

Mind ^{Over} Matter

VOLUME 16

HELPING YOU PROTECT
YOUR BRAIN HEALTH

*Get & Stay
Brain Fit*

*Bipolar
Disorder*

*Wounded
Warriors*

*Medical
Gaslighting*

*A Lot on
Your Plate*

*Retirement &
Brain Health*



Women's Brain
Health Initiative

1998
25
2023



25 Years of Putting Our Brains to Work For Yours.

This year, Brain Canada celebrates a quarter century of accelerating, amplifying, and funding critical brain research. Working with a community of caring partners and donors, we've invested over \$290 million in next-generation investigators, capacity-building initiatives, innovative research teams, and unique collaborations to drive brain science forward.

With your support, we'll continue advancing the brain health of people in Canada for decades to come.

*Financial contribution from
Avec le financement de*



Health Canada Santé Canada



Fondation
Brain Canada
Foundation

Editor-in-Chief

As Women's Brain Health Initiative (WBHI) enters its second decade, we are so grateful for the ongoing support of our many friends and heartened by the growing momentum of our mission.

There is no better barometer than our flagship publication *Mind Over Matter*®. At a time when so many magazines are struggling, I'm happy to tell you that we get hundreds of requests for copies with every edition. That is on top of our substantial distribution from coast to coast and our digital version.

When WBHI launched we were one of the few voices speaking up to promote brain health, rather than focusing on disease, and to fund groundbreaking research into the sex differences that mark brain-aging disorders. Now I'm encouraged that more people are catching up and tuning into an important conversation in which we are proud to play a leadership role.

We pioneered the idea of a Women's Brain Health Day, which was officially endorsed by the federal government, and which complements one of our leading fundraising initiatives, the Stand Ahead® Challenge. On the fourth Women's Brain Health Day last December 2 we reached another pinnacle when supporters contributed more than a million dollars, the highest total yet! My deepest thanks to all who donated, especially The Citrine Foundation of Canada and our friends at Brain Canada. Once again, Brain Canada generously matched all donations up to \$250,000, and we are so grateful they have agreed to continue as a crucial partner to WBHI, including supporting *Mind Over Matter*®.

The Stand Ahead® Challenge has now raised more than 3 million dollars; money that will fund research into brain-aging disorders that disproportionately affect women.

WBHI's educational and outreach initiatives continue to grow in depth, breadth, and variety.

On Women's Brain Health Day, we launched the BrainFit app, which is designed to help improve lifestyle habits across all Six Pillars of Brain Health: stress management, exercise, mental stimulation, social activity, nutrition, and sleep. It is unique in its specific focus on extending cognitive vigour, all its features are free, and it was created with women in mind.

BrainFit's popularity is beyond our expectations. It is constantly being updated, so I encourage you to try it and tell us how you think we can improve it. Dr. Lora Appel, Assistant Professor of Health Informatics in the Faculty of Health at York University, is analyzing the efficacy of the app and she speaks about the project in an article in this edition of *Mind Over Matter*®.

WBHI is also expanding our reach to different parts of the country

as the host of a Healthy Bodies, Healthy Minds event in Vancouver on May 1 that will feature a panel discussion among researchers with expertise in brain health, cancer, and heart disease, focusing on the unique risks for women and what we can do to protect ourselves.

A similar event in Toronto was a huge success, with compelling conversations about the concept of a "whole body" approach to health. It turns out that lifestyle choices that benefit brain health are also good for your heart and can reduce cancer risks.

Our initiatives are backstopped by a growing list of partners, which we are so grateful to. RBC is the principal sponsor of the Vancouver event. BMO Financial Group sponsored Women's Brain Health Day and committed to do more in the future. CIBC continues its generous sponsorship of our From Her Lips to Our Ears events and now supports the BrainSuite initiative, which is geared toward young adults. It is no coincidence that financial leaders have been drawn to our mission. With increasing rates of dementia and an aging population concerned about protecting financial security, it makes sense that financial institutions support our efforts to preserve brain health.

Our newest education initiatives are prospering, including Brainable, a brain health program geared to students. We have now produced 12 *Mind Over Matter*® podcasts and eight videos, all centred on the Six Pillars of Brain Health. Generous government grants made these initiatives possible, along with the support from many individuals who believe in the vital work that we do, and from organizations like TELUS, RBC, BitBakery, York University, RB33, and The Citrine Foundation of Canada.

In this edition of *Mind Over Matter*®, I invite you to check out the latest on brain health research, advice, and issues. We cover the topic of "medical gaslighting," which is when doctors downplay or disbelieve women's symptoms. We explore whether early retirement can be bad for cognition. And we survey new research that explores reasons why women develop Alzheimer's disease much more frequently than men.

Wishing you happiness and good health. 🍀

Lynn Posluns
President and CEO,
Women's Brain Health Initiative

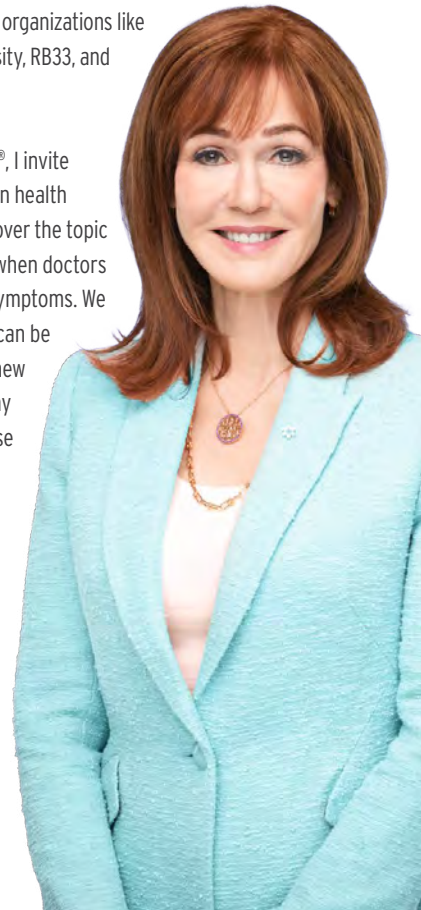


TABLE OF CONTENTS

- 6 Medical Gaslighting
- 10 Finding Equilibrium
- 15 Hypertension
- 18 At Full Strength
- 23 The Good, The Bad, & The Ugly
- 26 Subclinical Hypothyroidism
- 31 Zentangle
- 34 Get & Stay Brain Fit
- 36 Wounded Warriors
- 39 It's About Time
- 42 On the Cover
- 44 Bipolar Disorder
- 48 Put Your Finger on It
- 51 Heads Up
- 53 BrainBuzz
- 54 Sugar Challenged
- 56 Sittin' on the Dock of the Bay
- 58 Those Were the Days
- 61 A Lot on Your Plate
- 65 Memory Morsels
- 67 Board of Directors & Supporting the Initiative

Contributors



ALEX MLYNEK // MANAGING EDITOR

Alex Mlynek is a Toronto-based journalist who has worked as an editor for *Today's Parent* and *Canadian Business* magazines. Her writing has appeared in a number of publications, including *Reader's Digest*, *Broadview*, *Chatelaine*, *Best Health*, *The Walrus* and *Report on Business*. She loves telling a good story and making copy entertaining and accurate. When she isn't hanging out with her husband and two kids, you will likely find Alex in her garden or with her nose in a book.



SANDIE BENITAH // WRITER

Sandie worked as a journalist in some of Canada's biggest newsrooms for more than 20 years before taking a step back to concentrate on freelancing. The one thing that always drew her to journalism was the lifelong education that came with meeting new people, learning about their struggles, and telling their stories. Writing for Mind Over Matter® has given Sandie a deeper understanding of the importance of brain health and the critical steps both men and women can take to improve their lives.



SUSANNE GAGE // WRITER

Susanne is a marketing/communications agency and events professional, with a solid appreciation for smart thinking. A believer in life balance and healthy body and mind, Susanne is also a passionate advocate for giving back. "As a business woman, wife, mother, daughter, and friend, I am inspired by the impact of WBHI and the collaborative opportunities to make a real difference."



STEPHANIE HAHN // WRITER

Stephanie is a writer and yoga instructor living in Waterloo Region, Ontario. It was through the "gift" of back pain that Stephanie learned to slow down, listen to her body, and rediscover the joys of moving. "Writing for this magazine allowed me to merge my love of writing with my love of spreading the word that stress relief is critical for health."



JANE LANGILLE // WRITER

Jane is a health and medical writer living in Richmond Hill, Ontario, who writes for healthcare organizations, hospitals, and academic health research institutions in Canada and the United States. Having seen close family members deal with progressive supranuclear palsy and Parkinson's disease, she enjoys interviewing experts to learn about the latest advances in women's brain health and sharing evidence-based insights.



SEAN MALLEN // WRITER

Sean is a Toronto-based communications consultant, media trainer, and writer. Having seen close family members deal with dementia, he is a passionate supporter of WBHI's mission and is inspired by telling the stories of researchers who are expanding our knowledge of women's brain health. Sean's first book, *Falling for London: A Cautionary Tale* from Dundurn Press, is widely available across North America and the United Kingdom.



SUBHA RAMANATHAN // WRITER

Subha is a director and research consultant for Atmoco Ltd., specializing in health promotion through physical activity. With a PhD in public health, Subha helps non-profits collect relevant information, make research findings understandable, and put recommendations into action. She also teaches a university course in sustainable happiness. Writing for Mind Over Matter® unites Subha's knowledge, skills, and desire to share information and strategies that enhance brain health and overall well-being.

LOOKING FOR
MORE COPIES?
mom@womensbrainhealth.org





**VITINA BLUMENTHAL //
CREATIVE DIRECTOR**

Vitina, co-founder of Align Creative Minds, is creative to her core with a passion for a healthy lifestyle (especially all things yoga) and sharing her love of mindfulness with others. Through her business, she empowers yoga teachers to spread tools that support brain and mental health.



**GREGORY CIRA //
CREATIVE DESIGNER**

Gregory is an established design entrepreneur with an acuity for information design and understands the importance of communicating clearly. Having had family members who suffered from dementia, he has been inspired to raise awareness of the importance of brain health and uses his visual communication skills to help bring that awareness to others.



COVER PHOTO: JAVLYN TODD

MELISSA GRELO & CLARITA GRELO // ON THE COVER

Viewers of CTV's *The Social* might be surprised to learn that co-host Melissa Grelo's childhood was spent mucking out stalls at the family's horse farm northwest of Toronto. That's where she learned about the value of hard work and where her mother, Clarita, taught her about the importance of eating fresh food. It was a lesson passed down from Clarita's mother, who shopped daily in the market for vegetables and fish she would prepare for a family of seven children in the Philippines. Long before they ever thought about the concept of brain health, Melissa and Clarita were already doing the right things with regular exercise and healthy eating. Now that they're sharing the cover of *Mind Over Matter*®, they hope to use the platform to help spread the word. "People should be aware of how to keep their brain healthy," said Clarita.

WE ARE TRULY GRATEFUL TO:



*Financial contribution from
Avec le financement de*



Health Canada Santé Canada

AND ALL THOSE WHO GENEROUSLY SUPPORTED THIS PUBLICATION:

- | | | | |
|------------------------|-------------------------|-------------------------|------------------------------------|
| Sheila Alexander | Marlene Gage | Pauline Menkes | Anne Schwartz |
| Beverley Andrews | Paul Gagne | Ellen Sue Mesbur | Mona Sherkin |
| Sephi Band | Lynn Glazer | Susan Minuk | Joan Siwik |
| Marilyn Brunet | Teresa Gombita | My Tribute Gift | Joan Sohn |
| John Chen | Mashuri Clark & Candice | Margaret Nightingale | Fran Sonshine |
| Sylvia Chrominska | Gottlieb-Clark | David Pamenter | Sylvia Soyka |
| CIBC | George & Kitty Grossman | Kelly Park | Maria Stenger |
| Coheze Developments | Marie Hall | Naomi Parness-Levy | Agnes Stevens |
| Karen Cox | Sandra Hare | Felicia Posluns | Barbara Sugar |
| Crowe Soberman LLP | Shelagh Hare | Joyce Posluns | Carole Tanenbaum |
| Jade Crystal | Susan Hodgkinson | Lynn Posluns | The Benevity Community Impact Fund |
| Mary Danel | Jewish Community Fund | Wendy Posluns | The Goodman Family Foundation |
| Jane Deighton | Jewish Foundation of | Gail Priestman | The Philip Smith Foundation |
| Mary Edwards | Greater Toronto | Ellen Rachlin | Gabriella Tino |
| Susan English-Thompson | Kathy Kelaidis | RBC Dominion Securities | Matteo Tino |
| Rachel Farber | JoAnne Korten | RBC Foundation | Arlen Todd |
| Susan Fenwick | Nancy Laughton | Susan Rose | Bryna Wasserman |
| Ken Flood | Anne MacArthur | Elizabeth Ryan | Jack & Nan Wiseman |
| Elaine Frost | Monica McIntosh | Gloria Salomon-Levy | Maria Zakos |

Brain Canada recognizes Women's Brain Health Initiative for its role in educating the public about the importance of women's brain health and the role of prevention, but neither Brain Canada nor the Minister of Health or the Government of Canada are responsible for the accuracy of the contents of this magazine.

The production of this magazine has been made possible in part with the financial support of Health Canada, through the Canada Brain Research Fund, an innovative partnership between the Government of Canada (through Health Canada) and Brain Canada. To date Health Canada has invested over \$145 million through the CBRF which has been matched by Brain Canada Foundation and its donors and partners.



Medical Gaslighting

HOW TO SPOT IT & WHAT TO DO ABOUT IT

In her early 20s, Melissa Geraghty finally got up the courage to see a second neurologist about migraine attacks that were more severe than usual after a negative experience with a first neurologist. She shared her list of physical health challenges and how she had been addressing them so the doctor could understand her health history with a view to figuring out why her migraine attacks were more intense.

"All he heard was my fibromyalgia diagnosis. He laughed and said, 'Do you want to get better? Because pain clinics are just made to keep people sick. Next time your husband gets married, he should marry someone fat and ugly as they would be too scared to be sick!'" said Geraghty.

"I left feeling devastated and furious at the same time: Here I was, finally reaching out for help, and I didn't receive any. I also couldn't believe how poorly I was treated." Much later, she was diagnosed with cluster headaches by a doctor who did listen.

Fuelled by her personal experiences with medical gaslighting and determined to make a difference for others, she became a licensed clinical health psychologist, an inaugural board member of the Coalition for Headache and Migraine Patients, and CEO of her own company called Phoenix Rising with Dr. G.

Today, Dr. Geraghty provides counselling services to patients who face medical gaslighting for chronic pain, chronic illness, depression, anxiety, and recovery from eating disorders. She also offers medical gaslighting sensitivity training for medical professionals. Dr. Geraghty's experiences are, unfortunately, all too common.

Medical professionals have long minimized, dismissed, and ignored women with health issues.

There is a plethora of examples where they have told women, "It's all in your head," "It's anxiety or depression," or "You'd feel better if you lost some weight."

Medical gaslighting is infuriating and unfair and can delay diagnosis and treatment. Here's how to spot it and what to do about it.

MEDICAL GASLIGHTING

The gaslighting concept comes from the play *Gas Light* by Patrick Hamilton that premiered in London in 1938. Set in 1880, it told the story of a husband who tried to convince his

new wife she was insane by changing things in their house, such as dimming the gas-fuelled lights and then denying her observations of them flickering, causing her to think she'd lost her mind.

The term *medical gaslighting*, which describes manipulative behaviour by healthcare professionals, has become more prevalent over the past five years. Case in point: The Merriam-Webster Dictionary chose *gaslighting* as the 2022 word of the year, reflecting a rise in the use of the term to describe deliberate forms of deception and manipulation in a variety of political and personal contexts.

“*Medical gaslighting includes dismissive attitudes by healthcare providers that depict patients as non-credible and may lead them to doubt their own perceptions and symptoms,*

said cardiologist Stacey E. Rosen, MD, Senior Vice President of Women's Health, Katz Institute for Women's Health at Northwell Health in New York. "This mistreatment may be unconscious and without malice, but it has a significant negative impact on patients' physical and mental health."

WHY MEDICAL GASLIGHTING HAPPENS

There are several reasons why women experience medical gaslighting more frequently than men:

>> MALE-FOCUSED HEALTHCARE MODEL

"For at least a century, health care has traditionally assumed that bodies and what happens to them are the same for men and women, except for the breasts and reproductive organs," said Dr. Rosen. "For example, even as recently as the early '80s, we thought heart disease affected mostly men. Only in 1985, when the cardiac death rates for women surpassed that of men, did the field recognize the critical need to focus on the role of sex differences in heart disease."

Dr. Rosen noted that differences between sexes can be traced down to our cells, according to a study by molecular geneticists at the Weizmann Institute of Science in Israel published in *BMC Biology*. They found that a third of 6,500 protein-coding genes express differently in men and women. →



WOMEN ARE NOT JUST LITTLE MEN. PRACTICING 'BIKINI MEDICINE' MAKES NO SENSE WHEN EVERY CELL IN THE BODY HAS A SEX, A BIOLOGICAL VARIABLE THAT AFFECTS UNIQUE RISK FACTORS, DIAGNOSTIC TEST RESULTS, AND RESPONSES TO TREATMENTS.

>> UNDER-REPRESENTATION IN HEALTH RESEARCH

Lab studies have traditionally relied on male animals since they are perceived to be “more stable” for research purposes than female animals with menstrual cycles and related hormonal shifts. After the U.S. National Institutes of Health implemented a policy in 2016 that required grant recipients to include female vertebrates and cells and study sex as a biological variable in preclinical research, addressing that oversight has accelerated.

For example, researchers have discovered how differences between men and women affect risk, prevalence, and responses to treatments in several diseases, including Alzheimer’s disease, cancer, and cardiovascular disease, yet more work is needed, according to Dr. Nancy J. Brown, MD, the Jean and David W. Wallace Dean of the Yale School of Medicine.

Women also continue to be under-represented in clinical trials. Researchers from the Mary Horrigan Connors Center for Women’s Health and Gender Biology and the Department of Psychiatry at Brigham and Women’s Hospital in Boston recently published a study in *Contemporary Clinical Trials* that analyzed female participation in adult cardiovascular, cancer, and psychiatric clinical trials between 2016 and 2019.

The investigators found that the percentage of women enrolled in clinical trials fell short of the proportion of women affected by the conditions under investigation - cardiovascular disease and cancer, the leading causes of mortality among women, and psychiatric disorders, the leading cause of disability for women. They told *U.S. News & World Report* that the disparity is disturbing and a significant barrier to understanding the safety and efficacy of drugs and devices intended for both sexes.

>> DIFFERENCES IN SYMPTOMS

Women may experience symptoms differently than men, but the differences may be subtle. “Chest pain is still the most common symptom of heart attack in both sexes, but women are much more likely to have other symptoms, such as nausea, breathlessness, and back pain,” said Dr. Rosen.

“Some of the symptoms and causes of stroke may also be sex-specific. Women tend to attribute their symptoms to other causes, such as not sleeping well, and have a sociological tendency to look after others first, so they are less likely to take care of themselves when symptoms of heart attack or stroke first present and are less likely to call an ambulance in a timely manner.”

CONSIDER ALSO THAT MANY DISEASES AND CONDITIONS THAT DISPROPORTIONATELY AFFECT WOMEN HAVE VAGUE AND OVERLAPPING SYMPTOMS, MAKING DEFINITIVE DIAGNOSES CHALLENGING.

Dr. Rosen noted that up to 80% of patients with autoimmune disorders, including arthritis, lupus, and Sjogren’s syndrome, are women, and it can take three to four years to establish a diagnosis.

“It can also be difficult to diagnose other diseases that affect women more so than men, such as chronic Lyme disease, long COVID, and certain types of migraine,” Dr. Rosen said. “When symptomatology is not as well defined as other conditions, it can be a setup for medical gaslighting.”

HOW TO SPOT MEDICAL GASLIGHTING

Lindsay Weitzel, PhD, is executive director of the MigraineNation Foundation, founder of the MigraineNation Facebook group, chronic daily migraine survivor, and host of the National Headache Foundation’s weekly *For Heads Sake* podcast. She discussed medical gaslighting with Dr. Geraghty and shared her first experience with it in a recent episode:

As a young child, with her feet hanging off the edge of the exam table, the pediatrician said, “You’re perfectly healthy. Aren’t you glad?” after her blood work showed no issues. Dr. Weitzel recalled she could barely see because her head hurt so badly from a migraine. She was far from fine.

This denial of her reality is but one example of medical gaslighting. Here are some of the techniques healthcare professionals or even loved ones may use to gaslight you regarding your health issues and what they may say:

- **COUNTERING**
“You aren’t remembering that correctly; you have a bad memory”;
- **DENIAL**
“Oh, I never said that. You must have misheard”;
- **TRIVIALIZING OR MINIMIZING YOUR SYMPTOMS**
“You’re overreacting; it’s just a small symptom, not a big problem.” Or “your lab tests are fine, so you’re fine”;
- **WITHHOLDING**
“I don’t know what you’re talking about. That didn’t happen”;
- **BLOCKING OR DIVERTING**
“Why are you being defensive?”

RECLAIM YOUR PATIENT POWER

Mind Over Matter® asked both experts we spoke with to recommend effective strategies for dealing with medical gaslighting. Here's how you can shift discussions with your providers back to shared decision-making:

- **BE PREPARED.** Write down your questions and concerns in advance and take a printed copy to the appointment. Consider recording the visit using a voice recorder app if you find it difficult to remember what's discussed.
- **TAKE AN ADVOCATE.** A friend or a loved one can vouch for your atypical symptoms and help take notes during the visit.
- **CHANGE YOUR PRIMARY CARE PHYSICIAN.** You may need to speak to several providers before you find one who listens well. "Everyone should have a primary care physician they trust," said Dr. Rosen. "Don't wait to navigate the system with a stranger when you're ill. It's ideal to have a long-term relationship with a provider who knows your history and respects patient-centred conversations."
- **ASK FOR A SECOND OPINION.** No competent healthcare professional should feel threatened by this request. "It's ironic that women will fire a hairdresser over one bad haircut and don't think twice about looking for a different pediatrician for their child if they have concerns about the quality of care, yet they're afraid asking for a second opinion for themselves will anger a healthcare provider," said Dr. Rosen. "But what could be more important than health? Women need to advocate for themselves the same as they advocate for loved ones. If this was a referral to a specialist, you could always ask your primary care provider for another referral."
- **OBTAIN YOUR MEDICAL RECORD.** You have a legal right to access and obtain a copy of your medical record under the Health Insurance Portability and Accountability Act (HIPAA) in the United States and the Personal Information Protection and Electronic Documents Act (PIPEDA) in Canada.
- **BE ASSERTIVE, NOT AGGRESSIVE.** Practice calm responses in your mirror at home ahead of time, especially if you're someone who gets anxious or tends to avoid conflict. "Even if you're feeling overwhelmed and angry, use the same neutral tone you'd use to order a coffee," advised Dr. Rosen. Here are some examples of assertive statements Dr. Geraghty recommended:

- » "I realize you intended to make light of this matter, but what you said was hurtful." Make sure to use "and" not "but," since both points are valid.

- » "Your perspective differs from mine. I understand what you're saying, and I'm not imagining things."
- » "I know what's happening to my body. I live with this condition. I'm here today because I'm reaching out for help."

- **ASK THE DOCTOR TO NOTE A REFUSAL FOR TESTING IN YOUR MEDICAL RECORD.** Remember, though, that competent healthcare providers rely on evidence-based guidelines for diagnosing and treating diseases and conditions, and patients' requests may not align with approved protocols, advised Dr. Rosen. In these situations, she discusses why testing is not recommended and includes the decision together with the rationale in a patient's chart.
- **FIND YOUR SUPPORT PEOPLE.** Many health organizations have online support groups and in-person events. Collaborating with others experiencing the same health issues may help you find a better provider. Banding together can also raise awareness, lessen dismissive attitudes among healthcare providers, and may even lead to significant investments in health research.

For example, a group of long COVID survivors formed the Patient-Led Research Collaborative after connecting in the Slack group Body Politic. They conducted the first patient-reported survey on long COVID symptoms in April and May 2020 and published a report called What Does COVID-19 Recovery Actually Look Like.

Their report, based on 640 responses, was the first evidence that long COVID symptoms were not limited to respiratory issues and SARS-CoV-2 infection caused a constellation of 62 symptoms, including brain fog, trouble concentrating, memory loss, and dizziness. The report received extensive media coverage, including a September 2020 blog post by Dr. Frances Collins, MD, PhD, who was then Director of the National Institutes of Health (NIH). In February 2021, the NIH announced US\$1.15 billion in funding to study the long-term health consequences of COVID-19.

- **SEE A HEALTH OR PAIN PSYCHOLOGIST.** Medical gaslighting itself can lead to anxiety and stress. A health or pain psychologist can support you and help you process any medical trauma you may have experienced.

Knowing how to spot medical gaslighting and how to counter it will enable you to advocate for yourself in conversations with your healthcare provider and help ensure you are receiving the best possible care. 🌐

Finding Equilibrium

BETTER BALANCE LINKED WITH BETTER BRAIN HEALTH



Tap into your inner child and try this: see how long you can stand on one leg. With your eyes open, shoes off, and arms crossed over your chest, raise one of your feet so that it is near (but not touching) your other ankle, and see how many seconds you can hold the position.

As soon as you uncross your arms, or touch your raised foot to the ground, or move your weight-bearing foot to maintain balance, stop counting. Now, if you feel comfortable and safe to do so, try it again with your eyes closed. Feel free to try a few times and see what your best time is after a bit of practice.

If you're like most people, you might be shocked to discover how soon you lose your balance and begin to topple over, particularly when your eyes are closed. The older you are, the shorter your time likely will be before losing your balance.

How do your results compare to others your age? One 2007 study published in *Journal of Geriatric Physical Therapy* found that on average, participants maintained balance on one leg for:

- 45 seconds with eyes open and 15 seconds with eyes closed if they were under 40;
- 42 seconds with eyes open and 13 seconds with eyes closed if they were aged 40-49;
- 41 seconds with eyes open and 8 seconds with eyes closed if they were aged 50-59;
- 32 seconds with eyes open and 4 seconds with eyes closed if they were aged 60-69; and
- 22 seconds with eyes open and 3 seconds with eyes closed if they were aged 70-79.

That research shows a clear trend that balance deteriorates with age.

ALTHOUGH BALANCE TENDS TO BE RELATIVELY STABLE UNTIL YOUR 50S, BEYOND THAT, IT DECLINES SUBSTANTIALLY EACH DECADE.

Why does that matter, and why are we talking about it in a magazine about brain health? Well, it turns out that balance isn't child's play, it's key to health as we age. Yet, it is something we tend to take for granted, until something goes awry - for example, when we fall. While falls are certainly a major public health issue for older adults, fall avoidance is not the only reason it is wise to improve your balance.

POOR BALANCE IS LINKED WITH MORTALITY

A recent study by Dr. Claudio Gil Araujo and colleagues - published in *British Journal of Sports Medicine* in 2022 - found that being able to complete a ten-second one-legged stance test was linked with lower risk of all-cause mortality.

Overall, 20.4% of the 1,702 participants (female and male, aged 51-75 years) were unable to stand on one leg with eyes open for ten seconds or more. The inability to stand on one leg rose in tandem with increasing age, approximately doubling every five years from ages 51-55 onwards.

"Among the participants aged 71-75, approximately 54% were unable to complete the test, making people in that age group

11 times more likely to fail compared to the participants just 20 years younger," said Dr. Araujo, Dean of Research & Education at CLINIMEX (Exercise Medicine Clinic) in Rio de Janeiro, Brazil.

OVER A MEDIAN FOLLOW-UP PERIOD OF SEVEN YEARS, THE PROPORTION OF DEATHS WAS 3.8 TIMES HIGHER AMONG THE PARTICIPANTS WHO WERE UNABLE TO SUCCESSFULLY COMPLETE THE BALANCE TEST COMPARED TO THOSE WHO COULD SUCCESSFULLY COMPLETE IT (17.5% VS. 4.6% RESPECTIVELY).

"In general, the participants who failed the test had poorer health, so we adjusted our data to account for many potentially confounding factors. After adjusting for age, sex, and underlying health conditions (including heart disease, obesity, and diabetes mellitus), our research revealed that the inability to stand on one leg was linked with an 84% increased risk of death from any cause over the next 10 years," explained Dr. Araujo. "It's important to note that this was an observational study and so, it only reveals associations between variables; it does not establish cause and effect."

The size of the association between inability to complete the test and mortality was quite big, though. "For someone aged 51-75 years, the risk of dying is - on average - higher if unable to complete a ten-second one-legged stand than if that person has coronary artery disease, obesity, arterial hypertension, or high blood cholesterol!" said Dr. Araujo.

These findings suggest that it would be useful for physicians to have patients do this balance test as part of health check-ups. Not only would such a test provide useful information to the physician, but it can also serve as motivation for patients to start some balance training (because people who are unable to do the test successfully are often surprised).

BALANCE TRAINING BOOSTS SOME BRAIN FUNCTIONS

Many research studies have shown that exercise in general is good for our brains, and much of that research has focused on aerobic exercise and resistance training. However, there is also evidence that balance training can have a positive impact on brain function, separate from the effects of any improvements in cardiovascular fitness.

A small study by Dr. Ann-Kathrin Rogge and colleagues - published in *Scientific Reports* in 2017 - looked at the effects of a demanding balance training program on specific cognitive functions. The participants, aged 19-65 years, were split into two groups: one that engaged in balance training twice a week for 12 weeks, and one that served as the control group. →

During each 50-minute balance training session, participants completed eight different balance exercises on varying surfaces, either on one leg or both. For example, one exercise involved standing on a wobble board while throwing a medicine ball back and forth to a partner.

Another involved standing in a single-leg stance while being pulled to one side by an elastic strap around the hips. Exercises were made progressively more challenging over time, as skill level increased. Dr. Rogge, a neuroscientist and psychologist based in Germany said,



IN OUR STUDY, THE BALANCE GROUP EXPERIENCED SIGNIFICANT IMPROVEMENTS IN MEMORY AND SPATIAL COGNITION. AND THOSE GAINS HAPPENED DESPITE THE PARTICIPANTS EXPERIENCING NO CHANGE IN CARDIORESPIRATORY FITNESS OVER THE COURSE OF THE STUDY. RATHER, BALANCE SKILLS WERE SIGNIFICANTLY IMPROVED AFTER TRAINING.

“Our findings suggest that there are multiple mechanisms through which physical activity affects cognitive function. It looks like different types of exercise may benefit different aspects of brain function, so it’s ideal that people strive for variety in their exercise, engaging in balance training along with aerobic exercise and strength training.”

HOW DOES BALANCE TRAINING SUPPORT BRAIN HEALTH?

When it comes to exercise, balance is a unique category that is distinct from aerobic and strength training. Aerobic and strength exercises are “physical training”; they involve activities that are typically repetitive and automatic in nature and require high physical energy output but low mental effort.

For example, running gets your heart pumping and burns a lot of calories but can be done without much concentration. In contrast, balance is considered “motor training” and involves little physical energy but a high level of mental effort. (A lot is happening in your brain to help your body maintain balance - not the usual conscious mental effort required to play chess, for example, but rather the unconscious mental effort required by your vestibular sense and proprioception - the sensory systems that are key for balance and spatial orientation.)

Neuroplasticity refers to the brain’s ability to form and reorganize connections, rewiring itself in response to learning or after injury to function in a different way than before.

A 2019 review by Dr. Yael Netz - published in *Frontiers in Medicine* - looked at existing research on the relationship between exercise and cognition, to shed some light on whether one mode of exercise might be more efficient in enhancing cognition than another. Dr. Netz found that both aerobic/strength training and balance training affect neuroplasticity, and thus cognitive function, but that they do so in different ways.

Aerobic and strength training appear to affect cognition through improvements in cardiovascular fitness, impacting neuroplasticity and cognition in a global way. Balance training, on the other hand, seems to affect cognition directly but its impacts are more specific, affecting select parts of the brain and certain types of cognitive function.

When it comes to aerobic and strength training, it is the intensity of the training that matters for enhanced neuroplasticity and improved cognition.

WHEN IT COMES TO BALANCE TRAINING, IT IS THE COMPLEXITY OF THE TASK THAT MATTERS.

To maximize the cognitive benefits of balance training, the activities need to change over time as one’s skills improve. It’s essential that they challenge the brain to increase neuroplasticity and improve cognition.

WHAT ARE SOME WAYS TO IMPROVE BALANCE?

If your results in the one-legged balance test indicated your balance could use some work, rest assured that it’s never too late to take action to improve your balance. And, if you did well on the one-legged balance test, remember that balance deteriorates with age, so it would be wise to continue to work on your balance, to help keep it strong.

Many formal balance training programs have been developed and shown to help improve balance and prevent falls. Some of these are quite resource-intensive, i.e., they involve trained professionals working one-on-one or in small groups to provide a particular set of balance training.

While that type of intensive and supervised balance training may be necessary for some individuals (e.g., people with conditions that affect balance like Parkinson’s disease and multiple sclerosis), many people can successfully engage in balance training on their own, at home or at the gym.

BALANCE-ENHANCING EXERCISE PROGRAM (BEEP)

The Balance-Enhancing Exercise Program (BEEP) is an example of a program that was designed to improve balance through a quick, daily routine that can be done at home without professional supervision.

It is a multimodal exercise program, meaning it involves strength building as well as balance exercises. (Strength plays an important role in balance.) It also includes exercises that help improve gaze stabilization, which is also critical for balance.

The program begins with warming up by doing three minutes of dancing to your favourite song or jogging in place. Then you do a series of exercises on a solid surface:

- **KNEE SQUATS.** Standing with feet shoulder-width apart, hands on your hips, you bend at the knees as though you are sitting down on a chair and then stand back up. This is done ten times with eyes open and then repeated ten times with eyes closed.
- **HEEL/CALF RAISING.** Standing with arms crossed over your chest, raise your heels to come up onto your toes and hold as long as you can (or up to approximately ten seconds) and then lower your heels back down to the ground. Hold onto something for support if needed, e.g., a wall or a table. Repeat three times with eyes open, and then three more times with eyes closed.
- **ONE LEG STANDING.** Standing with hands on your hips and eyes open, raise one foot about 15 cm off the floor and hold, standing on one leg as long as you can (or up to one minute). Repeat on the other side. Once you are proficient at this with eyes open, perform the exercise with eyes closed.

Next, you repeat the above series but on a surface that is not 100% stable, like a double folded exercise mat.

Then, back on a solid surface, you do:

- **HEAD ROTATIONS.** Standing with feet shoulder-width apart, looking straight ahead with eyes open, hands clasped behind your back, and keeping your trunk still, turn your head and look as far as you can over your right shoulder and hold for a few seconds. Then, turn your head quickly to look over your left shoulder and hold for a few seconds. Do this a total of ten times (right then left = one time). Repeat another ten times with eyes closed.
- **ROTATIONAL JUMPS.** Standing with feet shoulder-width apart, looking straight ahead with eyes open and hands on your hips, jump a quarter turn to the right or left (90 degrees), keeping your body, head, and vision aligned with the direction of your feet. After finding your balance, jump a quarter turn back to the original position, find your balance there, and then jump a quarter turn in the opposite direction, find your balance, then jump back to your original position. Repeat five times or until you get dizzy or tired.

Dr. Anna Hafström and colleagues conducted a study in which 40 participants aged 60 to 80 performed the BEEP training as

WOMEN AND MEN DIFFER WHEN IT COMES TO FALLS

- Women have a higher risk of falls. A U.K. study with 4,301 participants, by Dr. Catharine Gale and colleagues, found the prevalence of falls was higher in women than men (29.1% vs. 23.5% respectively). These findings were published in 2016 in *Age and Ageing*.
- Women account for the majority of non-fatal fall-related injuries. A U.S. study led by Dr. Judy Stevens found that of the estimated 1.64 million older adults who were treated in hospital emergency departments for fall-related injuries in 2001, 70.5% of them were women. These findings were published in 2005 in *Injury Prevention*.
- Research by Dr. Daniel M. LeBouthillier and colleagues, published in 2013 in *Journal of Aging and Health*, found that severe fall-related injuries were found to be linked with subsequent fear of falling and activity restriction in women only.

described. On average, the participants completed 16 minutes of BEEP exercises four times a week.

After six weeks of training, the 34 participants who were available for the final analyses showed significant improvement in balance across several measures. For example, one-legged standing time with eyes open improved by 32%, and with eyes closed on a solid surface it improved 206%! These findings were published in 2016 in *Gerontology and Geriatric Medicine*.

THERE ARE LOTS OF INDIVIDUAL EXERCISES THAT CHALLENGE BALANCE, INCLUDING SOME THAT CAN BE INTEGRATED INTO DAY-TO-DAY ACTIVITIES.

For example, challenge your balance while you're washing dishes or brushing your teeth by standing with your feet right together or placed tandem (i.e., front heel touching toe of back foot), rather than the usual hip-width apart, which is more stable. Or, as you walk down a hallway, so a wall is nearby for support if needed, do a tandem walk where you shorten your stride so that your front heel touches the back toe with each step.

To improve your balance during the workday, use a standing desk and also stand on a balance board for part of the day.

There are a variety of designs to choose from, but all balance →



boards provide an unstable surface for you to stand on so that your balance is challenged.

You can also improve your balance by engaging in exercise that naturally includes a balance component, like dance or Tai Chi, which combine aerobic and/or strength training along with balance, thus stimulating neuroplasticity in multiple ways.

HOW MUCH BALANCE TRAINING IS RECOMMENDED?

Experts recommend that people aged 65+ should engage in physical activity that challenges their balance, in addition to the aerobic and strength training that is recommended for all adults.

The World Health Organization specifies that older adults should “do varied multicomponent physical activity that emphasizes functional balance and strength training at moderate or greater intensity, on three or more days a week.”

Even though physical activity recommendations suggest that it is older adults who need balance training, don't wait until you're 65 years old to begin. People of all ages benefit from strong balance, so integrating balance training into your exercise and/or your day-to-day life in early or mid-adulthood can help you age well.

Test your balance occasionally, even if there aren't obvious signs your balance has deteriorated, and if your score falls below what is average for your age, be sure to incorporate balance training.

One study - by Dr. Marco Taubert and colleagues - found that even a little balance training appears to make a difference. In this study, 28 young and healthy participants engaged in training sessions requiring complex whole-body balancing and underwent brain scans to observe any resulting changes in brain structure.

The researchers found significant grey matter volume increases (i.e., a positive change) in frontal and parietal brain areas after just two 45-minute sessions, done a week apart. (These findings were published in 2010 in *The Journal of Neuroscience*.)

So, take action to improve your balance, regardless of your age and physical limitations. Every bit of challenge to your balance helps. 🧘



Hypertension

HIGH BLOOD PRESSURE IN YOUNG ADULTS

HEIGHTENS FUTURE DEMENTIA RISK

Anthony Sherwood* was going through member orientation at his new gym in Toronto when a staff member took his blood pressure.

The reading stopped the staffer cold.

Sherwood's blood pressure was 146/90, above Canada's threshold for hypertension diagnosis of 140/90.

"I was 23 years old with the blood pressure of a stressed out 50-year-old man," Sherwood said. "I had no symptoms and felt fine like I always felt. It was quite the wake-up call."

Sherwood is part of a relatively small group - according to Statistics Canada 3% of people aged 20-39 have high blood hypertension, with the majority of those diagnosed over the age of 60, according to Hypertension Canada, a national non-profit organization.

Typical risks that come with untreated high blood pressure include heart attack or stroke, kidney failure, aneurysms, and loss of vision. But Statistics Canada estimates 74% of people who had stage 1 hypertension are unaware they even had it, since it is a silent disease that produces few if any symptoms.

And several recent studies have now linked a hypertension diagnosis in early adulthood with an increased risk of dementia.

FINDINGS SHOULD PROMPT EARLIER INTERVENTION

One study, entitled "The Association of Age at Diagnosis of Hypertension with Brain Structure and Incident Dementia in the UK Biobank" and published in *Hypertension* in October 2021, looked at

data collected from the UK Biobank between 2006 and 2010.

Research, led by Dr. Xianwen Shang and colleagues, concluded there were different levels of cognitive risk depending on the age of the patient at the time of diagnosis.

PATIENTS DIAGNOSED WITH HIGH BLOOD PRESSURE BETWEEN THE AGES OF 35 AND 44 FACED A HIGHER RISK OF DEVELOPING DEMENTIA, WHILE THERE WAS AN ASSOCIATION WITH SMALLER BRAIN VOLUME FOR THOSE DIAGNOSED AT THE AGE OF 54 OR YOUNGER. THOSE WHO DEVELOPED HYPERTENSION LATER IN LIFE DID NOT FACE INCREASED ASSOCIATIONS WITH SMALLER BRAIN VOLUME OR DEMENTIA.

A second study, entitled "Association of Early Adulthood 25-Year Blood Pressure Trajectories with Cerebral Lesions and Brain Structure in Midlife," published in March 2022 in *JAMA Network Open*, made a similar conclusion.

Researchers followed 853 adults with hypertension who were between the ages of 18 and 30 years old for 30 years. The research, led by Dr. Yi-Han Hu and colleagues, found high blood pressure in early adulthood was associated with a decline in brain health in midlife after adjusting for sociodemographic and cardiovascular risk factors.

HYPERTENSION IN YOUNGER ADULTS

Dr. Ernesto Schiffrin, Professor and Vice-Chair of the Department of Medicine at McGill University, who was named the American Heart Association's 2021 Distinguished Scientist, was not involved in the aforementioned studies but said when it comes to hypertension, it's hard to pinpoint the difference in risk or consequences between men and women. →

Dr. Schiffrin said while there is a risk of a dementia diagnosis for both sexes, there is no evidence to suggest women suffer more or less cognitive decline than men. Furthermore, he said women are more likely to identify high blood pressure earlier on as they tend to be more proactive with their health from a younger age and can therefore work to get it under control earlier.

In Sherwood's case, before that high blood pressure reading he hadn't had a physical in nearly 10 years.

However, he visited a walk-in clinic just hours after learning how high his blood pressure was. He also booked a full physical and has already started making significant changes to his diet.

"A stressful job, poor diet, non-existent sleep, and partying with friends was catching up to me a lot sooner than I thought it would," he said.

ARE WOMEN WHO ARE DIAGNOSED WITH HYPERTENSION MORE AT RISK OF DEVELOPING DEMENTIA?

The difference between men and women when it comes to early-onset hypertension and the impact on cognitive function is still being carefully studied, but one study published in *Neurology* in October 2017 found evidence that being diagnosed with this condition in midlife is a risk factor for dementia, but only for women.

The study, conducted by Dr. Paola Gilsanz and colleagues and entitled "Female Sex, Early-onset Hypertension, and Risk of Dementia," found that although it is more common for men to be diagnosed with high blood pressure in midlife, only women with hypertension in mid-adulthood appeared to have an elevated risk (65%) of developing dementia.

Researchers identified midlife as being around 43.3 years old. They did not find that dementia was associated with hypertension in early adulthood (a mean age of 32.7 years old) although again, they found effect estimates were elevated in women.

While the study noted that links between early adulthood hypertension and dementia are unclear, its findings about women in their 40s pointed to "growing evidence" that high blood pressure carries more of a harmful effect for women in terms of some outcomes.

Dr. Schiffrin said while all of those things certainly contribute to high blood pressure, it's always a good idea to look for secondary reasons, like a condition connected to an adrenal abnormality, which he noted is a relatively rare cause, especially when dealing with hypertension as a young adult.

Once any underlying conditions are ruled out, Dr. Schiffrin said treatments revolve around a healthy lifestyle that includes regular sleep, minimal alcohol, consistent fitness routines, eating foods that are rich in nutrients, and very importantly, lowering salt intake.



EARLY INTERVENTION IS KEY BECAUSE WHILE A HEALTHY LIFESTYLE AND MEDICATION CAN CERTAINLY SLOW DOWN OR PREVENT FURTHER DETERIORATION, IT CAN'T REVERSE THE DAMAGE THAT HAS ALREADY BEEN DONE.

PATIENTS OFTEN IGNORE PREVENTATIVE MEASURES

The real problem occurs when people don't take their diagnosis seriously and fail to monitor their blood pressure on a regular basis, Dr. Schiffrin said.

He explained all the research he has come across suggests that controlling blood pressure is likely the only intervention that can help reduce cognitive decline.

GETTING PATIENTS TO ADHERE TO A LIFESTYLE AND TREATMENT PLAN TO HELP REGULATE THEIR BLOOD PRESSURE IS ONE OF THE BIGGEST CHALLENGES DOCTORS FACE ON A REGULAR BASIS.

"I've studied small vessels all my life and I know that they're very affected by high blood pressure, both from a point of view of function and structure. If blood pressure is elevated then the same thing occurs in the brain," he said. "If you intervene very late, you may slow down things a little bit but you won't go back, especially if dementia has already developed."

But dementia is far from being the only thing a younger patient with hypertension needs to think about.

"If somebody has elevated blood pressure from a young age, they have more of a chance of having target organ damage, of having a stroke, of having a heart attack. They have more of a chance of developing chronic kidney disease and developing peripheral vascular disease. And then eventually, cognitive decline," said Dr. Schiffrin.

HOW TRUST CAN HELP

There are many reasons why patients don't always stick to a treatment plan. In some studies, the pandemic and the level of misinformation circulating on social media seemingly made things worse as people began to increasingly question doctors and their ties to pharmaceutical companies.

TIPS TO KEEP YOUR BLOOD PRESSURE UNDER CONTROL

There are several steps you can take to ensure you maintain a healthy blood pressure.

Dr. Ernesto Schiffrin, Director, Hypertension and Vascular Research Unit, Lady Davis Institute for Medical Research and Editor-in-Chief of the *American Journal of Hypertension*, said regardless of age, a balanced lifestyle is critical to living a healthy life.

1. MAINTAIN A HEALTHY WEIGHT

"Blood pressure rises proportionally to weight," said Dr. Schiffrin. "People who suffer from obesity very often have elevated blood pressure levels or, if their blood pressure is at the higher end of normal, will develop it within five years, some studies have shown." He said to a large extent, maintaining a healthy weight helps keep fluctuations in blood pressure under control.

2. KEEP A REGULAR FITNESS ROUTINE

Aside from helping patients keep the weight off, cardiovascular activity is essential to keep the heart strong and healthy. According to the Mayo Clinic's "Strategies to Prevent Heart Disease," people should aim for 150 minutes a week of exercise or 30 to 60 minutes of activity daily.

3. MINIMIZE SALT INTAKE

According to Dr. Schiffrin, ideally, people should stick to less than five grams of table salt a day, particularly as it contributes to elevated blood pressure and cardiovascular disease. However, the reality is that most people in developed countries actually consume 10-15 grams of salt a day, he said.

4. EAT A CONSISTENTLY HEALTHY DIET

Nothing is perhaps more critical to our health than diet, said Dr. Schiffrin. So stock your diet with plenty of fish, fruit, poultry, whole grains, and nuts, and eat very little red meat. Avoid refined carbohydrates, drinks with added sugar, and meals with added sugar, sodium, and trans fats. A study published in *The Journal of Nutrition* in 2012 by Dr. Stephanie Chiuve and colleagues, found that people with diets that consistently included the foods recommended by Dr. Schiffrin had a 31% lower risk of heart disease and a 33% lower risk of diabetes.

5. LIMIT ALCOHOL INTAKE

Canadian guidelines suggest that consuming more than two drinks a week increases health risks. Dr. Schiffrin said recent studies back that up. "Data from the UK Biobank suggests that anything above that certainly increases blood pressure and increases mortality significantly," he said.

"COVID has had terrible consequences on the population on so many levels - anxiety, solitude, long COVID - and that has impacted the trust that people have in authorities making mandates, public health, and physicians," said Dr. Schiffrin.

He said the most important part of a doctor-patient relationship is building up a trusting relationship.



THERAPEUTIC DECISIONS ARE SHARED DECISIONS BUT THE PATIENT NEEDS TO BE INFORMED. THEY HAVE TO KNOW WHAT THEY ARE DEALING WITH AND THE CONSEQUENCES OF DISEASE. THERE'S A TRUST THAT NEEDS TO BE BUILT BETWEEN DOCTOR AND PATIENT."

For his part, Sherwood is determined to get his blood pressure under control, listen to his doctor's advice, and find a healthier balance between life and work. His motivation? Now that he has landed a job in his field, he worries having high blood pressure will cost him an opportunity.

"(Having high blood pressure) is not something I want tied to my name. I haven't been at the company that long, and I don't want anyone wondering, 'Is the stress too much? Should he be doing this job?'" But, overall, he's cautiously optimistic. "I'm lucky I live in Canada where we have access to great doctors and great medicine. It's been a hell of an adjustment period trying to find a healthy balance, but I'm getting there." 🍀

**Name has been changed to protect his privacy*



At Full Strength

HEAVY LIFTING FOR BRAIN HEALTH

The benefits of exercise on a person's overall health have been well-documented over the years, but recently, more attention has been paid to the specific benefits strength training can have on a person's brain health and lifespan.

Recent research conducted by Dr. Jessica Gorzelitz and colleagues and published in September 2022 in *British Journal of Sports Medicine*, found that adults who engaged in weightlifting exercises specifically enjoyed an overall lower risk of mortality as it relates to all-cause and cardiovascular-specific mortality (cancer excluded).

The study, entitled "Independent and Joint Associations of Weightlifting and Aerobic Activity with All-cause, Cardiovascular Disease and Cancer Mortality in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial," followed nearly 100,000

people across the United States for 9.6 years through 2016. More than half (52.6%) of adults studied were women and the mean age of the participants was about 71 years old.

Interestingly, the biggest benefit came to those who engaged in both aerobic and weightlifting workouts at least twice a week. When looking at cancer mortality specifically, the study found a lower mortality rate only when weightlifting was combined with aerobic activity.

"Our results show that weightlifting is uniquely associated with lower mortality and that doing both types of exercise may provide greater mortality benefit," Dr. Gorzelitz, the lead researcher behind the study and Assistant Professor of Health Promotion at the University of Iowa, recently told *Mind Over Matter*®. →

POPULAR MISCONCEPTIONS ABOUT STRENGTH TRAINING

Weightlifting, strength training, and resistance workouts all help build muscle and improve our overall health, but there are many preconceived notions about these types of exercises that fitness experts want to debunk.

Weight, strength, and resistance training are generally used interchangeably and refer to the same thing – using an external load to get stronger. It is the rep scheme that determines building strength versus size, but the classification of "weight/strength/resistance" all refers to the same process.

"Until recently, strength training is something that was perceived to be limited to certain environments, such as athletes training for a sport, professional bodybuilders, and the like," explained Michelle Dukowski, co-founder of RedLeaf Fitness, a CrossFit gym in Toronto.

"It was generally thought to be more socially acceptable for people – especially older women – to engage in cardio training. Now, there has certainly been a public shift and it is becoming more 'normal' to see average people entering the weight room. Hopefully the research on the benefits of strength training will continue to encourage more people to give it a try."

According to Dukowski, who has been a leader in the fitness industry for the last 15 years, the three biggest misconceptions that people have about strength training are:

- lifting weights will add too much bulk;
- the exercises are too difficult to achieve; and
- strength training can lead to injury.

Dukowski says most of people's concerns are rooted in fear rather than facts. She explains that weightlifters who look "too bulky" generally have this as a specific, deliberate goal and train for years to look like that.

"I tell them, 'We aren't training in a way that will produce that result,' and then I walk them through what their training will look like and help them understand the difference," she said.

For people who lack confidence in their skills at the gym or worry about getting hurt, Dukowski reminds them that progress is what matters.

"When people have a goal that they can't see themselves accomplishing, I tell them, 'Right now you can't but that doesn't mean you won't soon be able to!'" she said. She then asks about the movements they are feeling the least confident about and explains the steps they will take to build their strength up to do it and the techniques they will learn to help avoid injury.

"We take a big goal that seems unattainable and make it smaller and more manageable," she said. "It helps them see that even though they can't do it yet, there is always a path to get there."



Adding weightlifting to one's physical activity routine, even for those who are aerobically active, is important for better health and longevity.

While the findings are promising, Dr. Gorzelitz said more studies need to be done to better understand the full potential of a strength-training regimen.

"Previous evidence showing mortality benefits associated with muscle strengthening exercises (like weightlifting) is quite limited. One of the challenges that this project is addressing is the lack of evidence about weightlifting specifically, instead of the lumped category of muscle strengthening exercise or activity," she said.

"It is appropriate and necessary to issue caution with our findings. No one study stands alone, and there must be replication of any scientific findings to strengthen our confidence in the results."

STRENGTH TRAINING, AEROBICS PACK HEAVIEST PUNCH

While studies on weightlifting are scarce, there are others that look at the benefits of resistance training outside of aerobic activity that show similar results in terms of its positive impact on a person's lifespan.

In July 2022, Japanese researchers released their findings after conducting a meta-analysis of 16 cohort studies that explored the impact of muscle-strengthening exercises on the health of adults (18 years and older) without severe health conditions. Their report was published in *British Journal of Sports Medicine*.

30 TO 60 MINUTES OF MUSCLE-STRENGTHENING ACTIVITIES PER WEEK, SHOWED AN ASSOCIATED 10 TO 17% LOWER RISK OF ALL-CAUSE MORTALITY, CARDIOVASCULAR DISEASE, TOTAL CANCER, DIABETES, AND LUNG CANCER.

The study also found that up to 60 minutes of resistance training a week led to a "large risk reduction" for diabetes. Similar to Dr. Gorzelitz's study, the analysis found that when muscle-strengthening exercises were combined with aerobic activity, there was an even lower risk of mortality.

However, the researchers echoed calls for a deeper investigation around the benefits of strength training. "Given that the available data are limited, further studies - such as studies focusing on a more diverse population - are needed to increase the certainty of the evidence," the analysis said.

Michelle Dukowski, an avid weightlifter, co-founder of RedLeaf Fitness and a leader in the wellness industry for the past 15 years, says the studies that have been done lend immense credibility to what health experts have been saying for years.

"When someone is focused on strength training, it requires them to lead a certain lifestyle that is conducive to building muscle: they tend to prioritize sleep, nutrition, stress management, and regular exercise."

Dukowski added that there are studies that show the more muscle one has, the less likely they are to develop type 2 diabetes, abdominal (visceral) fat, heart disease, and high blood pressure, which are some of the leading causes of death in North America.

STRONG BODY, STRONGER MIND

While there are few studies looking at the impact of resistance training on an adult's lifespan, there are an increasing number of studies on the impact of weight training on a person's overall health, particularly around matters of the brain.

Dr. Teresa Liu-Ambrose, Tier 1 Canada Research Chair in Healthy Aging and Professor in the Faculty of Medicine at the University of British Columbia, has been studying the correlation between strength training and the brain's cognitive capabilities since 2007.

In 2010, Dr. Liu-Ambrose and colleagues published the findings of a 12-month randomized controlled trial on women aged 65 to 75 years old in *Archives of Internal Medicine*. The study, entitled "Resistance Training and Executive Functions," found that resistance training even once a week "significantly improved" older women's cognitive abilities to regulate behaviour.

The study also found that resistance training twice per week could reduce the progression of pre-existing disease in the small blood vessels of the brain, which may delay the onset of cognitive impairment.

Furthermore, the researchers discovered a correlation between increased walking speed and enhanced cognitive control, suggesting that cognitive abilities are related to how well a person moves. It also noted that faster walking speed is a predictor of “substantial reduction in mortality.”

In an interview with Mind Over Matter®, Dr. Liu-Ambrose said she focused on women because at that point, very few people had looked at studying the impacts of resistance training and she wanted to look at a homogenous group to be able to confidently determine if there was in fact an impact on the brain.

THERE IS EVIDENCE TO SUGGEST THERE ARE SEX DIFFERENCES IN EXERCISE'S EFFECT ON COGNITIVE CAPABILITIES.

That's particularly important when considering what we do know about women's cognitive issues as they age. “Other studies have shown evidence to suggest that once females have an onset of cognitive impairment, they actually do decline more rapidly as compared to males,” she said.

“It's interesting because in many ways, women are kind of protected beforehand with the effects of estrogen on the brain, but then something happens. After perimenopause, we are more vulnerable.”

However, regardless of whether the subject is a woman or a man, resistance training positively strengthens the mind, a more recent study concluded.

The study, involving Dr. Michael Valenzuela and colleagues, entitled “Hippocampal Plasticity Underpins Long-term Cognitive Gains from Resistance Exercise in Mild Cognitive Impairment (MCI),” was published in *Neuroimage: Clinical* in 2020.

Notably, it found for the first time that resistance training can protect hippocampal areas of the brain responsible for memory function for up to one year. With Alzheimer's disease, these particular subareas are susceptible to volume loss and therefore declining memory function.

It also found that computerized cognitive training did not lead to long-term cognitive improvements when coupled with a strength training program. That result surprised Dr. Valenzuela.

“We had expected to see the greatest benefit when combining strength training with computerized brain training, but this turned out in some respects to be worse than either strength training or brain training by itself!” he said in an interview with Mind Over Matter®.

Calling dementia a “great challenge to modern society,” researchers behind the study warn more exploration should be done to further understand the potential benefits of strength training.

“Future work will need to establish just how long-lived these outcomes are and whether they are sufficient enough to delay cognitive decline,” the study concludes.

STRENGTH TRAINING SHOULD BE PART OF TREATMENT PLAN

Dr. Valenzuela, who is a visiting professor at the Centre for Healthy Brain Ageing, University of NSW Sydney, an expert advisor at the World Health Organization, and co-founder and CEO of Skin2Neuron biotech company, said there is still a role for strength training with people who have advanced cognitive impairment.

“Generally speaking, exercise and physical activity takes on a different role after diagnosis,” he said. “Before diagnoses, as we and others have shown, it has a proven role in prevention, risk reduction, and protecting the brain from shrinkage. After diagnosis, it remains important but more from a quality-of-life perspective and as a way of helping to manage agitation and anxiety.”

BOTH DR. VALENZUELA AND DR. LIU-AMBROSE BELIEVE THE REAL POTENTIAL LIES WITH THE HEALTHCARE SYSTEM MAKING STRENGTH TRAINING AN INTEGRAL PART OF A TREATMENT PROGRAM FOR SENIORS.

“Policymakers need to take seriously the link between physical activity and exercise and long-term brain health,” Dr. Valenzuela said. “Around the world there is an opportunity to help avert millions of people developing dementia over the coming decade. In my view, high-income countries need to move beyond awareness and education campaigns to drivers of concrete behavioural change.”

MENTAL HEALTH, SELF-CONFIDENCE HUGE BENEFIT OF STRENGTH TRAINING

In the meantime, fitness leaders such as Dukowski see older adults coming into the gym on their own to improve both their overall physical health and mental health.

“Particularly with clients who are in the 50-plus age category, life begins to change,” she said. “The kids have left home, they are starting to think about retiring or they have just retired and are trying to redefine themselves and their purpose. Their sense of identity begins to change and strength training is one of the best places people can go to because it helps them build →

an identity outside of those things. At the gym, they can become someone who is physically capable and mentally capable of doing hard things in life.”

One of her clients, Donette Chin-Loy Chang, refocused her energy on fitness after her husband, well-known Canadian philanthropist Raymond Chang, passed away. Chin-Loy Chang has always been athletic, but even as a child she turned to exercise to help focus her mind.

“I’ve always found the gym to be my saviour,” she said. “I see such a difference when I work out, not just in my body but in my brain. A lot of the physical stuff I do is to calm myself down.”

Outside of the gym, Chin-Loy Chang keeps busy with philanthropic projects, sitting on the board of the Toronto International Film Festival, and taking care of her 90-year-old mother. Keeping busy gives her a sense of control but she said being in the gym is the mental exercise she needs to remember that she actually is in control.

At 103 lbs, Chin-Loy Chang can pick up 183 lbs on a sumo deadlift and she can back squat 85-90 lbs. At 67 years old, she is believed to be the oldest member at RedLeaf Fitness, and often, can give the average 30-something member a run for their money when it comes to fitness.

“Lifting 183 lbs is a mental game and I like to challenge myself all the time,” she said. “I’m experienced enough to know that I can tell myself to lift that weight. It strengthens my brain because I feel invincible.”

Chin-Loy Chang said as she gets older, she has less of an appetite for risk and works out to keep her brain sharp as well as mentally fit.

“In my mind I’m always too far ahead, I don’t live in the moment. But strength training is in the moment and for me not to get injured, my brain needs to get engaged,” she said. “Muscle has memory and the brain is a muscle. It really is the last frontier.” 🧠

TIPS AND TRICKS ON HOW TO STRENGTH TRAIN AT HOME

While working out a gym gives people access to experts and equipment, many critical strength training exercises can be done at home with no equipment at all.

Older adults should focus on functional movements that can help their daily routines.

“Focus on the movements you do in your day-to-day world, outside of the gym,” Michelle Dukowski, co-founder of RedLeaf Fitness said. “For example, if you are taking care of your elderly parents at home, practice lifting heavy objects in case you have to help lift up one of your parents.”

Here are other tips and tricks she shares with her clients:

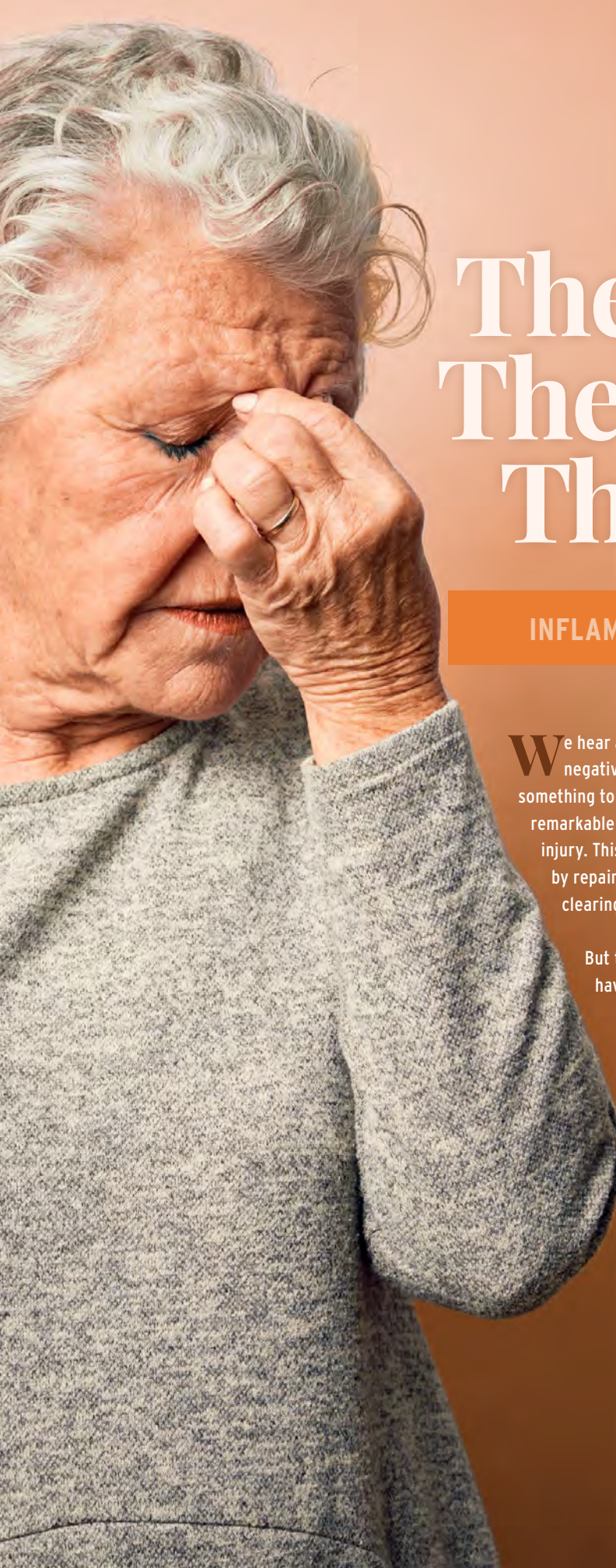
Start slowly – Anything is better than nothing. Start with going for a walk or walking up and down the stairs several times in a row a couple of times a day. When watching TV, sit and stand ten times in a row. Even ten minutes of exercise is better than zero.

Watch instructional videos – When looking for new exercises to explore at home, look for videos that explain the movements well and demonstrate the correct form. The goal is to learn to move safely and focus on progress, not perfection, Dukowski said.

Work out in the morning – People who work out in the morning often report that they feel more focused and productive throughout the entire day but they also tend to make healthier lifestyle decisions throughout the day as well. “It’s a win right off the bat,” Dukowski said. “They are more likely to eat well, go to sleep early, etc. Plus, they are less likely to have something in their schedule interrupt their workout.”

Wear a heart-rate monitor – For older adults who have never strength trained, having a wearable device that measures a heart rate will let them know if they are working out at the right pace. If a heart-rate monitor isn’t available, Dukowski said there are other signs to look out for when working out. “Are you able to talk? Are you gasping for air? Do you feel light-headed? Take it slow at first and you will naturally increase your abilities,” she said.

Find a friend – Even when working out alone at home, it helps to have a friend to call for support and accountability, Dukowski said. “Find someone you trust. Pursuing fitness can open the door for vulnerable conversations about what you are going through right now. Having someone you trust to talk to can make all the difference.”



The Good, The Bad, & The Ugly

INFLAMMATION IN THE BRAIN

We hear a lot about inflammation, and usually in negative terms. But inflammation isn't always something to be concerned about. In fact, it's a remarkable way the body responds to infection and injury. This immune response can heal the body by repairing wounds, destroying pathogens, and clearing pollutants or damaged cells.

But too much of a good thing can sometimes have negative consequences.

Inflammation can also occur with the onset and flare up of chronic diseases, like heart disease, arthritis, diabetes, bowel diseases, and certain types of cancer (e.g., colon cancer). →

Chronic inflammation may result from a variety of conditions, including uncontrolled infection or injury, autoimmune disorders, exposure to toxins, and lifestyle factors like chronic stress, poor eating habits, excessive alcohol consumption, smoking, low levels of physical activity, and sedentary behaviour.

WHEN THE IMMUNE RESPONSE IS ACTIVATED AND GETS STUCK IN THE “ON” POSITION BECAUSE OF AN ONGOING FIGHT WITH CHRONIC DISEASE, THIS CAN LEAD TO THE CHRONIC PRESENCE OF INFLAMMATION, CAUSING HARM TO HEALTHY CELLS AND TISSUES.

This relationship can work in the other direction as well, where chronic inflammation can worsen or trigger flare ups of chronic disease.

NEUROINFLAMMATION & NEURODEGENERATIVE DISEASE

Taking a deeper look at brain health, ongoing research shows that neuroinflammation - an inflammatory response in the brain or the spinal cord - can negatively affect regions of the brain involved in thinking, memory, and movement.

Neurodegenerative diseases like multiple sclerosis, Parkinson’s disease, Alzheimer’s disease (AD), and other forms of dementia have been shown to worsen with neuroinflammation, where the immune system goes rogue and attacks healthy brain tissue.

One possible way this occurs is connected to a type of brain cell called an astrocyte and how it communicates with T-cells, which are white blood cells. When things are working well, T-cells can help regulate a sub-type of astrocyte, which will then regulate inflammation in the brain. However, those same T-cells can also secrete proteins that cause the astrocytes to release potentially brain-damaging free radicals into the central nervous system.

Cells outside of the immune system have also been shown to communicate with astrocytes. A growing amount of research is being done on the way this happens along what’s known as the “gut-CNS axis” (gut-central nervous system axis).

Research has shown that chemical signals produced by gut bacteria and metabolites can activate astrocytes to trigger (positive) anti-inflammatory processes or (destructive) neuroinflammation (inflammation in the brain), depending on the signal sent.

SEX DIFFERENCES IN IMMUNE RESPONSES

A solid base of evidence shows that females have stronger peripheral immune responses than males. A 2016 review by Drs. Sabra Klein and Katie Flanagan in *Nature Reviews Immunology* explains women clear pathogens faster and tend to have better antibody responses to vaccines when compared to men (making vaccines, like the seasonal flu vaccine, more effective for women).

AT THE SAME TIME, STRONGER IMMUNE RESPONSES PLACE WOMEN AT A HIGHER SUSCEPTIBILITY TO AUTOIMMUNE DISEASES, WITH 80% OF AUTOIMMUNE DISEASES OCCURRING IN FEMALES.

When it comes to neuroinflammation, the opposite seems to be true, where males show a stronger response when compared to females. In their 2021 article published in *Journal of Neuroinflammation*, Dr. Caitlin Posillico and colleagues identified sex differences in protein release, chemical signalling, and gene expression within brain cells of mice.

The authors explained that sex differences in neuroinflammation is a relatively new area of research, with the bulk of previous research looking at only males or only females. Future studies are needed to learn more about how sex differences in neuroinflammation may affect outcomes like cognitive function and mood disorders so that new targets for treatment may be identified.

FREE RADICALS & ANTIOXIDANTS

Free radicals are unstable molecules that are highly reactive. Free radicals are generated by the body during essential metabolic processes, like inflammation and breathing, but can also result from exposure to external sources like cigarette smoke, some medications, and air pollution. An abundance of free radicals can cause large-chain chemical reactions that damage DNA and cells, leading to oxidative stress and illness/disease. Thus, free radicals must be kept in balance by antioxidants.

Antioxidants stabilize free radicals, essentially “disarming” them from causing damage to the body. As with free radicals, there are internal and external sources of antioxidants. Antioxidants are produced in the body during essential metabolic processes like energy production and can also be ingested from foods rich in vitamins (e.g., vitamins C and E) and phytochemicals (e.g., lycopene from tomatoes and flavanols in cocoa).

Sex differences have also been noted along the gut-CNS axis, playing potential roles in the incidence of neurodegenerative diseases (e.g., AD and Parkinson's disease) and mental health disorders (e.g., anxiety and depression).

A 2020 review of evidence by Dr. Calliope Hologue and colleagues in *Current Psychiatry Reports* explains that although there are known differences in hormones (e.g., estrogens), metabolism, and gut microbes between men and women, we are in the early stages of identifying how these sex differences influence the brain, mental health, and physical health.

ANTI-INFLAMMATORY DIETS & BRAIN HEALTH

With clear evidence pointing to the harmful nature of chronic inflammation in the brain and body, and emerging findings on the gut-CNS axis, attention has turned toward anti-inflammatory strategies to mitigate disease progression or reduce risk of disease.

While research on the timing and target of anti-inflammatory pharmaceutical approaches for chronic inflammation is ongoing, parallel research has been exploring alternate approaches, with considerable attention on the role of diet.

In 2009, researchers at the University of South Carolina developed a dietary inflammatory index (DII) to quantify the ways that food parameters (components) affected chemical markers of inflammation.

Published in *The Journal of Nutrition*, Dr. Philip Cavicchia and colleagues reviewed 929 research studies on diet and inflammation and derived a list of 45 different parameters. The DII included macronutrients (e.g., fat, carbohydrate, protein), vitamins (e.g., vitamins C, D), minerals (e.g., magnesium, zinc, iron), specific foods (e.g., garlic, ginger, turmeric), alcohol, and food constituents abundant in fruits and vegetables (e.g., fibre, beta carotene).

The inflammatory potential of diet was calculated as a single DII score; a lower value indicated a more anti-inflammatory diet that is rich in antioxidants. Over time, the DII has been updated and is even available as an online calculator.

IT SEEMS THAT EATING FEWER INFLAMMATORY FOODS AND PLENTY OF ANTI-INFLAMMATORY SOURCES APPEARS TO BE HEALTH PROTECTIVE.

Over the last decade, population studies from around the world have confirmed that a high DII score is related to a higher

Not surprisingly, diets with plenty of colourful fruits and vegetables, plant sources of protein (e.g., lentils, nuts, and seeds), fatty fish (e.g., salmon), and unsaturated oils (e.g., olive, avocado) yield a low DII score. Diets with a lot of red meat, fried foods, refined sugars, and saturated fats yield a high DII score.

presence of inflammatory markers and is also linked to poorer health outcomes.

For example, a 2021 systematic review of meta-analyses published in *Frontiers in Nutrition* by Fang-Hua Liu and colleagues showed that there is a strong evidence base linking high DII to several forms of cancer (e.g., digestive and colorectal) and cardiovascular disease, and suggestive evidence linking high DII to other forms of cancer (e.g., breast and prostate), all-cause mortality, and depression. The researchers suggest that randomized controlled trials should be done to determine if these results are causal versus correlated.

Focusing on brain health, emerging research published over the last few years has found relationships between high DII and smaller brain volume, poor cognition, cognitive decline, dementia diagnosis, and risk of AD.

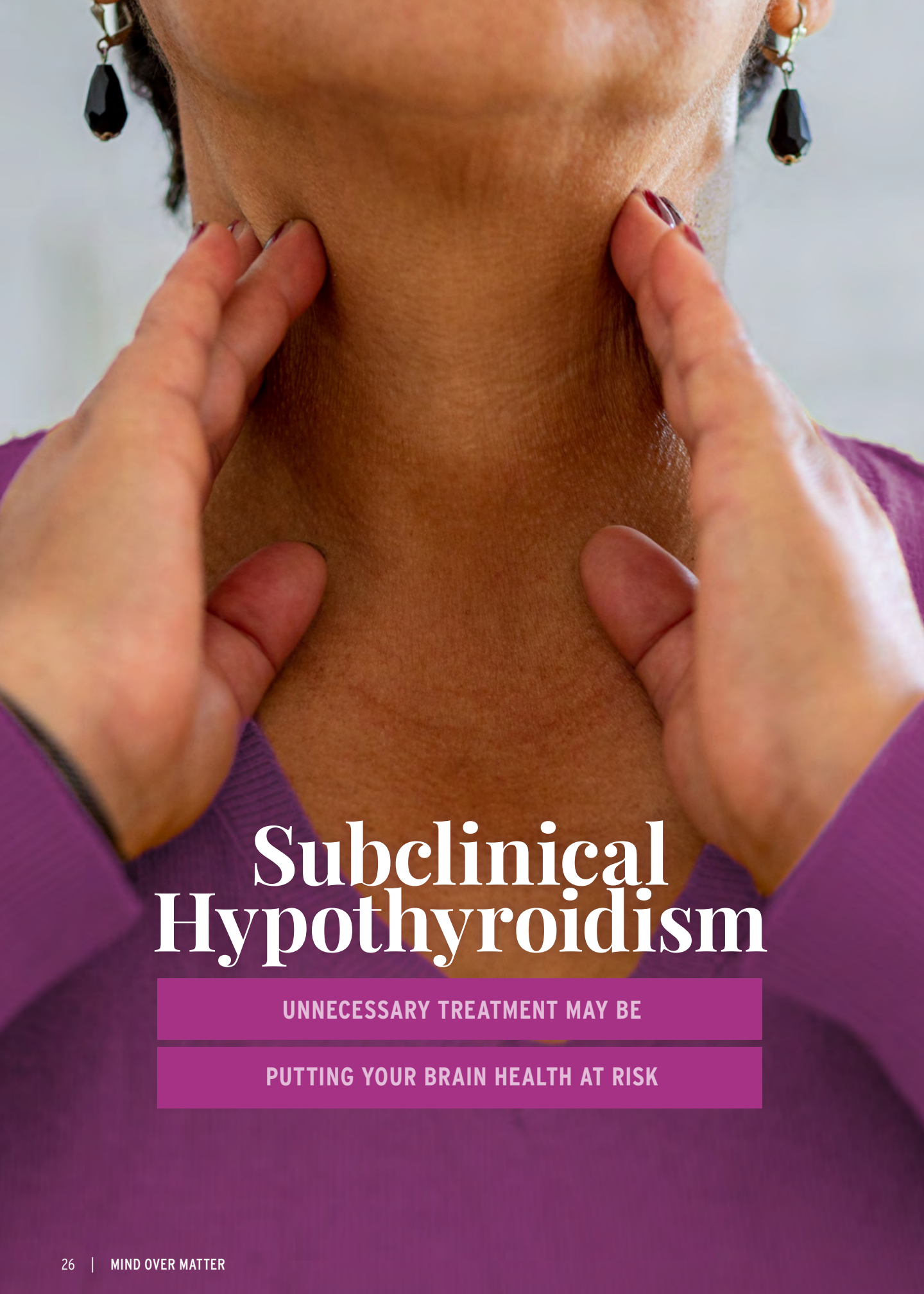
A growing number of randomized controlled trials examining the effect of low DII diets on disease outcomes are also underway, which will hopefully help researchers determine DII levels that offer health protection.

REDUCING THE BAD & INCREASING THE GOOD

New understandings of inflammation and immune responses give rise to future possibilities to manage and prevent chronic inflammation in the brain and body.

Over the last decade, we've learned there are detrimental and beneficial subgroups of cells involved in our immune systems, but what's missing is information about how to isolate and amplify the beneficial parts of inflammation and suppress the destructive ones.

At this point, though, what can be said is that a diet rich in anti-oxidants with limited inflammatory foods appears to be protective for overall health and promotes proper functioning of the immune system. So go ahead and eat the rainbow, and some beans and fatty fish, too! Your body and mind will thank you for it. 🌍



Subclinical Hypothyroidism

UNNECESSARY TREATMENT MAY BE

PUTTING YOUR BRAIN HEALTH AT RISK



You may have noticed tabloid headlines at the supermarket checkout proclaiming fatigue, weight gain, and brain fog are caused by an under-active thyroid, a condition known as hypothyroidism, and that hormone replacement therapy is the solution.

Levothyroxine, the medication for treating hypothyroidism, is the second-most prescribed drug in Canada and the United States. The percentage of individuals taking levothyroxine is two times greater than the frequency of the condition, indicating that it is over-prescribed.

One of the key drivers of its extensive use has been an increase in treating people with a controversial condition called subclinical hypothyroidism (SCH), a grey area of reduced thyroid function that shares some overlapping symptoms with perimenopause and menopause. Once initiated, levothyroxine is typically taken daily for life.

A growing body of research shows levothyroxine has little to no impact on SCH symptoms, and at the same time, is associated with an increased risk of dementia, atrial fibrillation, stroke, and fractures.

Mind Over Matter® spoke with two leading thyroid experts studying SCH overtreatment. Dr. Jennifer Mammen, an endocrinologist at the Johns Hopkins Bayview Medical Center and Assistant Professor at the Johns Hopkins School of Medicine in Baltimore, Maryland, is investigating how to distinguish whether decreases in thyroid function in older adults are signs of thyroid failure that needs treatment or protective mechanisms associated with aging.

Dr. Spyridoula Maraka, an endocrinologist at the Central Arkansas Veterans Healthcare System and Associate Professor of Medicine in the Division of Endocrinology and Metabolism at the University of Arkansas for Medical Sciences in Little Rock, Arkansas, is conducting a novel clinical trial to determine whether it's safe and feasible to discontinue levothyroxine prescribed for SCH.

THYROID HORMONES

Your thyroid gland is a small, butterfly-shaped organ that sits at the front of your windpipe below your Adam's apple. It produces hormones that regulate metabolism and affect almost all tissues in your body. —>

Hypothyroidism is ten times more common than hyperthyroidism. Hypothyroidism is much more common in women than in men.

Thyroid hormones are also essential for brain development and function. During fetal development, thyroid hormones influence the growth and organization of neurons, glial cells, synapses, and the insulating myelin sheath around nerves.

Worldwide, many pregnant women and newborns are screened to identify thyroid hormone problems as soon as possible because thyroid hormone deficiency during critical transition periods of fetal brain maturation can cause intellectual deficits and neurological impairments in babies.

IN ADULTS, IMBALANCES IN THYROID HORMONES CAN CAUSE CONFUSION, MOOD DISORDERS, DEMENTIA, AND PERSONALITY CHANGES.

The thyroid is controlled by your pituitary gland, a pea-sized organ located behind the nose at the base of the brain. It detects the level of thyroid hormone in your blood and adjusts the level of thyroid stimulating hormone (TSH) it secretes, which in turn tells the thyroid how much of two hormones called thyroxine (T4) and triiodothyronine (T3) to produce.

“A good metaphor for understanding the role of TSH is driving a car,” said Dr. Mammen. “TSH is the pressure on the gas pedal. It looks at the thyroid hormone in circulation the way you look at your speedometer and adjusts TSH to maintain your target speed, your metabolic rate.”

THYROID DISORDERS

Hyperthyroidism is a disorder that occurs when the thyroid produces too much T4 and T3. The pituitary gland eases up on the gas pedal and lowers TSH, trying to tell the thyroid gland to reduce T4 and T3 production.

Symptoms of hyperthyroidism may include weight loss despite an increased appetite, more bowel movements, irritability, fatigue, vision problems, light menstruation, increased sweating, nervousness, shaking hands, and insomnia. The most common cause of hyperthyroidism is Graves’ disease, an autoimmune disorder.

Hypothyroidism, on the other hand, is a disorder that occurs when the thyroid doesn’t produce enough T4 and T3. The pituitary gland presses harder on the gas pedal, increasing TSH to tell the thyroid gland to make more T4 and T3.

SYMPTOMS OF HYPOTHYROIDISM MAY INCLUDE WEIGHT GAIN, CONSTIPATION, FATIGUE, DRY SKIN AND HAIR, HEAVY MENSTRUATION, INTOLERANCE TO COLD, JOINT AND MUSCLE PAIN, AND A SLOWED HEART RATE.

Hypothyroidism is associated with depression, bipolar affective disorders, and decreased cognitive function. The most common cause of hypothyroidism is Hashimoto’s thyroiditis, an autoimmune condition that destroys thyroid tissue.

Thyroid disorders are diagnosed with a blood test that evaluates TSH, T4, and sometimes T3 and the presence of autoimmune antibodies. Reference ranges may vary slightly between different lab tests.

OVERT VS. SUBCLINICAL HYPOTHYROIDISM

Overt hypothyroidism, indicated by high TSH and low T4, is rare, occurring in less than half of a percent of the general population. Treatment is essential to reverse memory problems, slowed thinking, and sluggish physical movements. All diagnostic guidelines for dementia include screening for thyroid dysfunction because if overt hypothyroidism is causing the symptoms, it is easy to address them with treatment.

However, defining SCH and determining whether it should be treated, especially in older adults, is controversial. “So-called ‘subclinical hypothyroidism,’ found in about 11 to 15% of older adults, is really a laboratory definition, not a disease,” said Dr. Mammen.

“We mostly see isolated elevated TSH readings between 4.5 mIU/L and the upper end of the reference range, around 10 mIU/L, with T4 levels that look fine.” Only about 2 to 5% of subclinical hypothyroidism cases may progress to overt hypothyroidism annually.

Keep in mind that your TSH level may be affected by many factors. Just as the pituitary gland controls the thyroid, the hypothalamus, a structure located at the base of the brain, controls the pituitary gland.

“The hypothalamus adds another regulatory layer to thyroid hormone production for maintaining metabolic homeostasis. It integrates many factors, including whether you’ve recently eaten or fasted, gained or lost weight, slept sufficiently, or are stressed, healthy, or sick,” said Dr. Mammen. “That information also determines how much TSH the pituitary makes.”

Therefore, an elevated TSH caused by factors other than thyroid problems may return to normal after those issues resolve, so your physician should consider your whole health history and not prescribe treatment based on one somewhat elevated TSH result.

QUESTIONABLE TREATMENT BENEFITS

Once initiated, levothyroxine is taken daily and requires not consuming any food containing calcium or iron within four hours. However, evidence shows that it provides no benefit in improving symptoms and quality of life and little to no benefit in improving cardiovascular events or mortality when taken for SCH.

Three randomized, placebo-controlled blinded studies of levothyroxine in patients with SCH showed no improvement in depression or psychological distress measures, according to a review by Dr. Mary Samuels, an endocrinologist at the Oregon Health & Science University, in Portland, Oregon, published in *Endocrinology & Metabolism Clinics of North America* in 2014.

A large, double-blind, randomized, placebo-controlled trial led by Dr. David Stott at the Glasgow Royal Infirmary in the United Kingdom found that levothyroxine provided no benefits for older adults with SCH defined as TSH between 4.6 and 19.99 mIU/L and T4 within the reference range. There were no differences in hypothyroid symptoms, tiredness, or cognitive function measures between those who received treatment compared with those who took a placebo. The study was published in *The New England Journal of Medicine* in 2017.

OVER-TREATMENT RISKS

Studies have shown that over-treating hypothyroidism is associated with harms. For example, about 40% of patients over 65 taking levothyroxine develop hyperthyroidism, increasing the risk of irregular heart rhythms, stroke, bone loss, and fractures.

A retrospective population study of Taiwanese adults ages 65 years and older found that a history of hypothyroidism was associated with an 81% increased risk of having dementia, and taking thyroid hormone replacement therapy was associated with a three-fold increased risk of having dementia. Dr. Chien-Hsiang Weng, a family medicine physician with Lifespan health system and Clinical Assistant Professor at the Warren Alpert Medical School of Brown University in Providence, Rhode Island, led the large case-control study published in *Neurology* in 2022.

WHILE THIS STUDY DID NOT CAPTURE DATA ON THE SEVERITY OF THE HYPOTHYROIDISM FOR WHICH THYROID HORMONE REPLACEMENT WAS PRESCRIBED, IT STILL SERVES AS A WARNING SIGN ABOUT THE POTENTIAL HARMS OF OVER-TREATING OLDER ADULTS.

More research is needed to tease out the mechanisms that may explain these findings.

CHANGES IN AGING

An elevated TSH is more common with aging. However,

determining whether an increasing TSH signals hypothyroidism that needs treating or is a protective adaptation is a current area of investigation.

Dr. Mammen and colleagues analyzed data from the Baltimore Longitudinal Study of Aging (BLSA) to examine relationships between functional mobility, fitness, fatigue, and normal free T4 (FT4), defined as between 0.76 and 1.5 ng/dL.

They discovered that older adults at the lower end of the normal FT4 range had better mobility, fitness, and fatigue profiles than those at the higher end. Their findings, published in the *Journals of Gerontology, Series A: Biological Sciences and Medical Sciences* in 2016, added further weight to a growing body of evidence showing that declining thyroid function may align with healthy longevity.

Since 2019, Dr. Mammen has been leading a multi-year research grant funded by the U.S. National Institute of Aging exploring changes in the hypothalamic-pituitary-thyroid axis in aging adults. The project aims to identify markers for determining which individuals truly require thyroid hormone treatment by looking at TSH activity, the ability of the pituitary gland to respond to stimulation, the presence of antibodies, and other blood tests.



THIS WORK IS IMPORTANT BECAUSE TREATMENT DOES NOT SEEM TO IMPROVE COGNITIVE FUNCTION AND OVER-TREATMENT HAS THE POTENTIAL TO WORSEN COGNITIVE FUNCTION. OVER-TREATMENT ALSO INCREASES THE RISK OF IRREGULAR HEART RHYTHMS AND BONE LOSS IN AN ALREADY VULNERABLE POPULATION OF AGING ADULTS,

Dr. Mammen said. The research has produced some important findings. For example, she and her colleagues found that among 1,295 adults in the BLSA who were followed for nine years, those with normal TSH levels while taking levothyroxine had an 81% increased risk of mortality compared to those with normal TSH levels not taking the medication. Their study was published in the *Journal of the American Geriatrics Society* in 2021.

They also discovered that FT4 may be a useful marker for differentiating whether a transient, isolated elevated TSH is due to early development of SCH or represents an adaptation to age-related stress. Dr. Mammen and her team identified that FT4 levels in the lowest quartile of the reference range were associated with developing hypothyroidism due to thyroid failure, whereas higher and rising FT4 readings were found in older adults with evidence of an aging adaptation in the analysis of their hypothalamic-pituitary-thyroid axis. Their study was published in *Frontiers in Endocrinology* in 2022.

Currently, TSH reference ranges for adults apply to people ages 18 and up, with no separate range for those 65 and older. →

"We should probably be using different reference ranges for older adults that are a bit higher, just as we have lower reference ranges for pregnancy, and also evaluate FT4 to ensure caution when deciding to initiate treatment in older adults," said Dr. Mammen.

"The third National Health and Nutrition Examination Survey suggests a TSH of about 5.6 to 5.9 at the upper end is more appropriate for adults 65 and older, whereas most lab tests have it somewhere between 3.5 and 4.5 for all adults."

IS DEPRESCRIBING POSSIBLE?

In a systematic review and meta-analysis of clinical outcomes after discontinuing thyroid hormone replacement, Dr. Maraka and colleagues found evidence in 17 observational studies that suggested up to one-third of patients remained at normal TSH levels after discontinuing treatment.

They also found that a higher percentage of those who had an initial diagnosis of SCH remained at normal TSH levels after discontinuing treatment, compared to those with overt hypothyroidism. The paper was published in *Thyroid* in 2021.

Next, Dr. Maraka led a double-blind, placebo-controlled clinical trial to determine the impact of stopping levothyroxine in adults treated for mild SCH with an elevated TSH no greater than 10 mIU/L.

She presented the interim trial results at the American Thyroid Association's 2022 Annual Meeting.

Study participants were primarily older men, including 20 who continued to take their usual dose of levothyroxine (25 to 75 micrograms daily) and 20 who received a placebo. There were no differences between groups for TSH, FT4, antibody positivity, or clinical symptoms at baseline.

However, after eight weeks, only 36.8% of participants in the placebo group

developed SCH, much lower than expected, with an average TSH of 5.5 mIU/L. By contrast, 10% of those who kept taking levothyroxine developed SCH, with an average TSH of 2.7 mIU/L in the group overall.

Notably, there were no significant differences between groups in patient-reported symptoms, quality-of-life measures, or tiredness, and no reports of hypothyroidism or cardiovascular events, such as stroke, heart failure, atrial fibrillation, bone fractures, or deaths.



IT IS UNCLEAR WHY SO MANY PHYSICIANS HAVE TREATED PATIENTS FOR SUBCLINICAL HYPOTHYROIDISM OR WHY MANY PATIENTS ARE UNAWARE OF THE REASONS WHY THEY WERE PRESCRIBED LEVOTHYROXINE IN THE FIRST PLACE. OUR FINDINGS SUGGEST THAT IT IS FEASIBLE AND SAFE TO DISCONTINUE LEVOTHYROXINE IN PATIENTS WITH A HISTORY OF SUBCLINICAL HYPOTHYROIDISM. HOWEVER, THE DECISION REQUIRES CAREFUL CONSIDERATION AND DISCUSSION.

Dr. Maraka and her research team will report the final results after analyzing six months of data. They are also planning to conduct a larger, multisite trial in the future.

"Doctors should explore other factors first before jumping to start thyroid hormone replacement for patients experiencing difficulties losing weight, fatigue, or memory loss," said Dr. Maraka. "There is a great need for patient-centred care and shared decision-making, with a full review of symptoms and discussion about the anticipated benefits and long-term side effects of levothyroxine treatment."

THE BOTTOM LINE

The benefits of taking levothyroxine for SCH are questionable and may put your physical and brain health at risk, especially as you age. If you think you may be unnecessarily treated for SCH, speak to your doctor.

Any changes to your medication, such as reducing your dose or discontinuing treatment, will require close medical supervision.

You can also request a referral to an endocrinologist for a more complete thyroid health evaluation and management of treatment plan changes. 🌐



Zentangle®

RELAX THROUGH MINDFUL DRAWING

ZENTANGLE TERMINOLOGY

When you are creating a piece of art using the Zentangle method, you are said to be “tangling,” i.e., tangle is the verb used, not “Zentangling.” The individual repetitive patterns used to create each drawing are referred to as “tangles.” →

Looking for a fun and creative way to relax that is easy to learn, even for people who think they have no artistic talent whatsoever? Something that is simple, yet more individualized and expressive than just colouring? If so, you'll want to try Zentangle®, a popular self-help art modality that is both fun and therapeutic, and no previous art experience or skill is required.

Zentangle is a form of meditative drawing using structured patterns that can help you relax and focus.

The Zentangle method was created by Rick Roberts and Maria Thomas, of Whitinsville, Massachusetts, in 2003. The philosophy of this method is summed up in their trademarked tagline "Anything is possible one stroke at a time."

"Soon after it presented itself to us nearly 20 years ago, we knew it was important," said Thomas and Roberts. "We both trusted our feelings and our inspirations and left our day jobs to focus fully on Zentangle."

THE ZENTANGLE PROCESS

With Zentangle, it is the process that matters more than the end product. Yes, tangling does produce unique and beautiful pieces of art, but art-making is not the primary purpose. Rather, the main goal is to help you relax, reduce stress, and reach a mindful state.

To do that, it uses a specific process and principles.

- Begin by gathering your supplies. You only need three tools: a pencil, pen, and piece of paper. Typically, you use a 3.5-inch square piece of paper (called a "tile") and a permanent black pen, although other types of pen and sizes/types of paper can be substituted. Note the absence of an eraser from the supply list.

That's because, with Zentangle, there are no mistakes. You use the pencil only briefly at the beginning and then switch

ZENTANGLE & DEMENTIA

Zentangle Inc. and the Zentangle Foundation are working closely with the Alzheimer Society of Calgary. They are applying the Zentangle Method to benefit not only patients, but also caregivers and families of patients.

Negative affect refers to the subjective experience of unpleasant emotional states such as anxiety, sadness, fear, guilt, shame, anger, and envy.

to pen, and if you make any unintended marks, you just leave them and figure out how to incorporate them into your art.

- Before you begin, take a few slow and deep breaths, relax your body, and clear your mind.
- Using the pencil, place a light dot in each corner of your paper tile. Then use the pencil to lightly connect the four dots using straight or curved lines, creating a border. Next, continue using the pencil to divide your tile into sections by drawing what is referred to as a "string," which can be a zigzag, swirl, circle, X, or any other shape you like. Draw your string quickly, without any thought. Don't try to picture or plan in advance how the end piece of art will look.
- Choose your first tangle (i.e., pattern) and use your pen to draw it, one stroke at a time until one of the sections on your tile is filled. Be mindful as you work, focusing your attention completely on the task at hand, not thinking about the past or future. Repeat until each section is filled with a different pattern. Rotate your tile as needed while you work. You are creating abstract art and there will be no top or bottom.
- Once you are done filling the sections with tangles, you may choose to use the pencil to add shading and depth. Then, sign and date the back of your tile, and pause to look at the finished piece, reflecting on how you feel.

"The structured process used with Zentangle simplifies things, freeing your mind from the need to make a bunch of decisions," explained Deborah Kopeschny, a registered psychotherapist and art therapist, and certified Zentangle teacher, based in Toronto. "It is much easier to relax when you don't have to think about what to draw, or what materials and colours to use."

"Zentangle is very accessible. It is suitable for all age groups, and once someone has learned the basic techniques, they are able to do it just about anywhere, anytime, using only a few inexpensive supplies," continued Kopeschny. "Zentangle is such an enjoyable tool for managing stress and nurturing mental well-being that many people tangle every day."

ZENTANGLE-INSPIRED ART

The process described above is the traditional Zentangle method, the one that has been studied and found to cultivate a mindful, meditative state that provides many benefits (described in the next section). Some people stick to making traditional Zentangle art. There are endless possible combinations of strings and patterns one can put together to create a different piece of art every time.

However, others build on the foundation of traditional Zentangle and branch out to make what is referred to as Zentangle-inspired art. Some ways Zentangle-inspired art may differ from the traditional approach include: being much larger and more complex than a traditional piece, utilizing additional supplies like coloured pencils or markers, and not being abstract (e.g., a drawing of an animal, leaf, or other object may be used as the basic shape to fill in with patterns).

BENEFITS OF ZENTANGLE

The reported benefits of Zentangle include reduced stress, a sense of inner calm and peace, improved sleep, and lower blood pressure. It has also been linked to increased focus, concentration, creativity, and problem-solving, as well as improved memory and self-confidence. It can also help provide a healthy distraction from things like trauma, grief, or pain.

What is particularly exciting is that Zentangle can produce these benefits very quickly - after as little as one session.

One study involving 24 caregivers of people with Parkinson's disease found that a single 20-minute Zentangle session resulted in a significant decrease in both stress and anxiety. That study was conducted by Lianne Sufrin as part of a thesis for Hofstra University in 2015.

Another study also found positive impacts of a Zentangle intervention that was fairly short. In this study - by Siu-Ki Chung and colleagues, published in *American Journal of Occupational Therapy* - 38 adults from the general public were randomly assigned to a Zentangle group or a waitlist control group. Participants in the Zentangle group completed a two-hour class, learning basic principles and completing two drawings, and were then encouraged to practice on their own for two weeks.

The researchers found that, compared with the control group, those in the Zentangle group experienced significant reductions in negative affect both immediately after the intervention as well as two weeks later. Further, participants who practiced Zentangle for more than 80 minutes per week experienced a significant reduction in anxiety symptoms as well as improved self-compassion.

Zentangle is a mindfulness activity, i.e., it helps individuals cultivate a deep focus on the present moment, noticing what is happening here and now without judgement.

Research has shown that mindfulness offers a broad range of mental and physical benefits, including: psychological well-being; decreased mental health symptoms such as depression and anxiety; reductions in chronic pain; and improved brain function and immune response.

Long-term mindfulness practices have been found to change brain patterns (toward calm yet focused states of attention), as well as brain structure (encouraging thicker, more developed areas of grey matter).

"The Zentangle method has always been a fun, easy, and enjoyable system of creating beautiful images. However, we did not anticipate the many other ways a Zentangle practice would benefit people. Their stories tell of relief of pain, anxiety, and traumas small and large; of the joy of creating something beautiful; the pleasures of a worldwide supportive community of creators ... and 1,500 or so other things!" said Thomas and Roberts. "We are grateful that even after 20 years, Zentangle continues to be an amazing and magical adventure - for us and for so many other people across this world."

GIVE IT A TRY!

"The best way to discover the benefits of Zentangle is to give it a try," said Kopeschny. "In our fast-paced world where information overload is so prevalent, there is a critical need for mindfulness, calm, and uninterrupted focus. If you are seeking a brief respite from your busy life and relief from chronic stress, Zentangle might be an ideal pastime to begin. Other forms of mindfulness activity, like meditation, can be challenging to stick to, but many people quite enjoy putting pen to paper and allowing a beautiful, unplanned work of art to emerge, making it much easier to develop a consistent Zentangle habit and reap the subsequent benefits."

There are many free or inexpensive ways to learn to tangle. There are in-person and online classes offered by certified Zentangle teachers, or you can learn on your own using free online resources or one of the many books available on the subject. 🌍

Get & Stay Brain Fit

INVESTIGATING HOW THE NEW BRAINFIT APP PERFORMS

Women's Brain Health Initiative (WBHI) launched the free BrainFit mobile application (app) on Women's Brain Health Day, December 2, 2022. BrainFit was designed to help users improve their lifestyle habits across the Six Pillars of Brain Health - stress management, exercise, mental stimulation, social activity, nutrition, and sleep.

BRAINFIT - HABIT TRACKER IS THE ONLY APP WITH A SPECIFIC FOCUS ON EXTENDING COGNITIVE VIGOUR AND CREATED WITH WOMEN IN MIND.

An essential part of designing, developing, and refining any new technology is studying its performance after it launches. Mind Over Matter® (MOM) spoke with lead researcher Dr. Lora Appel, Assistant Professor of Health Informatics in the Faculty of Health at York University in Toronto, and a collaborating scientist at University Health Network's OpenLab, where she leads the Prescribing Virtual Reality (VRx) lab.

Dr. Appel and her team are investigating how BrainFit performed in its first three months since launch. We discussed the research goals, the information she and her team are collecting and analyzing, what they hope to find, and what they plan to do with their findings.

MOM: What is the overall goal of the BrainFit research?

DR. APPEL: My work focuses on designing interventions people can use in everyday lives

and see a result, so I'm excited to evaluate how BrainFit performs. We're assessing whether it increases the awareness of brain health habits among early adopters and encourages them to make positive lifestyle changes across the Six Pillars of Brain Health. We plan to incorporate our findings in future upgrades and versions of the app.

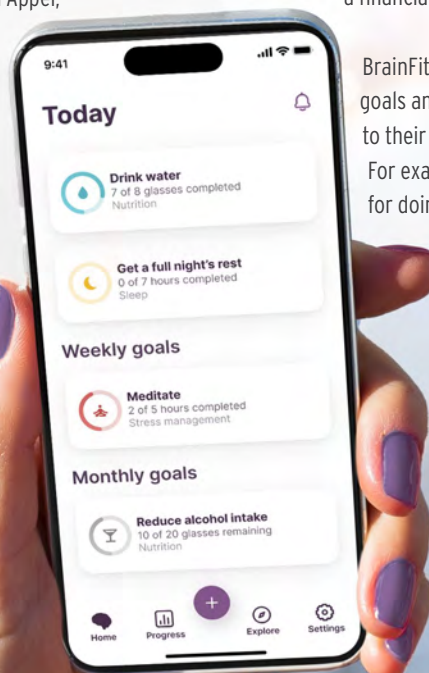
MOM: Are lifestyle behaviours easy to modify?

DR. APPEL: Changing behaviours is difficult. However, studies have shown that achieving small, bite-sized goals generates more momentum than one big goal. For example, many studies show it's psychologically more motivating to pay off several smaller pockets of debt than one big amount, even though that doesn't make sense from a financial perspective.

BrainFit allows people to start with a few small goals and build momentum over time, according to their personal motivations and preferences. For example, consider differences in preferences for doing household chores. I prefer doing dishes because I like things clean and the results are immediate and consistent, whereas cooking can be messy, and I don't know how it will turn out.

MOM: What information did you collect, and how are you analyzing it?

DR. APPEL: There are three parts to our research. The first part is a pilot trial. We asked 30 volunteers to answer comprehensive surveys on their habits before and three months after they used BrainFit.



Our analysis will determine whether the app led to positive habit changes over time. However, measuring self-reported improvements can be tricky since there is often a lack of consensus on the ideal amount of a healthy behaviour.

For example, some people do well with only six hours of sleep per night, while others need eight hours. So, we spent a lot of time looking at what positive impacts would look like and updated validated scales we're using to collect information in each pillar to ensure they're relevant in today's world.

We also conducted in-depth interviews with a few outliers - those who used the app very often and those who dropped off early - to look for deeper insights into common characteristics that may make the app more usable.

The second part of our research is a scoping review of the literature and other lifestyle behaviour trackers that are currently available. The aim is to identify features and benefits that set BrainFit apart from other apps and pinpoint things we should incorporate.

The third part of our research is a smaller evaluation to assess whether BrainFit raises awareness and reduces stigma related to dementia. Our funder, the Public Health Agency of Canada, provided a simple set of questions and scales for each of these two areas. We asked almost 100 participants to fill out two questionnaires at baseline.

They chose to listen to a podcast episode or watch a video in the app within one week, and then repeated the questionnaires. Beyond the app's ability to increase awareness and reduce the stigma associated with dementia, it will be interesting to see whether age, cultural characteristics, or other demographic differences defined the likelihood of selecting one medium over another.

EXAMPLE SURVEY QUESTIONS FOR MEASURING HABIT CHANGES

Research participants rated their current health and how often they engaged in healthy habits across all Six Pillars of Brain Health. For example, here are the questions from the mental stimulation pillar. Dr. Appel and colleagues adapted these scales from the Multifactorial Memory Questionnaire, a validated research tool.

1. How would you rate your memory when compared to other people your age?
-2 = Poor; -1 = Fair; 0 = Good; 1 = Very Good; 2 = Excellent
2. I have confidence in my ability to learn new things.
-2 = Strongly disagree; -1 = Disagree; 0 = Neutral; 1 = Agree; 2 = Strongly Agree

MOM: Does your research and refinement process take diversity and cultural sensitivity into account?

DR. APPEL: Diversity and cultural sensitivity have historically been overlooked in many aspects of research and development. However, there is a growing recognition of their importance, especially on modifiable risk factors and behaviour change strategies related to healthy lifestyles.

OUR GOAL IS TO ENSURE BRAINFIT MEETS THE UNIQUE NEEDS OF PEOPLE OF ALL BACKGROUNDS IN THEIR REAL LIVES.

We are intentionally engaging with diverse stakeholders (age, culture, ethnicity, language, income, location) so we can see if patterns emerge that we can use to better tailor the education and habit suggestions in the app.

For example, the Mediterranean diet is the most recommended diet for good brain health, but suggesting it to an individual from a southeast Asian community will likely be ineffective. Learning what's in their kitchen and making realistic suggestions they can implement will be much more successful.

MOM: What do you plan to do when the research is complete?

DR. APPEL: We will use the learning to refine BrainFit and plan to publish our results. The pilot trial (part one) is also a test of our research methods, so we plan to refine them before launching a more extensive study among a larger group of participants in the future.

MOM: Are there any preliminary findings you can share?

DR. APPEL: Midway through our scoping review (part two), I'm convinced most other apps target only one or two behaviours and focus on managing chronic conditions. By contrast, BrainFit is more comprehensive, allowing users to target behaviours in all Six Pillars of Brain Health and add habits aligned with their cultural preferences.

SO FAR, BRAINFIT IS THE ONLY APP THAT TRACKS PREVENTATIVE LIFESTYLE CHANGES LONG BEFORE BRAIN HEALTH PROBLEMS ARISE.

Learn more about the Prescribing Virtual Reality lab at prescribingvr.com. 



BrainFit – Habit Tracker is available at no cost for both iPhone and Android devices. For more information, visit BrainFit.org.

BrainFit is made possible through a financial contribution from the Public Health Agency of Canada and with support from York University, BitBakery, The Citrine Foundation of Canada, RBC, TELUS, and RB33.



There are times when Lorraine Downey comes home after work that she just does not want to talk to her husband. It is nothing against him. It has to do with what she has seen in her work as an Ottawa paramedic. Such as the day when she concluded a long shift that involved two intense hours on a ledge trying to convince someone from jumping. A police negotiator took over and brought the incident to a safe end, but it was a draining experience.

“It was very intense. And then I had an hour-long drive home and I was exhausted, and the last thing I wanted to do is talk when I arrived home. I just wanted to sleep and eat. At some point, I knew I would tell him why,” said Downey.

She counts herself lucky that her husband is a volunteer firefighter and has had his own experience of being a witness to troubling events.

“We’ve been married almost 30 years and we have a good understanding how each other ticks. He’ll ask me what I need. Sometimes it’s just a bath or a walk. I just don’t want to be around anybody and he understands.”

While our awareness of post-traumatic stress disorder (PTSD) has grown, less thought has been given to the spouses and partners of people at risk of PTSD. But in their own way, they are on the front lines as well, struggling to support a loved one who may see awful things on the job. As the Peer Support Coordinator for the Ottawa Paramedic Service, Downey hears about these challenges all the time.

“They know something is different, wrong. But they don’t know where to turn and might think they’re the only ones,” she told Mind Over Matter®.



Wounded Warriors

EMOTIONAL TOLL ON PUBLIC SAFETY

PERSONNEL EXTENDS TO THE FAMILY



IT'S NOT JUST THE PEOPLE WHO SHOW UP WITH LIGHTS AND SIRENS. FAMILIES CARRY THE WEIGHT WITH THIS, TOO. IT IMPACTS THE CHILDREN, RELATIONSHIPS. AND THEY NEED THE HELP BEFORE THEIR LOVED ONE IS NO LONGER ABLE TO WORK. THEY NEED UPSTREAM SUPPORT.

Downey is participating in a variety of new initiatives to bring help to the families and friends of public safety personnel (PSP). PSP is a relatively new term, which includes not only police, paramedics, and firefighters but other sectors like correctional officers.

A new resource hub, PSPNET Families, is a place for loved ones to learn more about what it means to be in this line of work. Funded by the Public Health Agency of Canada, researchers from Queen's University and the University of Regina have joined forces to build

something unique in the space and fill an important gap in resources within the PSP community.

"We've been working to give voice to the experiences of families and create resources that resonate with their unique challenges," said Dr. Heidi Cramm, one of the leaders of the project and a PSP spouse herself.

"We're bringing together state-of-the-art evidence around what it means to be a PSP family and to build out resources to deal with what goes with it," added Cramm, who is an Associate Professor in the School of Rehabilitation Therapy at Queen's University. She's collaborating with Dr. Heather Hadjistavropoulos and Dr. Nathalie Reid of the University of Regina.

Cramm says they are proactively preparing families with strategies for identifying the ways in which the job creates additional —>

challenges for the family, before someone shows signs of PTSD. It means understanding that a spouse may need some space and time alone after a tough day and perhaps recognizing that sudden irritability may be work-related.

WITHOUT UNDERSTANDING HOW PSP MIGHT REACT TO WHAT THEY SEE AND DO AT WORK, FAMILY MEMBERS MAY TAKE BEHAVIOURS LIKE DISENGAGEMENT PERSONALLY, LEADING TO RELATIONSHIP CONFLICT.

Cramm says the families are a diverse group, but their needs are secondary to those serving as PSP. Depending on the nature of the PSP's job, families may have to move frequently, with spouses balancing their own careers and child care demands, all while supporting someone who might be dealing with the effects of trauma exposure.

"It takes a lot of bandwidth for people to anticipate and manage the dynamic demands of the job. There's a constant need for adaptation and logistical management that's very complicated and creates concerns about the mental health of families," she said. Traditional gender norms around household management may be amplified in PSP families where most spouses may be women.

PSP families need a variety of supports. While PSPNET Families offers upstream resources and a well-being course for spouses experiencing their own mental health issues, organizations like Wounded Warriors Canada have developed a number of programs for those families affected by PTSD in trauma-exposed professions.

"Living with PTSD is hard. Families also need support," said Tim Black, National Clinical Co-Advisor to Wounded Warriors. When Wounded Warriors started providing programs for spouses and families, the demand was huge, with a wait list that was five years long. In response, they have scaled up, allowing people to access services more quickly.

Black, an Associate Professor of Counselling Psychology at the University of Victoria, says a person with PTSD is constantly reliving trauma, constantly feeling at risk of danger, with symptoms that can include emotional volatility, insomnia, and fear of certain spaces (some cannot stand going into Costco), for instance. All of which is not only bad for long-term brain health, but hard on the spouse and family.

"You can imagine what that's like, walking on eggshells, never sure what will set them off. Because of how the brain is affected by trauma, even a well-meaning comment by a loved one can be seen as an almost life or death level of threat to the person. It's a terrible, vicious circle," Black told Mind Over Matter®.

Wounded Warriors offers retreats for couples, where they encounter other people facing similar challenges. They start by teaching

participants how their brains work and what trauma is all about so they can understand that it is not their fault, while sending the message that they are not alone.

"I believe that bringing them together for five days is one of the biggest healing factors. It's understanding that I'm not a total screwup because I see others are going through the same thing. It's healing the shame," said Black.

The core program teaches couples skills that help them work together as a team to manage PTSD with strategies such as deep-breathing exercises to assist in calming down when experiencing a flashback.

"There are tons of self-regulation exercises that you must practice before starting to work through the past. It's very pragmatic. You have to do it and you have to practice it," said Black.

Based on his observations, Black believes that PSP who are the best at their jobs may be the most at risk for PTSD as they continue to be exposed to trauma for longer periods of time in their careers. They may show signs of trauma at home, but people at work might not notice because they continue to do their work proficiently in front of their colleagues. He believes that the PSPNET Families project can do a huge amount of good.




Exposure is inevitable, but traumatization isn't. With an ounce of protection, we could change things in Canada a lot for the better.

Along with PSPNET Families, Dr. Heidi Cramm and her colleagues are building more knowledge about the families of PSP through the Families Matter Research Group and the Families Matter Network, moving research into the community of PSP families and those who study, serve, and support them.

They are responding to an urgent need to create a coordinated hub of research that focuses on families that can effectively and efficiently identify and respond to gaps in the system, she explained. "Developing the evidence is essential, but the relationships with the community are critical if the evidence is to be impactful," she added.

As a paramedic who is also the daughter, sister, and wife of firefighters, Lorraine Downey could not agree more.

"All of Heidi's research is going to help me, both as a PSP and the spouse of a firefighter, as well as my peers. And keeping us well benefits society as a whole." 

A person is running in a field of tall grass at sunset. Two dogs are running alongside them. The sun is low on the horizon, creating a warm, golden glow. The person's legs and feet are visible in the foreground, and the dogs are in the middle ground. The background shows a line of trees under a clear sky.

It's About Time

MOVING TO THE BEAT OF YOUR CIRCADIAN RHYTHM

We've all experienced challenges of fitting exercise into our weekly routine, balancing work or school, household, and family responsibilities. But did you know that short bouts of just 10 minutes of exercise that add up to 150 minutes per week can have profound impacts on your health? Better yet, if you can time it with your natural body rhythm, known as your circadian rhythm, the health benefits are greater. —▶

EXERCISING WITH YOUR CIRCADIAN RHYTHM

A circadian rhythm is a natural “internal clock” that is synchronized with light and dark cycles from sunlight. This internal clock affects several body systems, including hormone production, sleep and wake cycles, and body temperature.

YOUR CIRCADIAN RHYTHM IS SO IMPORTANT FOR BODY FUNCTIONING THAT EVIDENCE SHOWS DISRUPTION OF ITS NATURAL RHYTHM NEGATIVELY IMPACTS YOUR HEALTH IN SEVERAL WAYS INCLUDING DIMINISHING COGNITIVE PERFORMANCE, ALTERING METABOLISM, AND IS EVEN ASSOCIATED WITH DEPRESSION, DIABETES, OBESITY, ALZHEIMER’S DISEASE, AND CANCER.

Fortunately, research has shown that exercise, which is one of the Six Pillars of Brain Health that will help reduce risk of developing dementia, is a powerful non-pharmacologic way of resetting or realigning your circadian rhythm. In addition, synchronizing physical activities with your natural circadian rhythm may optimize the positive impacts of exercise on health and physical performance.

TYPE OF EXERCISE & TIMING

The type of exercise you engage in can determine the ideal time slot to optimize health benefits and keep your circadian rhythm happy. For instance, certain types of yoga are best performed

early morning on a fasting stomach to stretch muscles, activate organs, and lubricate joints. In fact, there is a specific series of movements referred to as “sun salutations” that have been traditionally practiced shortly after sunrise for these reasons.

Andrea Roth, RYT 200, yoga instructor and Co-owner at Level Up Fitness Academy in the Greater Toronto Area explained: “Starting your day with a series of sun salutations can have a positive impact on your energy levels, your ability to regulate stress, and your overall clarity and focus.”

Toward the end of the day, when you are trying to wind down and prepare for restful sleep, “there is a slower-paced type of yoga known as Yin yoga that incorporates deep stretching and meditation,” said Roth.

When it comes to endurance exercise (like jogging and swimming), there is accumulating evidence that later in the afternoon or early evening may be best for building fitness (e.g., strength, power, and flexibility), in part because of how our bodies access energy systems suited for prolonged movement in these time slots.

Some evidence also suggests that our perception of exertion, that is, how hard we feel that we are working, is lower in the early afternoon.

This may be related to several circadian-regulated factors, like hormone release and mood. If you are thinking about working out for a little bit longer one day or wanting to try out a challenging set of movements, the early afternoon timeslot may allow you to push yourself harder without noticing it.

EXERCISE & SLEEP

Strenuous physical exertion late in the evening is shown to be detrimental to sleep, leading to poor muscle recovery during sleep and sleep deficits. As our body prepares for sleep, our body temperature naturally decreases, and production of the hormone melatonin increases. Exercise too late at night counteracts these circadian rhythms, making it harder for the body and brain to settle into a restful state.

Another factor to consider is that people generally consume water during and after exercise, as well as foods high in protein and carbohydrates after exercise. Food and drink stimulate the digestive system and can therefore disrupt sleep quality if



consumed late at night. For this reason, it is recommended to have your last meal or snack at least an hour before going to bed.

FLUCTUATIONS IN EXERCISE PERFORMANCE BY TIME OF DAY

If your goal is to build strength or increase your muscular endurance, there is evidence to suggest that exercise performance peaks in the late afternoon (3 p.m.-6 p.m.), with circadian rhythms related to body temperature and gene expression potentially playing a role. Dr. Alireza Basti and colleagues looked at relationships between time of day, resting muscle tone, and exercise performance.

Published in *BMJ Open Sport & Exercise Medicine* in 2021, in this study a group of 19 participants completed two strength tests (i.e., hand strength test and counter-movement jump) and one aerobic endurance test (i.e., shuttle run test) at four times of day: 9 a.m., noon, 3 p.m., and 6 p.m., over four rounds.

Across the rounds, researchers found that both male and female participants performed significantly better in the late afternoon. Interestingly, the best performance for the aerobic endurance test was at 6 p.m. across the four rounds, even though participants reported that they were less motivated to complete tests later in the day.

Further research examined biomechanical characteristics of major muscle groups at different times of day, including muscle tone, and found that muscles were more responsive in the late afternoon, helping to explain differences in exercise performance.

These findings on timing may be helpful for exercise rehabilitation in clinical settings, where the goal is to restore muscle tone and function.

If muscles are more responsive to activation in the late afternoon, physiotherapy and rehabilitation during this time slot may be more effective, which could help individuals meet their therapy goals in a shorter time frame.

Daniel Roth, NSCA-certified strength and conditioning specialist and Head Trainer and Co-owner of Level Up Fitness Academy in the Greater Toronto Area works with a range of clients, including individuals with acute and long-term mobility challenges. According to Roth, "For individuals who are restricted in what

they can do, be it from injury or other limitations, identifying the optimal window for muscle responsiveness could help to jump-start physical improvements."

However, it is important to note that there is a difference between building physical capacity and testing that capacity in real-world situations. Roth explained: "Training during less optimal times is one way to ensure you can perform well no matter what situations or conditions you are faced with. Training during sub-optimal times can build physical - and mental - resilience."

METABOLIC BENEFITS OF EXERCISE BY TIME OF DAY

Exercise at different times of the day also plays a part in circadian regulation of metabolism. Research by Dr. Shogo Sato and colleagues examined timing of exercise on energy metabolism in mice. In their 2019 article published in *Cell Metabolism*, Dr. Sato and colleagues demonstrated that energy metabolism (i.e., usage of various energy sources) differs during daytime exercise (i.e., circadian active phase) versus nighttime exercise (i.e., circadian rest phase).

Using a mouse model for their research, the authors observed that skeletal muscles that are responsible for movement were better at using carbohydrates and ketone bodies (lipids/fat produced by the liver) as energy sources during daytime exercise.

Muscles also metabolized lipids (fat) and amino acids (protein) at a higher rate when exercise was performed during the day when compared to night. Furthermore, these metabolic differences in energy usage based on time of day led to changes in systemic (whole body) metabolic homeostasis.

DR. SATO AND HIS CO-AUTHORS SUGGESTED THAT METABOLIC CHANGES FROM DAYTIME EXERCISE COULD BE ESPECIALLY HELPFUL FOR PEOPLE WITH METABOLIC DISEASES, LIKE DIABETES, OR FOR THOSE WHO ARE CLINICALLY OBESE AND TRYING TO LOSE WEIGHT. FUTURE STUDIES MAY CONSIDER DIFFERENCES IN METABOLIC REGULATION BASED ON EXERCISE TIMING TO DEVELOP BETTER PROTOCOLS AND "EXERCISE PRESCRIPTIONS" FOR PEOPLE WITH METABOLIC DISEASES.

Overall, it appears there are advantages in aligning the timing of exercise with your circadian rhythm, especially if you are working toward specific goals like better performance, muscle rehabilitation, and metabolic regulation. At the same time, when one considers the full range of health benefits from exercise, the best time to move is whenever you're able to do it. 🌍



On the Cover

WITH MELISSA & CLARITA GRELO

Growing up as the second of seven children in the Philippines, Clarita Grelo learned some important life lessons from her mother about healthy eating.

“My mom loved cooking vegetables and fish. Nothing from the fridge. Everything was fresh – she never opened a can,” Clarita told Mind Over Matter®.

Those habits stuck with her, even after she immigrated to Canada, married Frank Grelo, an immigrant from Portugal, and raised daughters Melissa and Rosanna, all while working long hours to help support the family. They ran a horseback riding business in Caledon, northwest of Toronto, and Clarita maintained a job in the city. To ensure her daughters ate well, she would stay up until midnight to prepare meals, then rise at 5 a.m. for a two-hour drive to work.

“It was a sacrifice, but it paid off, because Melissa and Rosanna rarely got sick growing up,” she said. Even now at age 82, with her grown daughters pursuing successful careers, Clarita holds to the same standards.



WHEN I SAY LET’S ORDER IN, MY MOM FREAKS OUT! THAT’S NOT AN OPTION,” SAID MELISSA, A CO-HOST OF THE SOCIAL ON CTV. “THE MODEL SHE SET FOR ME AND MY SISTER IS A TEMPLATE FOR MAINTAINING BRAIN HEALTH. AND THANK GOD MY PARENTS RAISED US THE WAY THEY DID!

Now Clarita and Melissa have a new platform to share their thoughts on healthy living, as they share the cover of Mind Over Matter®

magazine. In their process, they are learning more about the mission of Women’s Brain Health Initiative: to promote education about brain health and to fund research that considers differences between women and men while searching for answers about conditions such as Alzheimer’s disease.

“With the demographics of our population shifting rapidly, and so many more seniors, this is going to be the issue of our time,” said Melissa. “Do we have a healthcare system that can handle this? The shift has to be towards education and research. And the research can’t happen fast enough.”

Clarita added: “People should be aware of the benefits of healthy food, exercising, socializing, and sleeping well. People should be aware of how to keep their brain healthy.”

She enthusiastically embraced exercise after she retired at age 55 and now keeps up an impressive fitness regimen, with 30-minute workouts five days a week, coupled with exercise in the pool at a recreation centre in Brampton and brisk walks around the farm. She is planning to take up pickleball.

Growing up on a farm, her daughters were physically active from an early age, not so much with structured exercise but with chores: mucking out stalls, painting fences, and hauling buckets of water. Melissa says the need for some kind of physical exercise is ingrained in her. She puts in ten to 15 thousand steps every day and works out in the home gym that was installed by her contractor husband.

“When I’m not active I feel like garbage,” she said.

In the early days of the pandemic, Melissa said the anxiety attacks that she had in her early and mid 20s started up again.

“That made me double down on recognizing stress, realizing what it was doing to my body, and learning the best ways for me to find balance again.”

She says she has gotten better at recognizing and managing stress, while acknowledging that we can never be completely stress free. She uses exercise - specifically, high intensity interval training, cardio, strength training, and a lot of walking - particularly in nature - to help her feel as good as possible.



I'm prioritizing social time with my closest friends and family to keep my cortisol levels and anxiety in check and am happy to report that while no days are perfect, I feel much more balanced, peaceful, and empowered when it comes to stress.

Mother and daughter say they continue to learn from each other. Melissa helps Clarita keep up with the news, from international affairs to the local weather forecast, and regularly recommends new books. And Melissa learned from both her mother and father about the value of healthy food and an active lifestyle. She is grateful that in their 80s, her parents are in good health with sharp memories.


“Knock on wood, it’s not just good fortune, it’s the way they live,” said Melissa.

Serious issues aside, the photo shoot for the Mind Over Matter® cover was a special mother-daughter experience. “I feel so proud, just standing beside Melissa,” said Clarita. “It’s an honour. Thanks for the consideration. Not everyone has the opportunity to be on the cover of a great magazine!”

Her TV host daughter has done countless photo shoots and has a job that comes with the daily support of makeup artists and hair stylists, but she is excited for her mother to get the same treatment.

“My mom is a girly girl and doesn’t get to do this - being spoiled in this way, doted over. I’m really excited to do this with her.” 🌸





What do Selena Gomez, Demi Lovato, and Mariah Carey have in common? These famous singers have all publicly disclosed they live with bipolar disorder, a challenging yet treatable mental illness.

While we all experience ups and downs, people with bipolar disorder experience mood swings known as manic and depressive episodes that significantly affect their ability to function in everyday activities and their relationships with others.

Bipolar disorder affects approximately 1% of people, typically begins in early adulthood, and has a chronic and relapsing course. But is it different in women compared with men?

Mind Over Matter® spoke with leading experts and reviewed studies to learn whether there are differences in bipolar disorder between the sexes in terms of prevalence, symptoms, diagnosis, associations with other conditions, and treatment responses.

Bipolar Disorder

IS IT DIFFERENT IN WOMEN?

BIPOLAR DISORDER DEFINED

Bipolar disorder, formerly called manic-depressive illness, is caused by an imbalance of chemical messengers in the brain. It is characterized by mood swings that may last for days, weeks, or months. It's certainly not a modern mental illness: the Greek physician and philosopher Hippocrates first described mania and melancholia in ancient times.

People experiencing a **manic episode** have an elevated or expansive mood and may have some of the following symptoms: more physical energy, less need for sleep, increased talking and moving, racing thoughts, anxiety, irritability, excessive anger, hallucinations and delusions, and an elevated sense of self-esteem. They may also engage in reckless or inappropriate behaviours.

A **depressive episode** is different from normal sadness. It involves intense, persistent, and pervasive feelings of hopelessness, despair, and frustration. The person affected can feel angry and irritable, have trouble sleeping, and experience a loss of energy and enthusiasm for usual activities.

They may also have consuming thoughts about worthlessness or attempting suicide, according to the Mood Disorders Society of Canada. In the Apple TV+ documentary *Selena Gomez: My Mind and Me*, Selena Gomez shared her struggles with negative voices in her head telling her she's not worthy and being hospitalized for a psychotic episode due to bipolar disorder. Bipolar disorders include a spectrum of conditions diagnosed by a psychiatrist.

Symptoms are highly individual and many overlap with other psychiatric disorders, especially major depressive disorder and schizophrenia.

The American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders-5 defines the most common types of bipolar disorder as follows:

- **BIPOLAR I DISORDER:** individuals experience at least one manic episode and may also experience major depressive episodes that may exist with or without psychotic episodes; and
- **BIPOLAR II DISORDER:** individuals experience hypomanic and major depressive episodes that alternate in cycles and are typically less severe than bipolar I disorder.

BIPOLAR DISORDER CAUSES

Bipolar disorder is a complex and highly heritable psychiatric condition. Researchers have estimated the heritability of bipolar disorder to be more than 70%, meaning that inherited genetic factors are largely responsible for its development.

INHERITED GENES CONFER AN ELEVATED RISK OF DEVELOPING BIPOLAR DISORDER, BUT THEY ARE NOT DESTINY.

Non-genetic factors may also play a role. Physician and cancer researcher Dr. Siddhartha Mukherjee revealed his family's history of schizophrenia and bipolar disorder in his bestselling book *The Gene: An Intimate History*.

"Bipolar disorder is a complex disorder involving multiple genes, gene-environment interaction and chance," Mukherjee said in an interview with *Elle* magazine in 2016. "Although there is a hereditary component to it, it's not like there's one gene governing a certain type of mental illness."

Scientists have conducted genome-wide association studies and found thousands of genomic variants affecting bipolar disorder risk, including some overlapping with other severe mental illnesses.

For example, a study published in *Nature Genetics* in 2019 by the multinational Psychiatric Genomics Consortium Bipolar Disorder Working Group found 30 genetic variations affecting neurotransmitter function that were associated with the development of bipolar disorder. The researchers also found bipolar disorder I was strongly associated genetically with schizophrenia, driven by psychosis, and bipolar disorder II was strongly correlated with major depressive disorder.

MOST PEOPLE DIAGNOSED WITH BIPOLAR DISORDER HAVE A FAMILY HISTORY OF SEVERE MENTAL ILLNESS.

Dr. Louisa Sylvia, Associate Director of the Dauten Family Center for Bipolar Treatment Innovation at Massachusetts General Hospital and Associate Professor in the Department of Psychiatry at Harvard Medical School and colleagues found that 85% of 757 patients diagnosed with bipolar disorder reported having at least one first-degree relative with a history of bipolar disorder, major depressive disorder, psychotic disorder, substance abuse, or suicide.

Their research, published in the *Journal of Affective Disorders* in 2020, also found that people with a family history of mental illness tended to have more severe bipolar disorder and require more medications for treatment.

Most recently, a team of international researchers co-led by Dr. Duncan Palmer and Dr. Benjamin Neale at the Stanley Center →

for Psychiatric Research at the Broad Institute of Harvard and MIT identified the gene AKAP11 as a strong risk factor for both bipolar disorder and schizophrenia.

Their findings were published in *Nature Genetics* in 2022. While previous gene discoveries have played small roles in bipolar disorder risk, AKAP11 is the first gene that appears to have a more considerable impact.

Dr. Neale explained in a Broad Institute press release that while this variant doesn't contribute much to risk on its own, the discovery provides valuable insights into the roots of the disorder, how current treatments like lithium work, and holds potential for spurring research into new treatment targets.

SEX DIFFERENCES?

PREVALENCE

"Many people assume bipolar disorder is more common in women than men, but there's no appreciable difference in prevalence by sex or gender," said Dr. Abigail Ortiz, a clinician-scientist in the Campbell Family Mental Health Research Institute and Lead for the Bipolar Disorder Integrated Care Pathways at the Centre for Addiction and Mental Health in Toronto.



Major depression, which is different from bipolar disorder, is much more prevalent in women. That's likely where the misconception arises.

Dr. Bernardo Dell'Osso, Director of the Psychiatric Clinic of the Ospedale Luigi Sacco-Polo Universitario of Milan and colleagues recently found that bipolar disorder affects a higher proportion of women, 57 to 65%, based on their analysis of ten large studies conducted between 2011 and 2020.

IF YOU OR SOMEONE YOU KNOW IS IN CRISIS, GET HELP IMMEDIATELY:

CANADA:

Call 911 or text or call
Talk Suicide Canada at
833-456-4566

UNITED STATES:

Text or call 988 to reach
the 988 Suicide & Crisis
Lifeline

In their paper published in *International Journal of Bipolar Disorders* in 2021, the authors concluded their findings suggest a rising trend for the disorder in women. However, Dr. Ortiz put this suggestion into perspective: "Study results are always going to be a bit biased because a disproportionate number of women participate in bipolar disorder studies."

SYMPTOMS & DIAGNOSES

There are some distinctions between women and men in bipolar disorder onset and symptoms, which in turn may affect diagnosis. "Women with bipolar disorder tend to have a depressive onset, experience more depressive episodes, and we tend to see them earlier and more frequently than men, making it trickier to diagnose," said Dr. Sylvia.



MEN TEND TO HAVE AN ELEVATED MOOD AT ONSET AND PRESENT FOR TREATMENT WHEN EXPERIENCING MANIA OR HYPOMANIA, WHICH OFTEN MAKES THEIR ILLNESS EASIER TO DIAGNOSE.

While bipolar I disorder affects men and women equally, women with bipolar II disorder are much more likely to experience more rapid cycling of episodes than men, according to the Depression and Bipolar Support Alliance.

COMORBIDITIES

"Women with bipolar disorder are more likely than men to be diagnosed with additional physical and psychiatric conditions, including thyroid disease, migraine, obesity, and anxiety disorders," said Dr. Sylvia. "But identifying these comorbidities showing up more often in women may trace to the fact that they seek care earlier and we follow them for a longer period than men."

Hormonal changes associated with menstrual cycles, postpartum, and menopause do not cause bipolar disorder but may exacerbate mood disorder symptoms, according to the U.S. Department of Health and Human Services' Office on Women's Health. For example, studies have found an association between bipolar disorder and premenstrual dysphoric disorder, a more severe form of premenstrual syndrome. "Understanding these associations is an area of ongoing research," said Dr. Sylvia.



WE KNOW THAT HAVING HORMONAL CHALLENGES CAN AFFECT THE COURSE OF A MOOD DISORDER, DEPRESSION, OR BIPOLAR DISORDER, BUT WHETHER YOU ARE MORE LIKELY TO HAVE HORMONAL ISSUES IF YOU HAVE A MOOD DISORDER IS UNCLEAR.

Bipolar disorder was linked with earlier and more severe cardiovascular disease more than a century ago. However, the

connection has not been well understood, partly because the onset of bipolar disorder typically occurs in adolescence or early adulthood and cardiovascular issues tend to develop much later.

Recently, investigators have been researching this connection to find insights that may lead to new treatment options and better outcomes for people with bipolar disorder. As a member of the Vascular Task Force of the International Society for Bipolar Disorders, Dr. Sylvia collaborated with investigators from Canada, the United States, and other countries on a literature review published in *Bipolar Disorders* in May 2020.

AMONG THEIR KEY FINDINGS WAS THAT INDIVIDUALS WITH BIPOLAR DISORDER WERE UNDER-TREATED FOR CARDIOVASCULAR DISEASE RISK FACTORS, INCLUDING OBESITY, HIGH BLOOD PRESSURE, AND DIABETES, AND THESE FACTORS WERE ASSOCIATED WITH INCREASED MORTALITY AND REDUCED COGNITIVE FUNCTION.

Their paper served as a call to action, shedding light on the increased cardiovascular mortality among individuals living with bipolar disorder in an era when deaths due to cardiovascular disease have decreased in the general population.

Dr. Ortiz recently published research into sex-specific relationships between bipolar disorder and cardiovascular disease risk. She and her Canadian research colleagues found a two- to three-fold stronger association in women versus men between bipolar disorder and cardiovascular disease risk factors, including rates of coronary artery disease, heart failure, and high blood pressure not caused by other conditions using data from a large U.K. biobank.

The association remained significant after adjusting for self-reported race, education, income, and smoking status. The findings appeared in the *Journal of Affective Disorders* in 2022.

“Seeing the higher risk rates for women was shocking and made me angry because many of my patients are young, economically disadvantaged, and are already dealing with bipolar disorder,” said Dr. Ortiz.

“I hope our paper adds to increasing awareness that cardiovascular disease risk is a serious concern for women with bipolar disorder and that they are screened and followed more frequently for cardiovascular risk factors.”

TREATMENT RESPONSES

Standard treatment for bipolar disorder is a combination of medications and psychotherapy. Medications may include mood stabilizers, antipsychotics, antidepressants, anti-anxiety medications, and anticonvulsants.

FINDING THE RIGHT DOSE AND COMBINATION OF MEDICATIONS CAN TAKE TIME BECAUSE SYMPTOMS VARY FROM PERSON TO PERSON.

“Treatment response does not depend on sex or gender; it’s based on clinical characteristics and family history,” Dr. Ortiz said. “For example, if someone has a well-defined episodic illness and a family history of bipolar disorder in a related parent who responded well to lithium, they will likely respond to lithium. Similarly, people experiencing psychotic symptoms during episodes with a family history of schizophrenia will likely respond to antipsychotics. Those who abuse substances and have a higher frequency of anxiety and depression will likely respond to anticonvulsants.”

Dr. Sylvia and colleagues explored the relationship between a family history of bipolar disorder and disease severity and response to four frequently used treatment approaches in a study published in 2020 in the *Journal of Affective Disorders*.

They found that patients with a greater family psychiatric history required more intense treatment yet achieved similar responses to treatment compared with patients without a family history of psychiatric illness.

Dr. Sylvia also co-authored a study published in the *Journal of Affective Disorders* in 2022 that evaluated data from two comparative effectiveness trials of different treatments for bipolar disorder. She and her colleagues at leading U.S. health institutions looked for potential links with cardiovascular risk markers, including glucose, lipids, and vital signs before and after 24 weeks of treatment.

They discovered that treatment with the antipsychotic quetiapine was associated with an increase in cardiovascular risk markers, highlighting the importance of monitoring patients. While the research did not examine sex differences, 58% of 770 study participants were female.

THE PREVALENCE OF BIPOLAR DISORDER IS SIMILAR FOR WOMEN AND MEN, AND TREATMENT RESPONSES LARGELY DEPEND ON FACTORS UNRELATED TO SEX.

However, differences in symptoms, diagnosis, and associations with other conditions, such as cardiovascular disease, indicate that more research is needed to tease out sex-specific differences that may improve understandings of bipolar disorder and pave the way for targeted treatment strategies in the future.

What else do Selena Gomez, Mariah Carey, and Demi Lovato have in common? By speaking out about their challenges with bipolar disorder, they have raised awareness that it is a treatable condition and those affected by it can live successful, rewarding lives with the right support. 🌍

Put Your Finger on It

CELLULAR FINGERPRINTING FOR
EARLY ALZHEIMER'S DIAGNOSIS



Dementia is not only one of the most pressing global health challenges, but it is also a condition that lacks both effective treatments and a reliable means of early diagnosis. According to the Alzheimer Society of Canada, more than half a million Canadians are suffering from dementia, and that number is expected to exceed 900,000 by 2030. Currently, the most common form of dementia, Alzheimer's disease, can only be definitively diagnosed after death through examination of brain tissue.

"People with dementia are impatient, they have lived for too long with very few therapeutic or diagnostic breakthroughs," said Dr. Saskia Sivananthan, Chief Research and Knowledge, Translation and Exchange Officer with the Alzheimer Society of Canada.

Thankfully, however, there is hope on the horizon.

USING INFRARED LIGHT FOR EARLY DETECTION

Researchers around the world are exploring a variety of approaches for early diagnosis. One of the most promising methods comes from a research team at the University of California's Lawrence Berkeley National Laboratory (Berkeley Lab) who are investigating the use of skin cell analysis as a means of detecting disorders elsewhere in the body, including the brain.

THE TECHNIQUE, KNOWN AS "SPECTRAL PHENOTYPING," INVOLVES EXPOSING SKIN CELLS TO INFRARED LIGHT, WHICH CAUSES THE MOLECULES WITHIN THE CELLS TO VIBRATE.

Project leader Dr. Cynthia McMurray told Mind Over Matter® that her team has discovered a way to analyze the vibrations and identify unique differences between healthy individuals and those with Alzheimer's disease.

"Many scientists focus on specific biological molecules as biomarkers for disease, but here's a technique that uses light to create vibrational chemistry that can then be computationally analyzed for a very specific disease biomarker," explained Dr. McMurray, Senior Scientist at the Berkeley Lab. →

Infrared spectroscopy is a simple and reliable chemical analysis technique that has been around since the 1940s. It has a variety of uses in industry, research, and even law enforcement, from measuring potential adulteration of food and wine to determining the blood alcohol content of a suspected drunk driver.

She noted that the differences are so distinctive that she likens the process to “cellular fingerprinting.”

Scientists already knew that cells would react when exposed to infrared light. The challenge for Dr. McMurray’s team was figuring out how to analyze the vibrations. The answer came with the development of a computer algorithm that could identify the differences – an aspect of the project led by her colleague Dr. Ben Brown.

The researchers first tried the technique on the brain cells of mice, comparing healthy tissue with those with Huntington’s disease. “It was beautiful. The first time we tested the mature method on cells, it worked,” said Dr. McMurray.

The research team then successfully transitioned to human subjects, adjusting their algorithm and using skin cells from an existing tissue bank to compare healthy individuals with those with Alzheimer’s disease.



We were able to see very clearly the differences. It was quick, definitive, and exciting.

Dr. McMurray continued: “It was a huge step forward because now we can follow the disease without accessing the brain or using complicated procedures, so it was a big breakthrough for us.”

Her team’s successful proof-of-principle study was published in *Scientific Reports* in August 2021.

NEXT STEPS

While Dr. McMurray is confident that spectral phenotyping is an effective diagnostic tool, there is still important work ahead.

While there is currently no prevention or cure for Alzheimer’s disease, research has shown that we can reduce our risk of developing dementia through a variety of lifestyle choices such as exercise, social engagement, and diet. You can find out more about foods that help boost your brain health through Women’s Brain Health Initiative’s Memory Morsels program.

Her team is currently conducting studies with a larger group of participants with Alzheimer’s disease. Dr. McMurray wants to ensure that the procedure delivers an accurate diagnosis, and that it does not mistake other neurodegenerative diseases for Alzheimer’s disease.

DEVELOPING A RELIABLE MEANS OF EARLY DIAGNOSIS FOR ALZHEIMER’S DISEASE COULD HAVE A PROFOUND IMPACT.

It is well-established that changes in the brain begin many years (and even decades) before symptoms emerge. Early diagnosis could mean earlier interventions, adjustments in lifestyle that can slow the onset of the disease, and more advance planning. As treatments are developed, they can be administered before symptoms start to show.

Dr. Sivananthan of the Alzheimer Society of Canada noted that while there has been progress in identifying biomarkers that can indicate the early stages of the disease, many are not yet available for day-to-day clinical use.

“Those that are available, such as computerized tomography (CT) or magnetic resonance imaging (MRI), require expensive equipment and can involve painful, invasive methods such as collecting spinal fluid,” she said. “These tests are only available once symptoms of Alzheimer’s or other forms of dementia are present.”

Dr. Sivananthan cites blood-based biomarkers, more sophisticated imaging, and eye tracking as diagnostic methods that are showing real promise. The Alzheimer Society Research Program, which funds new and innovative research into the causes of dementia, has specifically supported this type of proof-of-concept research.

“There are several promising developments for early diagnosis of Alzheimer’s disease that I am hopeful will come to market in the next five to ten years, likely in combination with an existing method,” she said.

When asked about the Berkeley Lab’s spectral phenotyping project, Dr. Sivananthan noted that “any research that can accurately and reliably diagnose dementia early, without invasive methods, is a key step forward for the field.”

Dr. McMurray is interested in exploring whether the procedure could also work using cheek swabs – a simple and painless means of collecting cell samples. Her vision is to make spectral phenotyping widely available as an effective, non-invasive, and inexpensive diagnostic tool, one that she believes has the potential to detect a wide variety of diseases beyond dementia, including cancer. 🌐



Heads Up

EMERGING BRAIN HEALTH RESEARCHERS

It is well known that eating disorders such as anorexia nervosa are more common among women than men. Less well known is the deadly impact. According to the National Initiative for Eating Disorders (NIED), eating disorders have the highest mortality rate of any mental illness in Canada.

The causes have often been attributed to societal pressures that promote a particular viewpoint of body image, pressures now magnified by the firehose of pictures and influences delivered by social media to young people.

Dr. Lindsay Bodell wants to find out if there is something else at work, whether there are clues to be found in the structure of young brains.

“We’re interested in understanding why some individuals are more sensitive to these environmental cues and pressures. And perhaps help explain who’s more at risk for eating disorders,” said Dr. Bodell, an Assistant Professor in the Department of Psychology at Western University.

Supported by funding from Brain Canada’s Future Leaders in Canadian Brain Research Program, she is carrying out a study that seeks to learn more about the brains of adolescent girls. Dr. Bodell and her colleagues hope to recruit 90 girls aged 13-18, half of whom are coping with some kind of eating disorder or struggling with body image issues.

While participants are undergoing brain scans, they will receive feedback about how other kids “rate” them – that is, whether peers are open to creating friendships or not. Knowing that acceptance or rejection can have a powerful impact on teenagers, the researchers will observe how the girls’ brains react to these stimuli and how brain responses may relate to eating disorder symptoms. Future research projects will likely bring in male participants to consider why the

prevalence of eating disorders varies between the sexes.



IF WE DO FIND THAT INDIVIDUALS WITH EATING DISORDERS HAVE SPECIFIC BRAIN PATTERNS THAT MIGHT IMPLY THAT THEY’RE MORE SENSITIVE TO SOCIAL ENVIRONMENTS, THEN THOSE FINDINGS COULD HAVE VERY IMPORTANT IMPLICATIONS FOR EATING DISORDER TREATMENT AND PREVENTION.

“The funding from Brain Canada is essential to doing this work,” Dr. Bodell continued in an interview with Mind Over Matter®.

Since the Future Leaders program was launched in 2019, anchored by a lead gift from the Azrieli Foundation, Brain Canada has awarded \$6 million through 60 grants. Brain Canada’s President and CEO, Dr. Viviane Poupon, said they are building upon Canada’s pre-eminent position as one of the world’s five most active countries in neuroscience.

“From studying gene therapy for Huntington’s disease, to examining the brain structures behind eating disorders in adolescents, to fighting memory loss, these early-career Canadian researchers will continue to contribute to major scientific advancements in brain science that will further the field both nationally and internationally,” said Dr. Poupon.

She added that the ultimate goal of Brain Canada’s Future Leaders in Canadian Brain Research Program is to reduce the social and economic burden of neurological and mental health problems through prevention, early diagnosis, and treatment.

“Brain Canada is certainly a great funding opportunity for early career researchers,” said Dr. Ashlyn Swift-Gallant, another —>

recipient. "It's very difficult at the early stages of your career to get funds to pursue new lines of investigation without preliminary data that often takes years to collect."

Dr. Swift-Gallant, an Assistant Professor in Memorial University's Department of Psychology, is examining sex differences in autism spectrum disorder (ASD), a condition that is four times more common in males than females.

Using mouse models, she and her colleagues will manipulate sensitivity to the hormone androgen, which is typically higher in males than females. They will eliminate receptors for androgen in select cells in the brains of male mice and increase them in females and then observe any impact on autism-like behaviours. In other words, will suppressing "male" hormones make the mice less likely to have ASD-like behaviours?



WE WANT TO UNCOVER WHETHER SEX DIFFERENCES IN OUR BIOLOGY CONTRIBUTE TO THE GREATER RISK OF DEVELOPING AUTISM IN MALES COMPARED TO FEMALES.

Dr. Swift-Gallant continued: "It's a starting point to try to understand the biology behind ASD. If we find a role for these sex hormones, then we may be able to alter sensitivity to sex hormones like androgens, in particular brain cells, to decrease risk of developing the condition or mitigate the more severe symptoms. We have a long way to go. But Brain Canada funds will allow us to take a step towards understanding how this condition develops and how to treat both males and females with ASD."

Another recipient of a Future Leaders grant, Dr. Michèle Desjardins, is also using mice to learn more about our brains. In her case, the goal is to expand our knowledge of how our brains evolve as we age.

"In aging we know that there is some sort of cognitive decline happening but we're not sure where it starts. We know that both neurons and blood vessels are affected, but we don't know which is first," Dr. Desjardins said in an interview with Mind Over Matter®.

An Associate Professor in the Department of Physics, Physical Engineering, and Optics at Université Laval, she is leveraging innovative imaging tools, including two-photon microscopy, a technology that allows researchers to clearly view single neurons and single blood vessels, along with wide field imaging, which captures views of the entire surface of the brain. The goal is to get a sense of the activity of neurons and blood flow.

She will be observing changes in the brains of mice as they age. Given that the rodents' typical lifespan is only about two years, it means following them from middle age to death. Understanding that aging may affect males and females differently, she and her team will study mice from both sexes and consider sex as a variable when they analyze the data.

DESJARDINS' HYPOTHESIS IS THAT BLOOD VESSELS ARE AFFECTED BEFORE NEURONS. IF CONFIRMED BY THE RESEARCH IT WOULD NOT ONLY INCREASE OUR FUNDAMENTAL KNOWLEDGE OF THE PROCESS OF AGING, BUT FARTHER DOWN THE LINE WOULD HAVE MORE DIRECT BENEFITS.

"It could help target interventions to promote health in aging people," she said. Dr. Desjardins is grateful to Brain Canada for making her project possible.

"It's more difficult when starting your career to get this kind of large grant. To have this amount of money is really helpful. It helps pay the scholarships for students who are doing the research. It's really important."

LEARN MORE ABOUT THE FUTURE OF BRAIN RESEARCH IN CANADA

The next cohort of Future Leaders of Canadian Brain Research will be announced in the fall of 2023. Here are the other 2021 Future Leaders in Canadian Brain Research Program grant recipients:

Philippe Albouy
Université Laval

Annie Ciernia
University of
British Columbia

Federico Gaiti
University Health Network

Aislin Mushquash
Lakehead University

Elie Bou Assi
Université de Montréal

Catherine Duclos
Hôpital du Sacré-Coeur
de Montréal

Rishi Ganesan
Western University

Shaun Sanders
University of Guelph

Vincent Breton-Provencher
Université Laval

Emma Duerden
Western University

Jiami Guo
University of Calgary

Christoph Zrenner
Centre for Addiction
and Mental Health

Lindsay Cahill
Memorial University

Alexandre Fiset
Université du Québec à
Trois-Rivières

Karl Klein
University of Calgary

Julien Muffat
The Hospital for Sick Children



BRAIN BUZZ

CONTINUING SUPPORT FOR WBHI AND WOMEN'S BRAIN HEALTH

OCT 2021 & APR 2022
PRESENTED BY CIBC

FROM HER LIPS TO OUR EARS

(L-R Top) Nancy Bramm, Jann Arden
(L-R Bottom) Lynn Posluns, Amy Sky,
Kaitlin Smith, Joanna Milroy,
JoAnne Korten, Tina Brown,
David Walmsley,
Anne-Marie Mediwake

DEC 2022 | PRESENTED BY BMO

WOMEN'S BRAIN HEALTH DAY

(L-R) Moriah Linton,
Erna Snelgrove-Clarke, Lynn Posluns,
Pattie Lovett-Reid, Mary Walsh, Sharon
Howard-Laird, Anne-Marie Mediwake,
Cathy Williamson, Meghan Etcheverry

MAY 2022

RAISING THE BAR

(L-R) Jeanne Beker,
JoAnne Korten, Gillian Einstein,
Vivien Brown

AUG 2022 | PRESENTED BY RBC

ENGAGING MILLENNIAL MINDS

(L-R) Laurie Piltz, Rheann Quenneville,
Maggie Callaghan, Laura Best,
Rohan Sarna, Holly Atkinson, Alison
Walters, Madeleine Gray, Kayla Ross,
Erin Kenzie

Sugar Challenged

DIABETES & BRAIN HEALTH

Diabetes may be treatable and manageable, but that doesn't mean that living with a chronic disease is easy. There are constant stresses - managing medications, constant testing of blood sugar, and the unpredictability of the disease, not to mention the effect on everyday life, with possible limitations on exercise and socializing. It leads to a condition that is both common among people with the disease, and little-known among the general public: diabetes distress.

"There's sadness. People feel angry or feel they can't have a good time. The constant worry may cause them to not sleep well," said Dr. Peter Selby, Clinician Scientist and Senior Medical Consultant at the Centre for Addiction and Mental Health (CAMH).

"They require counselling, support, they need help to manage it, to not lose their sense of self so they can have a good quality of life. If they don't get help, some people feel overwhelmed, they just burn out and say I'm not going to be bothered with managing my diabetes, it's too much," Dr. Selby added in an interview with Mind Over Matter®.

Recognizing there are gaps in access to these kinds of supports, Brain Canada has partnered with JDRF Canada to fund research into interventions to help people with type 1 diabetes (T1D) deal with mental health concerns.

Dr. Selby and his team are working on one of three projects funded by the program. They're bringing together experts in mental health and T1D care, Diabetes Action Canada, and, crucially, people living with the disease to develop a program aimed at young adults between the ages of 18 and 29, a group recognized to be particularly vulnerable to diabetes distress.



Sometimes they feel all their time is spent managing diabetes rather than living their lives as a young person. People don't necessarily understand what they're going through, they're feeling worried, frustrated.

The project will carefully consider sex and gender differences. "One of the immediate challenges is that it is hard to engage men in the focus groups and experts in T1D tell me that their male patients struggle a lot but don't seek help," he said.

"So, distress affects them differently and we need more research in this space. Young women appear to report the most distress."

His project is in the early stages, but the goal is to develop a mental health platform that is easily accessible for all, likely with an online element so that it can be available for people in need no matter where they live.

"It's exciting that Brain Canada and JDRF see how critical this is to overall health and are working together with funding that integrates brain health with physical health."

Accessibility is also a central goal of another project, which is headed by Dr. Tricia Tang, Associate Professor of Medicine at the University of British Columbia. She is one of the few

psychologists who specializes in T1D. Dr. Tang and her colleagues designed a mobile app called T1D REACHOUT - which they call REACHOUT - that delivers mental health support to adults with T1D living in rural and remote communities in British Columbia, where mental health supports can be difficult to find.

Given the shortage of specialists, they are recruiting people with T1D who have experienced the many emotional challenges specific to diabetes and are training them to offer peer-to-peer support.



WE MUST LEVERAGE WHAT WE HAVE, WHICH IS PEOPLE. EVEN MORE VALUABLE, THEY HAVE DIABETES THEMSELVES. IF WE TRAIN THEM IN COMMUNICATION SKILLS, DIABETES DISTRESS, EMPATHY, AND RESILIENCE, THEY CAN REALLY MAKE A HUGE DIFFERENCE.

The project builds upon a smaller pilot study that successfully provided a proof of concept. Her team is in the process of recruiting approximately 75 peer supporters and 220 participants. Some of the peer supporter candidates who have already stepped forward are people who benefited from the help they received in the pilot study.

"The great thing is that they've chosen to pay it forward. It's just regular people, trained to provide emotional support," said Dr. Tang.

Participants can access REACHOUT virtually in a variety of ways: a 24/7 chat function available at all hours and on weekends; one to one with a peer supporter of their choice; or video "huddles," which are monthly face to face group sessions led by peer supporters.

The site includes a library of peer supporters, set up to look somewhat like a dating site, with information about the life and diabetes-related experience of each of the peers. It is moderated by a team of healthcare workers, who are available to intervene if someone is in crisis.

"What I love about this is you can choose what kind of support you need. It's like precision medicine, but customized to the person's psychological needs," said Dr. Tang, adding that she appreciates the decision by Brain Canada and JDRF to support this kind of project.

"The funding is instrumental in obtaining the evidence to move forward with these types of mental health services. If we can demonstrate that REACHOUT is effective, we could replicate this across Canada."

The third research project is being run out of the Children's Hospital of Eastern Ontario (CHEO) and focuses on youth with type 1 diabetes aged 12-17.

"Most teens living with type 1 diabetes experience some level of diabetes

distress. Diabetes distress happens when all the worry, frustration, and even burnout make it hard for people to take care of themselves and keep up with their daily insulin injections" said Dr. Marie-Eve Robinson of CHEO's Division of Endocrinology and Metabolism.

The project is called Teaching Adolescents with Type 1 Diabetes Self-compassion (TADS). Self-compassion is a practice in which you treat yourself with kindness and understanding, acting the same way toward yourself as you would toward loved ones.




It teaches you to be kind towards yourself. It's a skill that can be taught. That's why we're using it as a strategy to help kids with type 1 diabetes.

She and her team are recruiting participants from CHEO's diabetes clinic. They will participate in weekly virtual sessions led by trained facilitators for eight weeks, learning about the concept of self-compassion through a variety of practices and exercises, such as guided meditations and comforting gestures. Researchers will measure the effect on the participants' levels of diabetes distress as well as other issues, such as depression and their ability to control their blood sugar.

Dr. Robinson says she was moved to develop an intervention after seeing young people with T1D dealing with high levels of distress and mental health struggles, which were exacerbated during the pandemic.

"This is critical work. There's a really big gap in providing mental health support for youth with type 1 diabetes. We don't have enough resources on the ground to meet the needs of all these kids in distress. The support of Brain Canada and JDRF is allowing this important work to unfold. Without them, we couldn't do it," she said.

The funding program for the three projects is aligned with Brain Canada's mental health research initiative, which focuses on developing and implementing effective strategies that address the diverse needs for mental health care.

"At Brain Canada, we really want to foster collaboration and bring together people and organizations that haven't been working together historically," said Dr. Viviane Poupon, Brain Canada President and CEO. "Solutions within and outside of the healthcare system are urgently needed to address mental health in people with type 1 diabetes." 

Retirement was never for Sherry Baker. She landed her current job on her 71st birthday and continues to put in 50-hour work weeks at age 83 as the Executive Director of the BC Association of Community Response Networks.

"I was just really, really lucky that I was able to get a job that captured my imagination and my heart," Baker told Mind Over Matter®.

Because she has worked in non-profits all her life, she did not have a pension, and could not really afford to retire. But she was never inclined to step back from work anyway. "Even if I did (have a pension), I'm pretty sure I would have found some kind of meaningful volunteer work."

Baker is a living example of how to maintain brain health into old age. She rises at five every morning, exercises for an hour, reads the paper, and does a couple of crosswords before beginning her workday, a remarkable level of activity for a person of any age.

Although she has had two knee replacements and one hip replaced, she makes good use of virtual meetings to work from home and is on several advisory committees, including acting as Co-Chair of the Older Adult and Caregiver Advisory Committee for the national research network AGE-WELL, which supports the development of technology to assist older people live independently.

Baker knows many contemporaries who are struggling with cognitive issues and she credits her vitality to her active, engaged life.

"Oh yeah, I'm sure. There's evidence now that I've read it helps to keep your brain active. I think you need more than that including regular exercise, but it does help to focus those brain cells where you want to be."

Sherry Baker may be an exceptional case. Not many people choose to work into their 80s. But there is evidence that working past the typical retirement age can be beneficial for brain health.



Sittin' on the Dock of the Bay

RETIREMENT & BRAIN HEALTH

On the flip side, several research studies suggest that early retirement can have a detrimental impact on cognition.

A 2021 article co-authored by Dr. Jo Mhairi Hale of the University of St Andrews in Scotland published in *SSM - Population Health* concluded that “postponing retirement is protective against cognitive decline.”

It drew upon a massive survey, the U.S. Health and Retirement Study, which has been running since the early 1990s and now has about 20,000 participants, that included people who undergo cognition tests on a regular basis. With such a large study group, Dr. Hale and her colleagues were able to consider a variety of variants, such as race, education levels, and whether their work was professional or non-professional.

The researchers also considered gender, hypothesizing that men of that generation would do worse in retirement, believing that they felt more closely identified with their work and had fewer established social networks than women.

“My grandpa, they had to pry the stethoscope out of his hand. He was not into retirement at all, and he didn’t do that well as a retired person. He wanted to keep working and some of that was about his identity,” Dr. Hale told Mind Over Matter®.

But when the researchers analyzed the data, the results were a surprise.



We actually found postponed retirement worked well for men and women. It’s protective regardless of educational level or occupation.

The question of retirement age is not only of interest to health researchers, it is a highly charged political issue. The United States is in the process of raising the statutory retirement age to 67 from 65, with proponents saying it is a logical step because people are remaining healthier as they age, and many are choosing to continue working past 65. Critics suggest that it amounts to a cut in social security benefits.

Dr. Hale is focusing on the science and understanding the implications for health. She notes that her study does not

answer the question as to why levels of cognition are better for people who delay retirement.

“I’m just not willing to buy that it’s just about getting a paycheck. The public health message is that we need to stay cognitively and socially engaged,” Dr. Hale said.

Her next study is exploring more deeply the impact of social isolation and loneliness as they try to figure out what sorts of activities, like paid work, volunteering, or caring for grandkids, might be most beneficial for cognitive health.

Along with the impact on cognition, there is evidence that many people who retire early regret the decision. A June 2022 poll for *Forbes* surveyed more than 1,000 recent retirees. Thirty-two per cent said they wished that they had kept working longer. Another 32% said they did not feel prepared for retirement.

Dr. Patricia Heyn, Founding Director of the Center for Optimal Aging at Marymount University told Mind Over Matter® that it speaks to the need to develop a plan about how to remain active after stepping back from the many stimulations of work life.

“It can be very difficult, very emotional, and very stressful and you can feel very lost,” she said.

Dr. Heyn questions whether it is specifically the end of full-time work that contributes to cognitive decline. “I wouldn’t say early retirement per se is the factor, I would say it’s more the social determinants of health. Mostly it’s because when people retire, they decided that they want to be less engaged, less active,” she said.



BRAIN CELLS ARE LIKE MUSCLES. THEY’RE NOT GOING TO REMAIN STRONG IF YOU DON’T USE THEM.

Dr. Heyn suggested that employers could do more to develop programs that assist workers in navigating the transition to retirement. She believes that the whole subject of retirement needs more study to better understand the health and sociological implications.

While Sherry Baker’s work life is evolving, it is by no means ending. She is making preparations to step back from her executive director’s job in two years when she is 85 but plans to continue consulting. “Even if I’m not working at a set job, I hope to keep functioning until I’m 100. That’s my plan, and my family and friends think that I’ll go longer than that, but who knows.” 🌍

Those Were the Days

NOSTALGIA & HEALTHY AGING

Looking through old photographs, listening to songs from your youth, attending class reunions, indulging in comfort food after a stressful week, or simply sitting back and experiencing the first snowfall of the season, all these emotional experiences can stir up feelings of specific events of time, place, people, and happy moments that brought meaning, purpose, and social connection of some kind to our lives. In a word, the thoughts and memories offer nostalgia, or sentimentality for a happy past.

While reminiscing can bring us joy, there is scientific evidence that nostalgia can also improve our mental health and possibly even help with healthy aging. Read on to learn how this works and get tips on how to use nostalgia to keep you healthy and happy.

NOSTALGIA'S MENTAL HEALTH BENEFITS

Julie Fleury, Professor at Arizona State University and the Center for Innovation, Healthy and Resilient Aging, studies nostalgia's impact on healthy aging. She explained in a

NOSTALGIA AND YOUTHFULNESS

Want to feel a bit younger and healthier? Nostalgia may help. Research from a 2016 study by Drs. Andrew Abeyta and Clay Routledge found that nostalgic memories, as opposed to ordinary autobiographical memories, made people feel more youthful. And they also found that "nostalgia-induced youthfulness in turn predicted the extent to which participants felt healthy, confident about their physical abilities, and optimistic about their future health."

June 2022 interview on the PBS show *Arizona Horizon* “that there is a mechanism that links the heart and the brain, and the muscles in the face to the recalling and the retelling of these stories” shared when people are experiencing nostalgia – noting that this is theoretical.

“What we found is that given the links between the heart and the brain, and cues of safety, that this is a mechanism that can be exercised. And it can strengthen social, physiological, and emotional outcomes over time.” In terms of how this can help with aging, Fleury said in that interview:



Nostalgia engages safety cues, thereby cultivating feeling safe and contributing to regulatory capabilities to support healthy aging.... It can strengthen things like motivation, which can help promote social and physical functioning. And that's essential for our well-being later on in our lives.

TAKE THE GOOD, LEAVE THE BAD

Researchers have identified that there are two distinct types of nostalgia, both of which align with negative and positive emotional states and how we perceive our past. They are: reflective and restorative nostalgia.

Restorative nostalgia evokes positive feelings about our past with a desire to recreate it, and as a result serves as a driver that motivates us to pursue similar new possibilities and experiences. Reflective nostalgia, however, recognizes and acknowledges that the past is the past and does not seek to recreate the experiences. This type of nostalgia can often leave us sad and regretful with less optimism for the positive experiences that can still be explored.

Examples of restorative nostalgia include getting together for the holidays, celebrating socially with friends and family, or travelling to a familiar destination. The energy we get from this type of reflective experience is often positive and exciting and motivates us to create more similarly fulfilling experiences.

Examples of reflective nostalgia include grieving the death of a loved one, a breakup or divorce, a personal or professional failure, or battling with mental health or depression and anxiety. This can be a heavy weighted form of reflection that makes us feel sad,

disappointed, and resentful that the present does not compare with our recollection of memories.

AS A RESULT OF THE EMOTIONAL POWER BOTH TYPES OF NOSTALGIA CAN HAVE ON AN INDIVIDUAL, IT IS IMPORTANT TO ENSURE THAT WE TRY TO HAVE THE RIGHT BALANCE BETWEEN REFLECTIVE AND RESTORATIVE EXPERIENCES.

To help us do that we need to keep perspective, accept and harness our reality, and seek the necessary caution, healing, and help if required. For example, there are those that may have experienced significant trauma that might be triggered by nostalgia causing painful memories. It is important not to stay stuck in a state of reflective nostalgia, focused on the “what ifs” and making it difficult to push through and be open to what the future may hold.

On the flip side, when motivated by restorative nostalgia to recreate experiences and do something productive, it is just as important not to attempt to do the impossible and put pressure on ourselves to completely replicate past experiences.

We must learn to enjoy the memories and use them as motivation to create more, but also be a realist and try not to make decisions based on nostalgic memories alone. As the famous saying by Roy T. Bennett goes, “... the past is a place of learning, not a place of living.”

NOSTALGIA CAN HELP US LIVE FULFILLING LIVES

German psychoanalyst Erik Erikson famously created the Eight Stages of Psychosocial Development as the foundation for explaining how the positive and negative impacts of socialization are constructed in childhood, beginning with trust and then independence, all the way to the final stage of reflection, which revolves around looking back and assessing one's life and its meaning and purpose.

In his paper, “Music, Nostalgia, and Wellness in the Care of Older Adults,” published in 2019 by the University of Chicago's Crown Family School of Social Work, Policy, and Practice, musician, composer, and educator John Moulder argued that “nostalgia can be effectively employed in the process of reviewing one's life.”

Moulder cited University of Southampton psychology professors, Constantine Sedikides and Tim Wildschut, who he noted have conducted extensive research on nostalgia and the important association it has with older people's sense of belonging, self-acceptance, and hope.

He explained they have found through their research over nearly 20 years that, “the act of nostalgizing... is indicative of those who find meaning in their lives and a sense of value in the key episodes of their existence. This active cultivation of nostalgia generates a memory form that ‘pertains to momentous or →

cultural-lifescrypt occurrences.” He then noted they said that,



BY INCREASING SOCIAL CONNECTEDNESS AND SELF-CONTINUITY, AND THAT BY 'ENRICHING PEOPLE'S LIVES WITH MEANING, NOSTALGIA CONTRIBUTES TO MOTIVATED GOAL PURSUIT, PSYCHOLOGICAL EQUANIMITY, AND PSYCHOLOGICAL OR EVEN PHYSICAL HEALTH.

Nostalgia is also thought to help our aging health because as cited in a 2016 study by Dr. Kentaro Oba and colleagues in *Social Cognitive and Affective Neuroscience*, it can play a key role in psychological resilience. Dr. Abo and co-authors also noted that researchers have used

neuroimaging to show that when people are experiencing nostalgia there is a relationship between memory and reward systems.

The bottom line is that science and our experience tell us that we must not let nostalgia get us “stuck” in the past and undermine growth and progress for our future, but we certainly can use nostalgia to our advantage and relish in the positive feelings of self-esteem and social connectedness that it can offer, which can help us avoid possible feelings of loneliness and despondency.

So, consider adding activities that boost nostalgia to your regular routines; it is a relatively simple and easy practice to create and maintain. 🌱

HOW TO EXPERIENCE NOSTALGIA

In an effort to increase your mood and health, even when social opportunities are limited, try the following activities to bring about the positive uplifting feelings of nostalgia.

FLIP THROUGH PHOTOS

Whether your photos are in scrapbooks (a multimillion-dollar industry built on people capturing memories and creating nostalgia), or you are flipping through photos on your phone, the experience is guaranteed to bring joy and smiles to your heart and mind.

CALL OR VISIT AN OLD FRIEND

Conversations with a friend can trigger nostalgia by reminding oneself of events of the past, resulting in engaging social connection, happiness, and gratitude.

LISTEN TO MUSIC

Music has a significant way of bringing back memories. A wedding song or even a top 40 tune can trigger a feeling of nostalgia. In fact, we can often associate a specific song or genre of music with a particular period of our life and that is because science has proven that songs stimulate our visual cortex, which links the audio of a song with what we were experiencing at a moment in time. If you played the same song over and over again while getting ready with your friends when you were young, then you are likely to be brought back to that time when you hear it.

WATCH A FAVOURITE MOVIE

Whether it is an old classic, a funny family favourite, or a traditional holiday movie, the experience and visual stimulation of watching and reminiscing over movies is a definite nostalgia trigger.

GO FOR A DRIVE

Revisiting old neighbourhoods and seeing the growth and

changes (or not) while out for a drive is a great stimulus for reflection. Discussion about development in the area, the houses and locations of old friends and neighbours, and the route to schools, for instance, can bring up nostalgic memories.

GO THROUGH YOUR CLOSET

A simple quick fix for some nostalgia that does not require going anywhere or preparation logistics, is to look through your old clothes. The sense of touch is a powerful trigger for nostalgia, as that tactile sensation – say by holding a glittery dress you wore to a fancy party – triggers brain activity.

TRY SOME FAVOURITE RECIPES

Food has long been linked to emotion, and the nostalgia one can get from a familiar meal, drink, or simple taste is undeniable. To trigger some nostalgia, it is a nice idea to make a favourite recipe from your childhood, or one that is usually saved for special occasions and holidays, to lift your spirits and your health.

EXPLORE YOUR SENSE OF SMELL

Take the time to smell some flowers, particular spices, old perfumes, or generate your own smells by enjoying a scented candle or diffuser and reflect on any memories the aromas might stimulate. Scents have a way of flooding our brain with memories of a particular experience.

According to the article “Why Smells Bring Back Such Vivid Memories,” by Ana Sandoiu and published in July 2018 on MedicalNewsToday.com, there is a pathway between a part of your brain called the anterior olfactory nucleus, which receives information about things you smell, and the area of your brain where memory and emotions are processed. In fact, noted Sandoiu, researchers have labelled the ability of smell to trigger memories as the “Proust effect” due to how close the olfactory processing system is to the memory hub in the brain.

A Lot on Your Plate

ADOPTING THE MIND DIET FOR BRAIN HEALTH

The MIND diet (Mediterranean-DASH Intervention for Neurodegenerative Delay) was developed in 2015 to prevent Alzheimer's dementia by nutritional epidemiologist Dr. Martha Clare Morris and her colleagues at Chicago's Rush University Medical Center and Harvard T.H. Chan School of Public Health. —>

ORIGINS OF THE MIND DIET

The Rush Memory and Aging Project is an ongoing longitudinal study (with more than 1,000 participants) that examines genetic and environmental risk factors for Alzheimer's dementia. A diverse group of participants without a dementia diagnosis have been recruited primarily through retirement communities in the Chicago area of the United States from 1997 onward (recruitment and research is ongoing).

Participants complete annual clinical evaluations, assessments of risk factors (e.g., exercise), blood tests, and provide consent for organ donation at the time of death (i.e., spinal cord, muscle and nerve, brain) so that declines in motor and cognitive function may be documented through a variety of measures. In 2004, an optional food frequency questionnaire was added, providing data that formed the basis of the MIND diet.

Founded on the premise of “diet as a medicine,” this eating plan is a hybrid of the DASH (Dietary Approaches to Stop Hypertension) diet and Mediterranean diet and includes evidence-based recommendations to consume foods and nutrients that improve brain health.

The MIND diet, DASH, and Mediterranean diet all emphasize intake of fruits and vegetables, lean meats, fatty fish, unsaturated fats, and plant-sources of protein (e.g., nuts, beans, and lentils). Where they differ is in their nutrient- and food-specific recommendations.

THE DASH DIET

This diet was designed to reduce blood pressure and recommends lowering intake of sodium, saturated fat, and added sugars, while increasing intake of nutrients and food components known to decrease blood pressure (e.g., potassium, calcium, magnesium, fibre, protein). Daily recommendations include intake of grains, fruits, vegetables, fat-free or low-fat dairy products, lean meats, poultry, and fish.

THE MEDITERRANEAN DIET

This diet came about in efforts to describe eating patterns within countries by the Mediterranean Sea, like Greece, France, Spain, and Italy, where there are relatively low rates of cardiovascular disease. While there are several “Mediterranean-like” diets that have been studied over the years, key recommendations include daily consumption of fish, unprocessed whole grains, olive oil (or other plant oils), fruits, and vegetables.

THE MIND DIET

This hybrid diet borrows elements from the DASH and Mediterranean diets and emphasizes intake of nutrients that improve brain health and address risk factors for Alzheimer's disease (AD).

COMPONENTS OF THE MIND DIET

There are 14 dietary components to the MIND diet. The original version included one serving of wine per day as a brain-healthy food, but it has since been removed based on current evidence that suggests risk of wine (alcohol) consumption outweighs potential benefits.

9 BRAIN-HEALTHY FOODS TO EAT

- **EVERY DAY**
 - whole grains (three servings)
 - green leafy vegetables (at least 1 serving)
 - other vegetables (at least 1 serving)
- **MOST DAYS**
 - nuts
 - beans and legumes
- **TWICE A WEEK**
 - berries
 - poultry
- **ONCE A WEEK**
 - oily fish
- **OLIVE OIL** (if adding fat to meals)

5 UNHEALTHY FOODS TO LIMIT

- **RED MEATS** (less than 4 servings per week)
- **BUTTER AND STICK MARGARINE** (less than 1 tablespoon/day)
- **CHEESE** (less than 1 serving/week)
- **PASTRIES AND SWEETS** (less than 1 serving/week)
- **FRIED OR FAST FOODS** (less than 1 serving/week)

The MIND diet offers more flexibility for meal plans when compared to the DASH and Mediterranean diets, with only three foods to incorporate daily: whole grains, green leafy vegetables, and other vegetables.

Moreover, with its guidance to consume plant sources of protein like nuts, beans, and legumes most days and limit intake of butter and cheese, the MIND diet is easily adapted for vegetarians and vegans.

A key distinguishing factor of the MIND diet from its predecessors is that berries are the only fruit to make it on the list of brain-

healthy foods, with a specific recommendation to consume berries twice a week.

Though all fruits are good sources of nutrients that may be consumed when following the MIND diet, research has shown that berries have direct benefits to brain health through antioxidant and anti-inflammatory activity, and improvements to cognitive function.

RESEARCH HIGHLIGHTS ON THE MIND DIET & BRAIN HEALTH

The effect of the MIND diet on brain function and disease is a burgeoning area of research. The earliest studies published in 2015 in *Alzheimer's & Dementia* from the Rush Memory and Aging Project showed that high adherence to the MIND diet was linked to slower cognitive decline and 53% lower risk of AD.

This finding was comparable to the effect of the Mediterranean diet (54% lower risk of AD) and higher than that of the DASH diet (39% lower risk of AD). Encouragingly, findings showed that even moderate adherence to the MIND diet appeared to be protective

against AD (35% lower risk of AD), suggesting that there was some “wiggle room” when adopting brain-healthy eating habits. A similar trend was not seen for the Mediterranean or DASH diets.

THERE WAS ALSO EVIDENCE OF GREATER PROTECTION FROM AD THE LONGER THE MIND DIET WAS FOLLOWED, SUGGESTING THAT ADOPTION OF MIND DIET HABITS IN EARLY ADULTHOOD WAS BENEFICIAL.

Since 2015, the MIND diet has been examined alongside a number of lifestyle and environmental factors. Here are some highlights:

THE MIND DIET CAN IMPROVE COGNITION.

A study published in *Journal of the American Geriatrics Society* in 2017 by Dr. Claire McEvoy et al. showed that there is an association between the MIND diet and cognitive function in older adults, with greater adherence showing better cognition and lower risk of cognitive impairment. Data were drawn from the nationally representative Health and Retirement Study in the United States. →

HOLD THE WINE!

Although on the original list of brain-healthy foods, wine was removed from the MIND diet for the study “Mediterranean-DASH Intervention for Neurogenerative Delay (MIND) Study: Rationale, Design and Baseline Characteristics of a Randomized Control Trial of the MIND Diet on Cognitive Decline” (a randomized controlled trial from 2017-2021). This trial was led by research centres at Rush University and Harvard University, who developed the MIND diet.

Unlike the other nine brain-healthy components in the MIND diet where there are no known risks of consuming the recommended amounts, there is accumulating evidence that suggests having even one glass of wine per day (or an equivalent amount of alcohol) can lead to adverse health outcomes.

For example, extensive data has shown an association between low to moderate consumption of alcohol and an increased risk of developing breast cancer. According to a review published in *Current Breast Cancer Reports* in 2014 by Dr. Jasmine McDonald and colleagues, there is an estimated 30 to 50% increase in breast cancer risk from consuming one to two drinks per day.

Alcohol consumption has also been linked to sleep disturbances and suppressed cardiovascular recovery

during the first three hours of sleep. A 2018 study in *JMIR Mental Health* by Dr. Julia Pietilä and colleagues showed that sleep disturbances were shown with just one drink of alcohol, and disturbances were more pronounced with more alcohol consumption. Emerging data also suggests that if you increase daily wine consumption to one glass a day from half a glass the impact on your brain volume would be equivalent to aging two years.

This finding was from a 2022 study published in *Nature Communications* showing that among 36,678 healthy middle-aged and older adults, alcohol intake was negatively associated with brain volume measured by MRI. This relationship was evident even among those who consumed one to two units of alcohol (e.g., 0.5-1 glass of wine) per day.

Given the strong evidence identifying health risks of low wine/alcohol consumption, it is not surprising that health experts do not recommend that non-drinkers introduce wine/alcohol into their diet. In fact, the recent release of Canada’s Guidance on Alcohol and Health in January 2023 states that “even very small amounts of alcohol can be harmful to people’s health and well-being.” The bottom line is that if you drink, reducing your intake by any amount is beneficial.

Berries are low calorie and nutrient dense when compared to other fruit, with high levels of vitamin C, manganese, vitamin K, potassium, and fibre. Berries are the richest source of polyphenols in fruit, with about triple that of plums, cherries, and apples.

In a review published in *Neural Regeneration Research* in 2014, Dr. Selvaraju Subash and colleagues explained that research shows polyphenols have both antioxidant and anti-inflammatory functions in the body, and are neuroprotective because they can cross the blood-brain barrier and minimize oxidative stress and tissue damage in the brain.

Polyphenols and other active compounds in berries have been linked to a range of health benefits including possibly improving motor function, cognitive function, and regulating blood sugar.

BEING PHYSICALLY ACTIVE WHILE ON A MIND DIET PROVIDES ADDED BENEFITS FOR BRAIN HEALTH.

A study published in *Alzheimer's & Dementia* in 2021 by Dr. Thomas Holland and colleagues showed that there is a synergistic relationship between the MIND diet, physical activity, and brain health.

Among participants without cognitive impairment, those with high adherence to the MIND diet who also engaged in high levels of physical activity showed better memory and cognition scores and slower rates of decline in global cognition over time when compared to those with high adherence to the MIND diet and low rates of physical activity. Data was drawn from the Memory and Aging Project.

THE MIND DIET MAY MAINTAIN COGNITIVE FUNCTION EVEN AMONG THOSE WITH BRAIN PATHOLOGIES.

A 2021 study published in *Journal of Alzheimer's Disease* by Dr. Klodian Dhana and colleagues looked at the final set of cognitive tests and brain pathologies (e.g., accumulation of protein deposits in the brain) post-mortem among 569 participants of the Memory and Aging Project. Participants with a higher MIND diet score had better global cognitive functioning prior to death.

In fact, there was a group of participants with high MIND diet scores with enough protein deposits in the brain to constitute AD who were symptom-free and did not have a clinical diagnosis when they were alive. Authors pointed to this as preliminary evidence that the MIND diet has a protective effect on memory and thinking even as brain diseases progress.

THE MIND DIET MAY LOWER RISK OF DEATH FROM ALL CAUSES.

A longitudinal cohort study by Dr. Janie Corley looked at the dietary patterns of 882 participants in Scotland. Published in *Public Health Nutrition* in 2022, data showed that during a 12-year follow-up, participants with the top third of MIND diet scores had a 37% lower risk of death from all causes when compared to those with the bottom third of the MIND diet score.

Similar trends were not seen for those following a Mediterranean-type diet or traditional dietary patterns. Corley suggested that public health recommendations based on the MIND diet may help to promote longevity.

To date, most research on the MIND diet has been observational, that is, based on trends seen in cohort studies or population studies. Findings based on interventions, like randomized controlled trials, are needed to prove whether the MIND diet is specifically responsible for the positive health outcomes noted in previous research.

A groundbreaking three-year randomized control trial, known as the "Mediterranean-DASH Intervention for Neurogenerative Delay (MIND) Study: Rationale, Design and Baseline Characteristics of a Randomized Control Trial of the MIND Diet on Cognitive Decline" study, is currently underway. Led by the two research centres that developed the MIND diet, Rush University and the Harvard T.H. Chan School of Public Health, the study will test the effects of the MIND diet on cognitive decline among 604 participants without cognitive impairment who are overweight and have suboptimal diets.

Data collection concluded in 2021, and analyses are ongoing to examine the role of the MIND diet on a host of outcomes including cognitive function, changes in brain volume, and cardiovascular risk factors. Researchers are hopeful that findings from the trial may be the basis for future prevention and treatment of brain diseases and many other health conditions.

So while the research isn't fully conclusive in terms of the how the MIND diet affects brain health, it does seem promising, so you may want to give this flexible approach to eating a try. 🍓

Jenny Hui's Roasted Zucchini, Snap Pea, Cherry Tomato Salad with Poppy Seed Dressing

 SERVES 4

INGREDIENTS

SALAD

- + 2 medium zucchini
- + 1 tbsp olive oil
- + 2 cups snap peas, blanched
- + 16 cherry tomatoes, sliced in half
- + 1/4 small red onion, julienned in strips
- + 2 cups pea shoots (optional)

DRESSING

- + 1/4 cup apple cider vinegar
- + 1 tbsp lemon juice
- + 1 tbsp honey
- + 1/2 tbsp smooth Dijon mustard
- + 1/4 tsp kosher salt
- + 1 tsp fresh ginger, grated with microplane
- + 1/2 cup olive oil
- + 1/2 tbsp poppy seeds

INSTRUCTIONS

1. Preheat oven to 375°F. Line sheet pan with parchment. Set aside.
2. Cut zucchini into 1-inch wide half-moons. Toss with olive oil and season with salt and pepper. Place on sheet pan.
3. Roast in oven for 10-12 minutes. Remove and cool.
2. While machine is on, slowly pour the olive in.
3. Pour into a bowl.
4. Add poppy seeds and mix.
5. Season with salt and pepper.
6. Set aside.

DRESSING

1. Place vinegar, lemon juice, honey, Dijon mustard, salt, and ginger into a blender.

In a large salad bowl, combine zucchini, snap peas, cherry tomatoes, and red onion. Drizzle with desired amount of dressing and gently mix. Serve with pea shoots if desired.

Tomato

Tomatoes contain powerful antioxidants and are an excellent source of vitamin C, essential for focus, concentration, and memory.



Sablefish

Like salmon and halibut, sablefish is loaded with brain-protective omega-3 fatty acids.

INGREDIENTS

- + 6 (5 ounce) Sablefish fillets (also called Black Cod)
- + 2 green onions
- + 1/4 cup vegetable oil
- + 1 tbsp crushed garlic
- + 1/2 tsp red curry paste
- + 1/2 cup button mushrooms, sliced

MARINADE

- + 1/4 cup sake
- + 1/4 cup mirin
- + 1/4 cup white miso paste
- + 3 tbsp sugar
- + 1/2 cup red peppers, diced
- + 2 tbsp oyster sauce
- + 1 tbsp soy sauce
- + 2 tsp sugar

RICE

- + 2-3 banana leaves
- + 4 cups cooked Thai rice
- + 5 Makrut lime leaves
- + 1 1/2 tsp lime juice
- + 1/2 tsp salt
- + 1 tsp curry powder

Miso Glazed Sablefish with Khao Moak Rice

 SERVES 6

INSTRUCTIONS

Two days ahead, make the marinade and marinate the fish!

1. Boil the sake and mirin in a small saucepan for 20 seconds.
2. Turn the heat down to low, add the miso and whisk.
3. Turn up the heat, add the sugar, and whisk until dissolved. Cool to room temperature.
4. Pat the fish dry with paper towels.
5. Place fish in a glass or porcelain dish, and then spread the marinade over the fish. Wrap tightly with plastic wrap, place the dish in the refrigerator, and leave to marinate for 2-3 days.

TO COOK RICE

1. Preheat oven to 375°F.
2. Line a 9x13 casserole dish with the banana leaves. Make sure the leaves are hanging over the dish. Set aside.
3. Place cooked rice in a mixing bowl. Set aside.
4. Chop lime leaves until very fine. Place in small bowl.
5. Cut green onions into small pieces and place in the lime leaves bowl. Set aside.
6. In a medium sauce pan over high heat, heat oil and fry garlic until golden brown. Add curry paste and reduce heat. Add approximately 2 T of boiling water to make a sauce.
7. Add mushrooms and red peppers. Sauté.
8. Add oyster sauce, soy sauce, sugar, lime juice, salt, and curry powder. Stir until the sauce is thick. Remove from heat.
9. Add the sauce, lime leaves, and green onions to the rice. Mix together.
10. Place into the lined casserole dish. Fold banana leaves over the rice so that the rice is enclosed.
11. Bake in oven for 45 minutes.

TO COOK FISH

1. Wipe off excess miso.
2. Broil until the fish is caramelized on top and begins to flake or its internal temperature reaches 145°F (approx. 7-10 minutes).
3. Enjoy!



MEMORY MORSELS

— A WOMEN'S BRAIN HEALTH INITIATIVE —

This edition's recipes are courtesy of Jenny Hui, Executive Chef of The Lazy Gourmet.

For more recipes and the latest from our Featured Foodie, Jenny Hui, visit memorymorsels.org.



Scan for this delicious Broccoli Steak with Spicy Chickpea & Pistachio Pesto recipe by Jenny



WOMEN'S BRAIN HEALTH INITIATIVE BOARD OF DIRECTORS & OFFICERS



Jeanne Beker*
Journalist, Author &
Fashion Entrepreneur

Dr. Vivien Brown
MDCM, CCFP, FCFP, NCMP,
Assistant Professor,
University of Toronto

Brenda Dee
President, Brenda Dee &
Associates Inc.

Catherine Delaney*
President, Delaney
Capital Management Ltd.

Terrie-Lynne Devonish*
Chief Legal Officer & Corporate
Secretary, Altus Group

**Honorary*

Arlene Dickinson*
CEO, Venture
Communications

Janice Fukakusa*
Corporate Director
& Chancellor, Toronto
Metropolitan University

Mark Girard
CFO, Cedarpoint
Investments

Susan Hodkinson
Partner & COO,
Crowe Soberman LLP

JoAnne Korten
Executive Director,
Women's Brain Health Initiative

Mark Lash
Founder & President, Mark Lash

Nancy Laughton
Former Managing Director,
LHH Knightsbridge

Rosie MacLennan*
Olympic Gold Medalist

Lynn Posluns
President & CEO,
Women's Brain Health Initiative

Ellen Rachlin (U.S.)
Former Managing Director,
J.P. Morgan

Heather Reisman*
Founder, Chair & CEO, Indigo

Dr. Erna Snelgrove-Clarke
Vice-Dean & Director, School of
Nursing, Associate Professor,
Queen's University

Fran Sonshine*
National Chair, Canadian Society
for Yad Vashem

Kirstine Stewart*
World Economic Forum
Executive Committee

Will Stewart
SVP, Hill+Knowlton Strategies

Sarah Widmeyer
Director & Head, Wealth
Strategies & Chief Marketing
Officer, Richardson Wealth

YOU CAN SUPPORT WOMEN'S BRAIN HEALTH INITIATIVE AND BE A CHAMPION FOR WOMEN AND THEIR BRAIN HEALTH. YOUR CHARITABLE DONATION CAN FURTHER INTENSIFY OUR IMPACT, ALLOWING US TO REACH MORE AND TEACH MORE.



Women's Brain
Health Initiative

Yes! I'd like to support
Women's Brain Health Initiative
now with my gift of:

\$2,000 \$1,000 \$500
 \$250 \$100 Other \$ _____

I have enclosed a cheque payable to
Women's Brain Health Initiative

I prefer to use my credit card

You can also donate online at
womensbrainhealth.org/donate

DONOR NAME

ADDRESS

ADDRESS

CREDIT CARD NUMBER

EXPIRY DATE: MM/YY

CVD

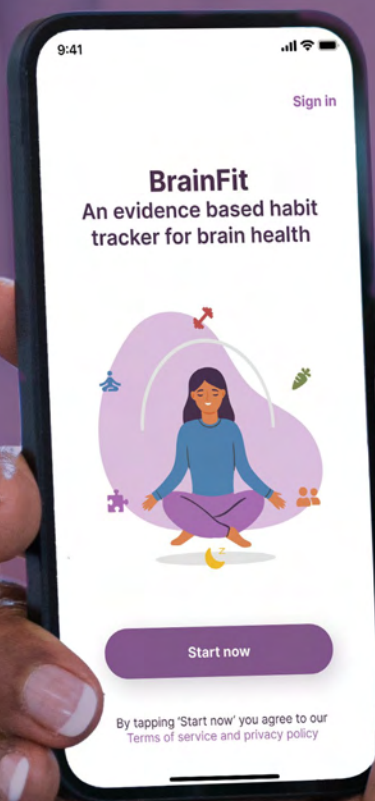
NAME ON CREDIT CARD

PHONE NUMBER

E-MAIL

SIGNATURE

Want to get and stay brain fit? We can help!



The first of its kind, BrainFit is designed to help lower dementia risk and prolong cognitive vitality with an emphasis on all Six Pillars of Brain Health – stress management, mental stimulation, social activity, nutrition, exercise, and sleep.

BrainFit – Free Habit Tracker Now available in the App Store!



Women's Brain
Health Initiative

BrainFit is made possible through a financial contribution from the Public Health Agency of Canada and with support from TELUS, RBC, York University, BitBakery, The Citrine Foundation of Canada, and RB33.

Charitable No. 80099 3206 RR0001 | 501(c)(3) Tax-Exempt Organization