global Brain Health Institute and Professor Emeritus at Trinity College Dublin. As a neuroscientist and a trained clinical psychologist, his research tries to bridge the gap between brain science, human psychology and the personal challenges that every single person on the planet faces from time to time. His popular books include *The Stress Test*, *Mind Sculpture*, *The Mind's Eye*, *Stay Sharp* and *The Winner Effect*.

Ian, 67, has distilled the science on healthy brain ageing and applied it to his own life. "I take plenty of exercise — five times a week at least, for anything from 20 minutes to a couple of hours. Recently I have used an exercise bike when I'm pushed for time, but more often now in good weather I cycle to work. Occasionally I run or swim and quite often walk. I have no doubt that this is crucial for my brain — and the science is very strong on this."

He pays as much attention to his mind and stress levels as his fitness. "I also use mindfulness, one

or two brief five-to-eight-minute sessions using an App (Budhify) most days. The science isn't as strong on this as it is for aerobic exercise, but it is promising, and for sure feeling hassled or stressed depletes your brain reserves.

"Finally, I made sure not to retire — I know my brain is, to a certain extent, like a muscle and the principle of 'use it or lose it' is a fact not a myth. If I wasn't still working I would keep my brain active through voluntary or community work, or maybe start to learn a musical instrument or some art — but leisure stops being leisure when that's all you have: it only stays leisure in contrast to work."

Ian's tips for brain health

- Regularly exercise — enough to raise a slight sweat (but check with your doctor first if you aren't already exercising). Try to find types of exercise that are enjoyable rather than chores, or if you can't, listen to talking books while you do it.
- Enjoy the moment by learning to relax and be mindful. There are hundreds of ways of doing this, including yoga, mindfulness apps and tai-chi. Spend at least a few minutes each day training your mind to stay in the moment.
- Remember that a healthy age-proofed brain needs three things: Challenge. Change. New Learning.