

# MIND <sup>OVER</sup> MATTER<sup>®</sup>



**BEST**  
**BRAIN BOOSTS**

**MARRIED TO**  
**ALZHEIMER'S**

**STAND AHEAD**  
**FOR WOMEN'S**  
**BRAIN HEALTH**

**DEPRESSION**  
**MAY SPEED**  
**BRAIN AGING**

**SEX DIFFERENCES**  
**IN STROKE**

**BRAIN BENEFITS OF**  
**LIGHT-INTENSITY EXERCISE**

Insight into the latest research findings to combat brain-aging diseases and what you need to stay **brain healthy longer.**



Women's Brain  
Health Initiative

# With Gratitude

**THIS EDITION OF MIND OVER MATTER® WAS MADE POSSIBLE THANKS TO THE GENEROUS AND ONGOING SUPPORT AND ENCOURAGEMENT OF OUR PARTNERS BRAIN CANADA FOUNDATION AND HEALTH CANADA.**

## **SEX, GENDER & THE BRAIN: PROMOTING EQUITY FOR EXCELLENCE A MESSAGE FROM BRAIN CANADA**

Brain Canada is committed to raising awareness of, and supporting research that is, sensitive to sex and gender differences. Sex and gender influence our risk of developing certain diseases, our symptoms and severity of illness, how well we respond to interventions, and how often we seek care. To date, we have invested more than \$3.25 million in six programs across the country with a sex and/or gender component. They include research focused in areas such as brain development, Alzheimer's disease, and chronic pain.

For example, it is estimated that 70% of individuals affected by chronic pain are women. Research has shown that women experience more recurrent pain, more severe pain, and longer-lasting pain than men. Despite these facts, women are less likely to receive treatment, and, at the research level, a gap remains in the representation of female subjects in studies. Dr. Jeffrey Mogil was a team member on one of Brain Canada's original five Brain Repair Programs, that began in 2003, and which aimed to study the different cell types and molecules involved in chronic pain. This work led to his realization that there could be a sex difference in the response to chronic pain, and he went on to receive a 2014 Brain Canada Multi-Investigator Research Initiative (MIRI) Team Grant to pursue this premise.

In a continued collaboration with Dr. Michael Salter, who was the lead investigator on the Brain Repair Program team, the researchers focused on their original finding that microglia (i.e. the brain's immune cells) can become activated after injury to nerves in the body. After decades of assuming that pain works the same way in both sexes, their new work discovered that while blocking microglia functioning reduced pain in male mice, it had no effect on pain transmission in female mice. Instead, a different type of immune cell appeared to carry out this function in females. The groundbreaking study was published in 2015 in *Nature Neuroscience*, one of the top journals in the neuroscience field.

"Sex differences have been almost entirely ignored in pain research, because pain research has been performed primarily on male rodents," says Dr. Mogil. **"THE RESEARCH, SUPPORTED BY BRAIN CANADA, IS ONE OF THE MORE STRIKING EXAMPLES TO DATE OF DIFFERENT BIOLOGICAL UNDERPINNINGS OF A PHENOMENON EXPERIENCED BY BOTH SEXES."**

Sex and gender differences in the brain matter. This is why we ask researchers applying for grants to describe how sex and gender are taken into consideration in their research projects. Our commitment also extends to gender parity in the scientists that we support: 49% of the applications received for our last three major competitions announced in 2018 were submitted by female researchers, and 57% of the recipients were women.

Brain Canada's partnership with Women's Brain Health Initiative (WBHI), which began in 2016, has been transformative. As part of the partnership, Brain Canada has sponsored six issues of Mind Over Matter® focused on sex and gender and the prevention of age-related cognitive decline. Brain Canada has also supported twelve of WBHI's Engaging Millennial Minds® events in Toronto, designed to educate young men and women on the importance of brain health and sex- and gender-based research.

Furthermore, in June 2019, the Government of Canada announced the next phase of funding for the Canadian Consortium on Neurodegeneration in Aging (CCNA). CCNA is led by Dr. Howard Chertkow, Professor of Neurology at the University of Toronto, and is the largest initiative in dementia research ever undertaken in Canada. WBHI has been a partner in CCNA since the first phase, ensuring that sex and gender considerations are included in the research. In this next phase, Brain Canada has pledged \$2.5 million over five years to support research on vascular dementia and sex- and gender-based analysis.

**"Ensuring that women's voices are heard and celebrated in research is not only about equity; it is also about excellence,"** notes Inez Jabalpurwala, President and CEO of Brain Canada. In upcoming issues of Mind Over Matter®, WBHI will also be highlighting the impact of sex and gender research that is being funded by Brain Canada and our partners, including Health Canada, which is providing matching funds through the Canada Brain Research Fund.

In addition to increasing our support for research that involves sex and gender, Brain Canada's broader goal is to consider diversity in all its forms. Only then can research ultimately benefit all of society.

To find out more about our work and the research we are supporting, please visit [braincanada.ca](http://braincanada.ca).



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# EDITOR'S LETTER

All magazines strive to grab your attention with their cover, typically with some combination of striking photographs and sensational headlines. At Mind Over Matter®, we rely on the faces of inspirational, intergenerational women - mothers and daughters who are poised and powerful, whose demeanour sends an eloquent, positive message of determination to live life to the fullest.

This edition of Mind Over Matter® is no different, but Global Television host Jennifer Valentyne and her daughter Georgia have the distinction of being our youngest cover women to date. This was a deliberate choice.

Women's Brain Health Initiative (WBHI) is committed to fostering a broad and diverse conversation about brain health. A central part of our mission is to reach out to millennials, since this demographic has the greatest opportunity to protect their brain health. Indeed, research has demonstrated that the earlier you start engaging in healthy lifestyle choices, the better the cognitive outcome.

Jennifer and Georgia have a particularly close bond, even sharing an Instagram account. A mother's influence over her daughter can wax and wane. We want our children to be strong, independent thinkers, but at the same time we wish that they would listen to us more faithfully. It is a lifelong, loving tension.

Whatever influence you may still have with your daughters (or sons for that matter), I encourage you to talk to your children about taking a proactive approach to their brain health, and I hope you will find some ideas to spark conversation in the pages of Mind Over Matter®.

In this edition, we pay close attention to the concept of healthy living, which starts with stress reduction. With so much bad news bombarding us daily, we could all use some advice for how to turn down the dial and give our brains relief from the relentless, multi-media cacophony of 21st-century existence. The tools, happily, are neither high-tech nor obscure. Read about the benefits of deep breathing and massage therapy, for instance. We have also included an article about a woman who has developed an exercise program using balloons as resistance tools.

Additionally, our "Best Brain Boosts" feature offers useful advice on some of the ways that you can help protect and maintain your cognitive vitality. We also explore a sensitive, but sadly common, issue: the profound changes that dementia can bring to intimate relationships. There is a touching feature article on an inspirational woman living with dementia who has chosen to give back to science by volunteering for a long-term research project.

Finally, I would like to tell you about a new WBHI campaign that I hope will get us all talking about brain health from a new angle. I was fascinated by research indicating that standing on your head has many health benefits. Those of you who study yoga might already have tried shirshasana (headstand). There is evidence to suggest that this playtime activity that many of us tried as children can bring improved blood flow, better digestion, and relief from symptoms of menopause, though safety is critically important and not everyone can (or should) do a headstand.

With that inspiration, WBHI is launching the Stand Ahead™ Challenge. We want both women and men to (carefully) stand on their heads, or have someone try it on their behalves, and post their pose online, donate to the cause, and challenge others to participate.

The Stand Ahead™ Challenge is not only for your own well being, but is also a statement to stand ahead for women's brain health, and to combat the kind of research bias that discouraged scientists from exploring the differences between the sexes.

And yes, I tried it myself recently. When I attempted a headstand in the middle of my living room, I was unable to maintain the pose. However, with the support of a wall, and my daughter-in-law Amy spotting me (just in case), I succeeded. I felt a true sense of accomplishment!

The Stand Ahead™ Challenge will be in support of the very first Women's Brain Health Day on December 2, 2019: a day to stand up, speak up, and upend the conversation about our collective cognitive destinies. Best of all, monies raised for women's brain health research through the Stand Ahead™ Challenge will be matched by Brain Canada. Look for more information at [standahead.org](http://standahead.org).

I'll be on my head that day and I hope many of you, or your designates, will join me! 🧘



**Lynn Posluns**  
Founder and President,  
Women's Brain Health  
Initiative



# CONTRIBUTORS

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### AMY CRYSTAL // CONTRIBUTING EDITOR

Amy is a real estate lawyer at DelZotto, Zorzi LLP, one of Canada's top real estate boutique law firms. "Although many people think of dementia as a disease that affects older adults, the disease begins to impact the brain decades before symptoms are even noticed. WBHI is inspiring a new generation of women to take care of our brain health today, since research now shows that the earlier you protect your brain health, the better the cognitive outcome."



### VITINA BLUMENTHAL // CREATIVE DIRECTOR

Vitina is creative to her core. An adventurous soul with a passion for travel, a healthy lifestyle (especially all things yoga), and sharing her love of mindfulness with others. She runs a self-discovery business, WanderfulSoul, which focuses on creating online programs and transformational events that promote mental and emotional well-being. Through WBHI's Young Person's Cabinet, she encourages millennials to start taking care of their mental and brain health.



### 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."



### DILIA NARDUZZI // WRITER

Dilia is a writer and editor living in Hamilton, Ontario. She's been interested in healthy eating and a balanced lifestyle for almost twenty years. She studied gender dynamics while doing graduate work at McMaster University and was honoured to write for Mind Over Matter®. "I want the medical profession and all women to know that women's bodies require specialized medical care."



### SEAN MALLEN // WRITER

Sean Malen 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 health. Sean's first book, *Falling for London: A Cautionary Tale* from Dundurn Press, is widely available across Canada, the U.S., and the U.K.



### 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."



### GEORGIA & JENNIFER VALENTYNE // ON THE FRONT COVER

Jennifer and Georgia Valentyne are extremely close and love spending time together as you can see on their Instagram account @motherdaughterdate. Their open dialogue on social media inspires other mothers and daughters to have meaningful conversations – one of which we should all be having are ways of promoting optimal brain health. Living an active and happy lifestyle and eating a nutritious diet are essential elements for a well-functioning brain. Thank you Mind Over Matter® for asking us to be a part of this very important initiative!





# EVERY BIT COUNTS

LIGHT-INTENSITY EXERCISE DOES BENEFIT YOUR BRAIN

It is widely understood that physical activity is important for both physical and cognitive health. But, just how much physical activity, and at what intensity level, is enough to reap the benefits?

The *Canadian Physical Activity Guidelines*, published jointly by the Canadian Society for Exercise Physiology (CSEP) and ParticipACTION in January 2011, recommend that adults (aged 18 to 64) should aim for at least 150 minutes of moderate- to vigorous- intensity aerobic physical activity (MVPA) each week, in bouts of ten minutes or more, as well as muscle and bone strengthening exercises at least twice per week. For older adults (aged 65 and over), the recommendations are the same, but the guidelines also note that those with poor mobility should perform physical activities to enhance balance and prevent falls. While there is no reference to light-intensity aerobic physical activity, the guidelines emphasize that engaging in "more physical activity provides greater health benefits."

The 2018 *Physical Activity Guidelines for Americans*, published by the U.S. Department of Health and Human Services, provide slightly different recommendations for adults, with a broader approach to exercise intensity and duration. The U.S. guidelines recommend a minimum of 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity each week for "substantial health benefits." →

They, too, recommend at least twice per week muscle-strengthening activities, but add that this exercise should be of moderate or greater intensity. Although the U.S. guidelines also mention that engaging in more physical activity is better, they emphasize the value of reducing sedentary time and note that engaging in "some physical activity is better than none." Their recommendations for older adults are the same as for adults, with a few additions:

- 1 ADD BALANCE TRAINING EACH WEEK;
- 2 ADAPT LEVEL OF EFFORT TO LEVEL OF FITNESS;
- 3 TAKE ANY CHRONIC CONDITIONS INTO CONSIDERATION TO CHOOSE PHYSICAL ACTIVITY THAT CAN BE DONE SAFELY; AND
- 4 IF 150 MINUTES OF MODERATE-INTENSITY AEROBIC ACTIVITY IS NOT POSSIBLE DUE TO CHRONIC CONDITIONS, JUST DO AS MUCH AS ABILITIES AND CONDITIONS ALLOW.

Both sets of guidelines stress the various health benefits of engaging in moderate and vigorous exercise, and there is a plethora of research to support these recommendations. Research is also beginning to demonstrate that

## THERE ARE BENEFITS OF ENGAGING IN LIGHT-INTENSITY EXERCISE AS WELL, EVEN FOR SHORT PERIODS OF TIME,

and the U.S. guidelines reflect this new understanding. The Canadian guidelines, however, are quite a bit older than their American counterpart, so perhaps the next version will incorporate similar recommendations in this regard. CSEP announced in June 2019 that it is working on developing the world's first 24-Hour Movement Guidelines for Adults and Older Adults, which will recommend the appropriate amounts of physical activity, sleep, and sedentary time for a healthy day.

### LIGHT-INTENSITY PHYSICAL ACTIVITY PROVIDES PHYSICAL AND COGNITIVE BENEFITS FOR OLDER ADULTS

Researchers from Hong Kong conducted a systematic review of the research on the effectiveness of low-intensity exercise on the physical and cognitive health of older adults, and shared

### WHAT IS "MODERATE" INTENSITY?

The *Canadian Physical Activity Guidelines* describe moderate-intensity physical activities as those that will cause you to sweat a little and breathe harder. Such activities would be rated 5 or 6 on a scale of 0 (at rest) to 10 (absolute maximum effort).

### WHAT IS "VIGOROUS" INTENSITY?

The *Canadian Physical Activity Guidelines* describe vigorous-intensity physical activities as those that will cause you to sweat and be out of breath. Such activities would be rated 7 or 8 out of 10.

their findings in 2015 in *Sports Medicine*. After reviewing 15 studies conducted from January 1994 to February 2015, Dr. Andy C.Y. Tse and colleagues concluded that there was "strong evidence" that low-intensity exercise improves physical and cognitive health for older adults. Specific to cognitive health, the researchers noted significant reductions in depression symptoms and improved cognitive function.





## WHAT IS LIGHT-INTENSITY PHYSICAL ACTIVITY?

Examples of light-intensity physical activity include walking at a slow pace, tai chi, gentle yoga or stretching, and lifting light hand weights. Certain household tasks also provide light-intensity exercise, including gardening and cleaning.

## LIGHT-INTENSITY PHYSICAL ACTIVITY REDUCES RISK OF COGNITIVE DECLINE IN OLDER ADULTS

In 2017, *Experimental Gerontology* published the findings from research conducted by Dr. Brendon Stubbs and colleagues examining the effect of light-intensity physical activity on cognitive decline. Rather than use self-reported measures of physical activity, which are known to be unreliable because they depend on an individual's recall ability, these researchers used accelerometers to measure the physical activity of over 270 older adults in Taiwan.

Light-intensity physical activity and MVPA were each considered separately, rather than as a combined measure of overall physical activity. The resulting data suggest that a higher amount of light-intensity physical activity, independent of MVPA, is linked with a reduced rate of cognitive decline. MVPA on its own was also associated with a lower decline in cognitive ability.

"Our data suggest that light-intensity physical activity may offer protection of future cognitive ability in older adults," said Dr. Brendon Stubbs, a National Institute for Health Research (NIHR) Clinical Lecturer at King's College in London, U.K., and lead author of the study. "We should not overlook the importance of promoting light-intensity physical activity, such as walking, to help older adults maintain their cognitive ability as they age."

## LIGHT-INTENSITY PHYSICAL ACTIVITY ASSOCIATED WITH LARGER BRAIN VOLUME AND HEALTHY BRAIN AGING

Dr. Nicole Spartano and colleagues analyzed data from over 2,350 participants (with an average age of 53 years) who were part of the Framingham Heart Study. Using accelerometer measurements and magnetic resonance imaging (MRI) brain scans, the

researchers looked at the effects of physical activity on total cerebral brain volume. They found that higher levels of light-intensity physical activity were associated with larger total cerebral brain volume.

## EACH ADDITIONAL HOUR OF LIGHT-INTENSITY PHYSICAL ACTIVITY WAS ASSOCIATED WITH AN ESTIMATED 1.1 YEARS LESS BRAIN AGING.

Total cerebral brain volume is known to shrink as a part of normal aging at an average rate of 0.2% per year once you are over the age of 60.

Given the emphasis on MVPA in both the Canadian and U.S. physical activity guidelines, it is surprising that these researchers found that MVPA was not significantly associated with brain volume after adjusting for light-intensity physical activity (i.e. in their analysis of MVPA, the researchers stripped away the effect of light-intensity physical activity and were able to examine the impact of MVPA individually). Their observation that MVPA in and of itself was not significantly associated with brain volume suggests that it is unclear whether one can expect additional benefits for the brain with higher-intensity activity. These findings were published in April 2019 in *JAMA Network Open*.

## EVEN A SHORT BURST OF LIGHT-INTENSITY PHYSICAL ACTIVITY PROVIDES A BRAIN BOOST

Researchers at the University of California, Irvine, and Japan's University of Tsukuba conducted a study involving 36 healthy young adults to learn about the impact of mild exercise on neurocognitive function, including hippocampus-dependent episodic memory. The participants engaged in a single ten-minute session of very light-intensity exercise on a recumbent bicycle and then completed a memory test. They each also underwent a high-resolution MRI brain scan shortly after the exercise session. The findings were published in October 2018 in *PNAS*.

The MRI scans revealed that, after just ten minutes of light exercise, participants' brains showed better connectivity between the hippocampal dentate gyrus and cortical areas linked with detailed memory processing. The hippocampus is important for the creation and

An **accelerometer** is similar to a pedometer, but uses different technology to measure movement in a way that is more sensitive and accurate.

storage of new memories and is one of the first regions of the brain to deteriorate with age, particularly severely in cases of Alzheimer's disease. And, the higher the level of connectivity observed in the brain, the better the participants performed on the memory test.

"This study demonstrates the immediate impact of light-intensity exercise," said Dr. Michael Yassa, a professor at University of California, Irvine, and co-leader of the research, "and it's exciting to know that just a small amount of light-intensity physical activity can make a difference." Dr. Yassa further noted that



## **EVEN SHORT WALKING BREAKS THROUGHOUT THE DAY COULD HELP CONSIDERABLY WITH IMPROVING MEMORY AND COGNITION. THAT'S A VERY REALISTIC GOAL FOR MANY OLDER ADULTS.**

### **THE IMPORTANCE OF THESE FINDINGS ABOUT LIGHT-INTENSITY EXERCISE**

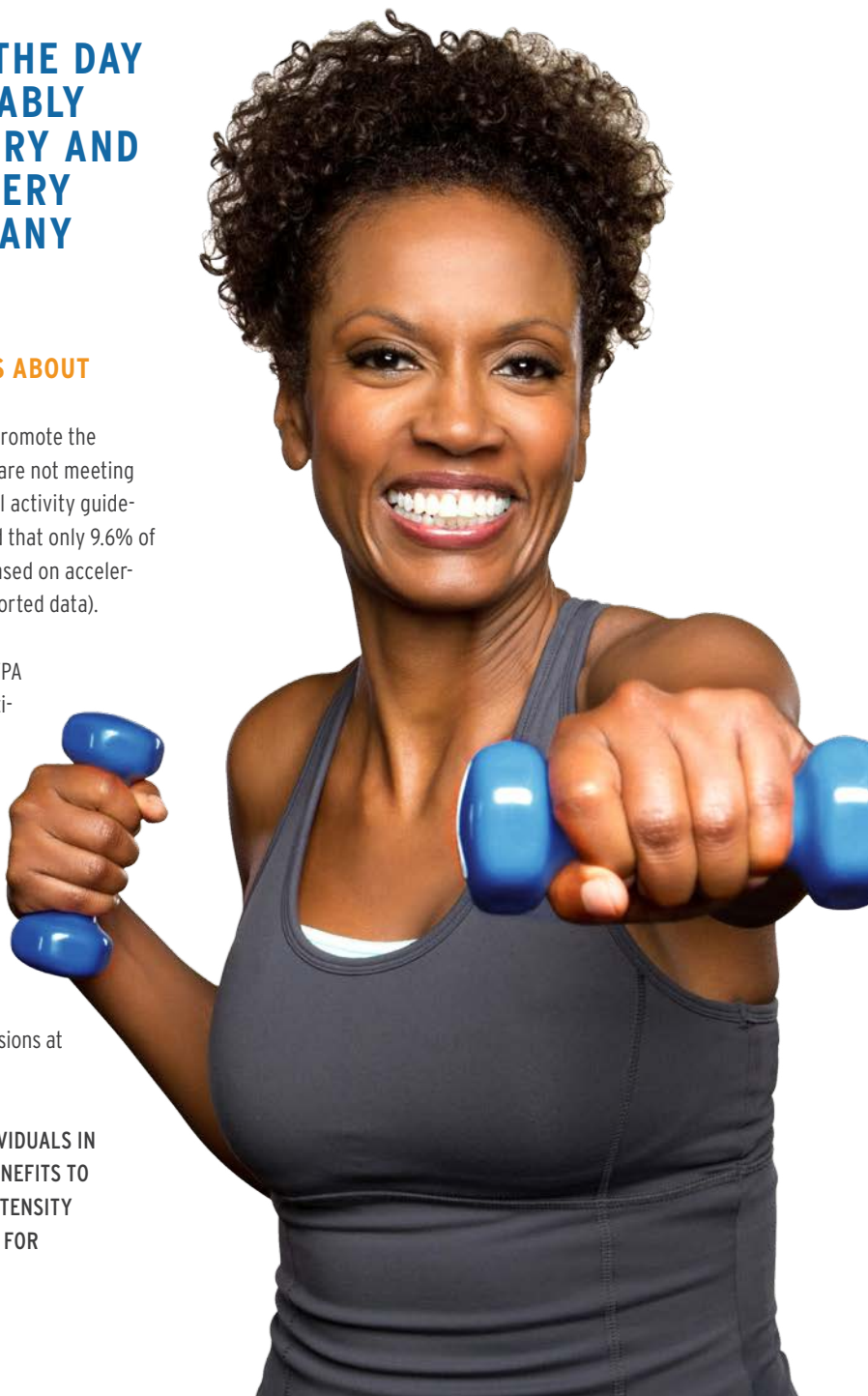
The reality is that, despite widespread efforts to promote the various benefits of physical activity, most people are not meeting the MVPA recommendations set out in the physical activity guidelines. In the U.S., for example, one study estimated that only 9.6% of U.S. adults met the minimum recommendations based on accelerometer measurements (or 62%, based on self-reported data).

Of course, for some individuals, not meeting the MVPA recommendations is a matter of lack of time or motivation. But, for many older adults, it is a matter of physical limitation and lack of energy, and these are likely not variables that are within their control to change. For some older adults, then, no amount of physical activity promotion is going to make them participate in moderate- to vigorous-intensity physical activity, particularly for the recommended duration. But many of these individuals are still capable of participating in light-intensity activities, particularly in short sessions at a time.

**MAKING THE GENERAL PUBLIC – AND OLDER INDIVIDUALS IN PARTICULAR – AWARE THAT THERE ARE BRAIN BENEFITS TO ENGAGING IN EVEN SMALL AMOUNTS OF LIGHT-INTENSITY PHYSICAL ACTIVITY COULD PROVIDE MOTIVATION FOR PEOPLE TO GET MOVING MORE.**

Knowing that even a little bit can go a long way might be surprising, and very welcome, information. Promoting light-intensity physical activity to older adults might also help with better compliance (i.e. people are more likely to engage in this level of activity because it is the right fit for their fitness level and is enjoyable), while at the same time potentially lowering the risk of injuries.

Of course, if you are physically capable of engaging in moderate- to vigorous activity, then certainly you should aim to meet the minimum guidelines. However, if MVPA is not realistic for you for any reason, these research findings should provide reassurance that if you move as much as you can (even if that is just at an easy pace and for a short period of time), your brain will thank you. 🧠







# BRAIN DRAIN

DEPRESSION MAY SPEED BRAIN AGING

**A**ccording to the Canadian Mental Health Association, depression (also known as clinical or major depression) is a mood disorder that will affect one in eight Canadians at some point in their lives. On a global scale, depression is recognized as the leading cause of disability worldwide, impacting over 300 million people. Although the symptoms of depression may be prevalent among older adults, it is important to understand that depression is not a typical part of aging. —▶

## STUDIES ARE NOW SHOWING, HOWEVER, THAT INDIVIDUALS SUFFERING FROM DEPRESSION (AT ANY AGE) MAY BE ACCELERATING THE AGE OF THEIR BRAINS, AND MAKING THEMSELVES MORE SUSCEPTIBLE TO OTHER SYMPTOMS OF AILING BRAIN HEALTH.

To learn more about how depression impacts the brain, researchers at the Yale School of Medicine used a new brain-scanning technique to examine the brains of 20 participants - half of which were diagnosed with clinical depression and the other half of which were deemed healthy after undergoing a comprehensive psychiatric assessment.

Research in the past has been dependent upon brain-scanning tools such as MRI (magnetic resonance imaging) scans, which can map out regions of the brain, but do not allow researchers to conduct an active review of synaptic activity (i.e. the connecting force sending information between neurons, cells, and muscles) in living humans.

With this new brain-scanning technique, an individual's synapses can be mapped out using a radioactive molecule (developed by the research team) that binds to proteins found only in synapses. Researchers can then track that molecule and observe where it gathers in order to determine where synaptic density (i.e. the number of connections in the brain) is higher or lower.

In this study, the researchers found that synaptic density begins to thin out ten years earlier in individuals with depression - namely, at the age of 40, as opposed to 50. According to the lead author of the study, Dr. Irina Esterlis, this could result in "earlier memory loss, brain fog, slowing speech, and even earlier onset of age-related diseases like Alzheimer's." Although small scale, this study delivered the results that the researchers had expected: synapse density was 2% to 3% lower in individuals with chronic depression.

Dr. Esterlis believes that

## THIS RESEARCH COULD BRING US CLOSER TO UNDERSTANDING WHY WOMEN, WHO ARE TWICE

## AS LIKELY THAN MEN TO SUFFER FROM DEPRESSION, HAVE TRIPLE THE RISK OF DEVELOPING ALZHEIMER'S DISEASE COMPARED TO THEIR MALE COUNTERPARTS.

She added that "it could also help us develop and approve drugs to target the hippocampus, the brain region affected in both disorders."

In another recent study, published in May 2018 in the *American Academy of Neurology*, researchers found a link between depression in older adults and memory problems. The study also suggested that those with greater symptoms of depression may have structural differences in the brain (compared to those without symptoms), including smaller brain volume and a 55% greater chance of small vascular lesions in the brain.

"Since symptoms of depression can be treated, it may be possible that treatment may also reduce thinking and memory problems," said study author Dr. Adina Zeki Al Hazzouri of the University of Miami Miller School of Medicine in Florida.



## WITH AS MANY AS 25% OF OLDER ADULTS EXPERIENCING SYMPTOMS OF DEPRESSION, IT'S IMPORTANT TO BETTER UNDERSTAND THE RELATIONSHIP BETWEEN DEPRESSION AND MEMORY PROBLEMS.

Psychologists at the University of Sussex have likewise found a link between depression and an acceleration of the rate at which the brain ages. Lead authors of the study, Dr. Darya Gaysina and Amber John from the EDGE (Environment, Development, Genetics and Epigenetics in Psychology and Psychiatry) Lab at the University of Sussex, are calling for greater awareness of the importance of supporting mental health to protect brain health in later life.

Although researchers have previously reported that individuals with depression or anxiety have an increased risk of dementia



as they age, this was the first study to provide comprehensive evidence for the effect of depression on decline in overall cognitive function, in a general population.

As Dr. Gaysina observed, our populations are aging at a rapid rate, and the number of individuals living with decreasing cognitive abilities and dementia is expected to grow substantially over the next thirty years.

“Our findings should give the government even more reason to take mental health issues seriously and to ensure that health provisions are properly resourced,” said Dr. Gaysina. **“We need to protect the mental wellbeing of our older adults and to provide robust support services to those experiencing depression and anxiety in order to safeguard brain function in later life.”** This study was published in the May 2018 issue of *Psychological Medicine*.

## HOPE

There is hope that researchers will soon have a better understanding of the relationship between depression and the aging brain, and some of the most innovative advances in research can be found at the Centre for Addiction and Mental Health (CAMH) - Canada’s largest mental health teaching hospital and one of the world’s leading research centres.

Researchers at CAMH are pioneering effective, new pharmacological treatments and developing new therapeutic molecules that show promise in reversing the memory loss linked to depression and aging.

In February 2019, Dr. Etienne Sibille, Deputy Director of the Campbell Family Mental Health Research Institute of CAMH, presented his research team’s latest findings in Washington, D.C., at the American Association for the Advancement of Science (AAAS) Annual Meeting. He noted that

**THESE MOLECULES NOT ONLY RAPIDLY IMPROVE SYMPTOMS OF DEPRESSION, BUT ALSO APPEAR TO RENEW THE UNDERLYING BRAIN IMPAIRMENTS CAUSING MEMORY LOSS.**

Dr. Sibille expects to start testing the molecules in clinical research in two years. “We’ve shown that our molecules that enter the brain are safe, activate the target cells, and reverse the cognitive deficit of memory loss. If successful, the potential

Depression changes the way that individuals feel, leaving them with mental and physical symptoms for long periods of time. The symptoms can look quite different from person to person, and certain groups of people are at a greater risk of suffering from depression, including:

➤ **YOUTH:** more than 250,000 Canadian youth (6.5% of individuals between the ages of 15 and 24) experience major depression each year;

➤ **OLDER ADULTS:** approximately 7% of seniors exhibit some symptoms of depression. This can be triggered by the loss of a spouse, a shrinking circle of friends, or the onset of an illness. It is also much more common among seniors living in care homes or who are suffering from dementia; and

➤ **WOMEN:** depression is diagnosed twice as much in women as it is in men. Some reasons for this difference may include life-cycle changes, hormonal changes, higher rates of childhood abuse or relationship violence, and social pressures. Since women are usually more comfortable seeking help for their health-related issues than men, it is possible that depression amongst men is under-reported.

**DEPRESSION IS VERY TREATABLE. IN FACT, WITH THE RIGHT TREATMENT, 80% OF INDIVIDUALS WITH DEPRESSION FEEL BETTER OR NO LONGER EXPERIENCE SYMPTOMS AT ALL.**

applications are great. Not only is there a lack of treatment for cognitive deficits in mental illness, but the brain improvements suggest the molecules could help to prevent the memory loss at the beginning of Alzheimer’s disease, potentially delaying its onset.”

“The current drugs used to treat depression were discovered by chance. Therefore, these other drugs are not based on the knowledge of what is deregulating the brain,” he continued. ➔

## SEX DIFFERENCES IN DEPRESSION

From early adolescence through adulthood, women are twice as likely as men to experience depression. A recent study, conducted by Dr. Naomi Eisenberger and colleagues, posits one reason why this may be the case, particularly for the kinds of depression that may be inflammatory in nature.

The researchers discovered that inflammation induces anhedonia in women, but not in men. Anhedonia is a common feature of depressive disorders, and is defined behaviourally by persistently low motivation and inability to experience pleasure or joy in things or activities.

In this study, over 100 healthy men and women were randomly assigned a placebo or a low-dose endotoxin, a substance that increases inflammation in a safe, time-limited manner. The researchers then measured activity in the reward region of the brain (i.e. the ventral striatum), while the participants completed a task in which they anticipated monetary reward.

## THE RESEARCHERS FOUND THAT WOMEN WITH GREATER INFLAMMATORY RESPONSES SHOWED LESS BRAIN RESPONSE IN ANTICIPATION OF POTENTIAL REWARDS, BUT THE RELATIONSHIP WAS NOT PRESENT IN MEN.

These findings - which were published in *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* in July 2019 - suggest that "women with chronic inflammatory disorders may be particularly vulnerable to developing depression through decreases in sensitivity to reward," said first author Dr. Mona Moieni, a postdoctoral researcher in Dr. Eisenberger's laboratory. "Clinicians who treat female patients with inflammatory disorders may want to pay close attention to these patients for possible onset of depressive symptoms."

"We, however, are doing the opposite. Our work and research are directly informed by the pathology of the brain. Simply put, other drugs address the symptoms, not the illness. **Our target reverses some aspect of the pathology - not just symptoms, but underlying mechanisms, and *this* is what is creating the excitement.**"

Dr. Sibille noted that the unmet therapeutic need and huge burden on quality of life of cognitive dysfunctions (for affected individuals and their respective families, as well as on the health care system more generally) highlight the urgency for a solution.


Dr. Sibille also indicated that the original research findings were more "robust" in females than males. This is particularly encouraging in light of the fact that women experience higher rates of depression and Alzheimer's disease than their male counterparts.

## MANAGE YOUR BRAIN HEALTH, TODAY

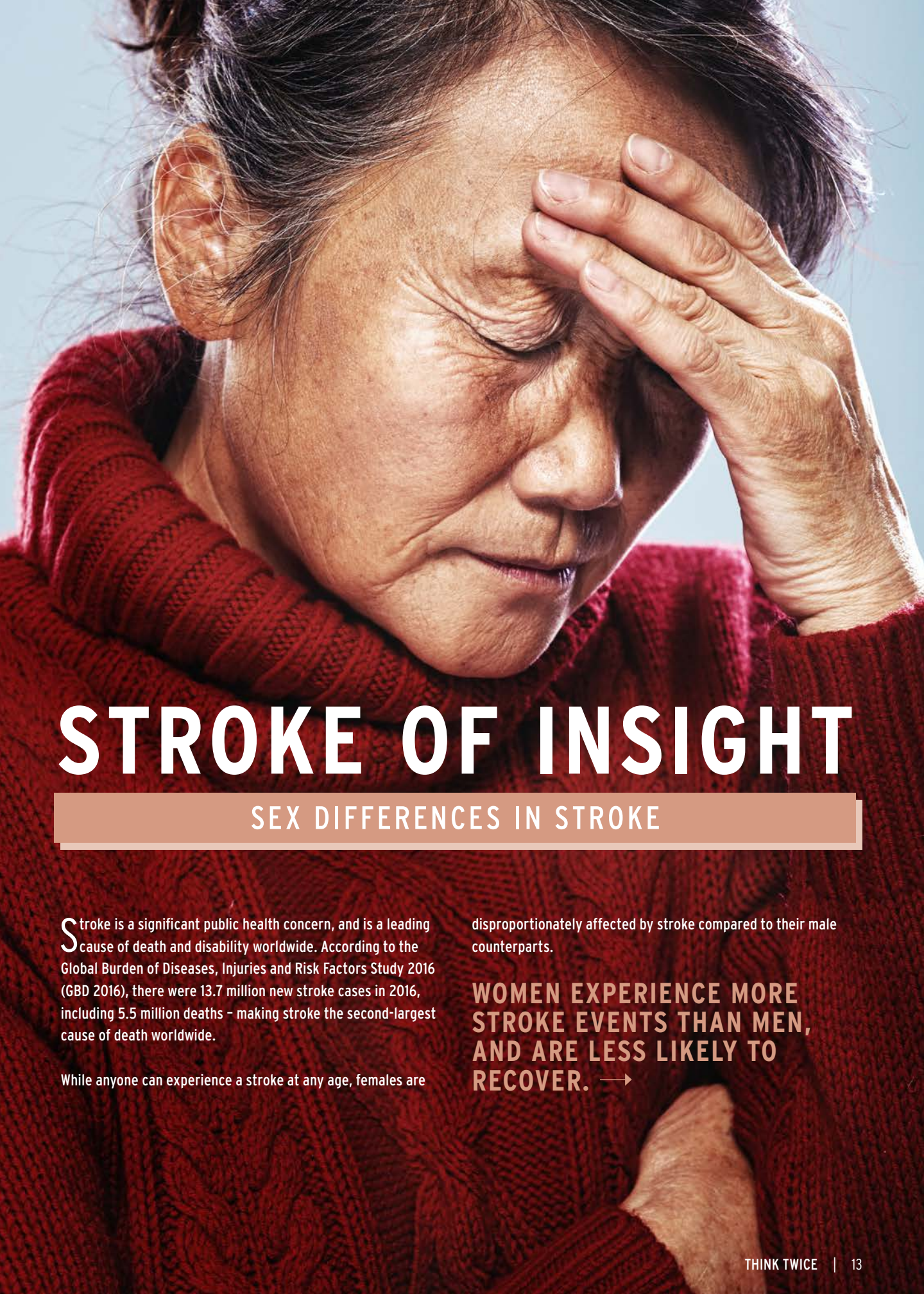
The evidence to date about the relationship between depression and brain aging reinforces the importance of managing your brain health at all stages of your life, and, in particular, learning what preventative measures you can take to help minimize or avoid depression. This includes, amongst other things, managing your stress levels - perhaps by engaging in regular exercise, eating a healthy diet, and/or practicing mindfulness meditation.

As we get older, there are various milestones that may impact our state of mind such as retirement, moving to a care facility, changing financial security, serious illness, or the death of a loved one.

## WHILE THE TIME TO HEAL OR ADAPT CAN VARY FROM INDIVIDUAL TO INDIVIDUAL, IT IS IMPORTANT TO BE COGNIZANT OF THE SYMPTOMS OF DEPRESSION, AND TO ASK FOR HELP AND SUPPORT WHEN YOU NEED IT.

If you are experiencing symptoms of depression, it is critical to talk to someone - whether that person is a family member, a friend, or a doctor. Help is also available through your local distress centre or crisis service, or you can even visit your local emergency department. There are also various educational resources available online, including on CAMH's website ([www.camh.ca](http://www.camh.ca)). 





# STROKE OF INSIGHT

## SEX DIFFERENCES IN STROKE

Stroke is a significant public health concern, and is a leading cause of death and disability worldwide. According to the Global Burden of Diseases, Injuries and Risk Factors Study 2016 (GBD 2016), there were 13.7 million new stroke cases in 2016, including 5.5 million deaths - making stroke the second-largest cause of death worldwide.

While anyone can experience a stroke at any age, females are

disproportionately affected by stroke compared to their male counterparts.

**WOMEN EXPERIENCE MORE STROKE EVENTS THAN MEN, AND ARE LESS LIKELY TO RECOVER. →**



## WHAT IS A STROKE?

A stroke or “brain attack” occurs when blood flow to the brain is disrupted, killing off cells in affected parts of the brain. There are two types of stroke:

- **ISCHEMIC** – when a blood clot cuts off blood flow to the brain; and
- **HEMORRHAGIC** – when an artery in the brain ruptures or leaks blood.

Ischemic strokes are much more common than hemorrhagic, but hemorrhagic strokes are more often fatal.

Elderly women, in particular, are especially vulnerable.

## WOMEN HAVE MORE STROKE EVENTS

The risk of stroke is different for women and men, and varies depending on the age group. According to an academic review conducted by Alyana Samai and Dr. Sheryl Martin-Schild (published in 2015 in *Vascular Health and Risk Management*), middle-aged women are at decreased risk of stroke, and older women are at increased risk of stroke, compared to men.

“Although the exact age ranges varied among the studies we reviewed, the general consensus is that women experience decreased risk for stroke compared to men while they are between the ages of roughly 40 and 75 years,” said Ms. Samai, currently the Director of Stroke Services at West Jefferson Medical Center in New Orleans. “But after the age of about 75, women become more likely than men to experience a stroke. In fact, they are at about 50% greater risk.” It is not surprising that women, as a collective, experience a higher number of stroke events than men, given their longer life expectancy and the higher incidence rate of stroke in the 75-and-over age bracket.

## MORE WOMEN DIE OF STROKE, HAVE WORSE OUTCOMES AFTER STROKE, AND ARE MORE LIKELY TO EXPERIENCE RECURRENT STROKE

Various research studies indicate that more women die as a result of stroke than men. “Based on the estimates available when we conducted our review, women account for approximately 60% of stroke deaths,” noted Ms. Samai.

Additionally, women who survive strokes tend to experience worse outcomes than men. “Our review found that after stroke, women are more likely to have more severe disabilities, need help with activities of daily living and walking, and be discharged to a nursing home than their male counterparts.”

An earlier review conducted by L. Christine Turtzo and Louise D. McCullough – published in 2008 in *Cerebrovascular Diseases* – reported similar findings. In particular, the researchers noted that after an acute ischemic stroke, only 22.7% of women were fully recovered by six months after stroke compared to 26.7% of men. They also observed that women are more likely to be severely disabled when discharged (36.1% of women versus 24.2% of men).

It is important to note that the differences between the sexes when it comes to outcomes after stroke may be, at least in part, the result of confounding factors (i.e. they might be explained by factors other than simply being female or male). For example, outcomes after stroke in women may be affected by the fact that women are generally older than men when they experience their first stroke (74.5 years on average versus 69.2 years for men), and they are more likely to live on their own at the time of the stroke, which may impact how quickly they receive medical attention.

The researchers also found that among those between the ages of 40 and 69 who had experienced a first stroke, 22% of women experienced a recurrent stroke within five years, compared to 13% of men. Among those aged 70 years and older, 28% of women experienced a recurrent stroke within five years versus 23% of men. Whether women are receiving the medications proven to prevent a recurrent stroke at the same rate as men is a matter of debate, and an area in need of further research.

## WHAT IS BEHIND THESE SEX DIFFERENCES?

Given that women are disproportionately affected by stroke, researchers are very interested in determining the underlying cause (or causes) for these sex differences.

## IT TURNS OUT THAT THERE ARE MANY RISK FACTORS FOR STROKE THAT ARE UNIQUE TO WOMEN.

One group of researchers, led by Dr. Kathryn Rexrode, conducted a comprehensive review of the research to date in order to identify stroke risk factors that are unique to women. The results of their findings were published in 2018 in *Stroke*. “Although most strokes can be attributed to traditional vascular risk factors that occur in both women and men – including high blood pressure, high cholesterol, diabetes, smoking, and atrial fibrillation – there are several stroke risk factors that are specific to women,” explained Dr. Rexrode, Chief of the Division of Women’s Health at Brigham and Women’s Hospital and Associate Professor of Medicine at Harvard Medical School.

“Our research revealed several factors that elevate stroke risk among women, including getting your first period before the age



of ten years; experiencing menopause at a young age (i.e. under 45 years); low levels of the hormone dehydroepiandrosterone (DHEAS); and taking oral estrogen or combined oral contraceptives." The researchers also reported that pregnancy and peripartum (a few weeks before and after childbirth) are periods of time associated with increased risk of stroke. In addition, complications of pregnancy - in particular, pregnancy-related hypertension, gestational diabetes, and pre-eclampsia - are associated with long-term risk of stroke.

## HOW TO LOWER YOUR RISK OF DEATH OR DISABILITY FROM STROKE

There are two key ways that individuals can lower their risk of death or disability from stroke:

- 1** Do what you can to address any modifiable risk factors for stroke. According to the U.S. Centers for Disease Control and Prevention, up to 80% of strokes could be prevented by making healthy lifestyle choices and working with your doctor to control any health conditions that are known to increase stroke risk; and
- 2** Know the warning signs for stroke, and call 911 immediately if you experience any of them.

### MODIFIABLE RISK FACTORS

There are certain stroke risk factors - such as gender, age, and family history - that cannot be controlled. However, there are many lifestyle-related risk factors that are within your power to control and can lower your risk of experiencing a stroke, including:

- Unhealthy diet;
- Cigarette smoking;
- Excessive alcohol and drug abuse;
- Physical inactivity; and
- Stress.

Not everyone who has a known risk factor will experience a stroke, and not everyone who is fortunate enough to have none of the risk factors will be assured of not having a stroke. "Many of the stroke risk factors that have been identified are extremely common, yet only a fraction of the women who have one or more of them will have a stroke in their lifetime," emphasized Dr. Rexrode.

"While women shouldn't be excessively worried if they have a risk factor, it is helpful for them to be aware of any elevated risk," continued Dr. Rexrode. "Hopefully that knowledge will motivate women to make the healthiest lifestyle choices possible to decrease their risk, and keep them alert for any possible stroke symptoms so that they can seek medical attention quickly if necessary."

### KNOW THE WARNING SIGNS AND BE FAST

Many stroke-focused organizations promote a quick checklist of six items to keep in mind when assessing whether you might be experiencing a stroke. The first letter of each item, when combined, spell the words "**BE FAST**" - a useful acronym that can help you remember the following:

**BALANCE:** Are you having difficulties with balance or coordination?

**EYES:** Are you experiencing suddenly blurred or double vision, or a sudden loss of vision in one or both eyes?

**FACE:** When you smile, does one side of your face droop or does your face feel numb?

**ARMS:** Is one of your arms weak or numb? When you raise both arms, does one drift downward?

**SPEECH:** Is your speech slurred or jumbled?

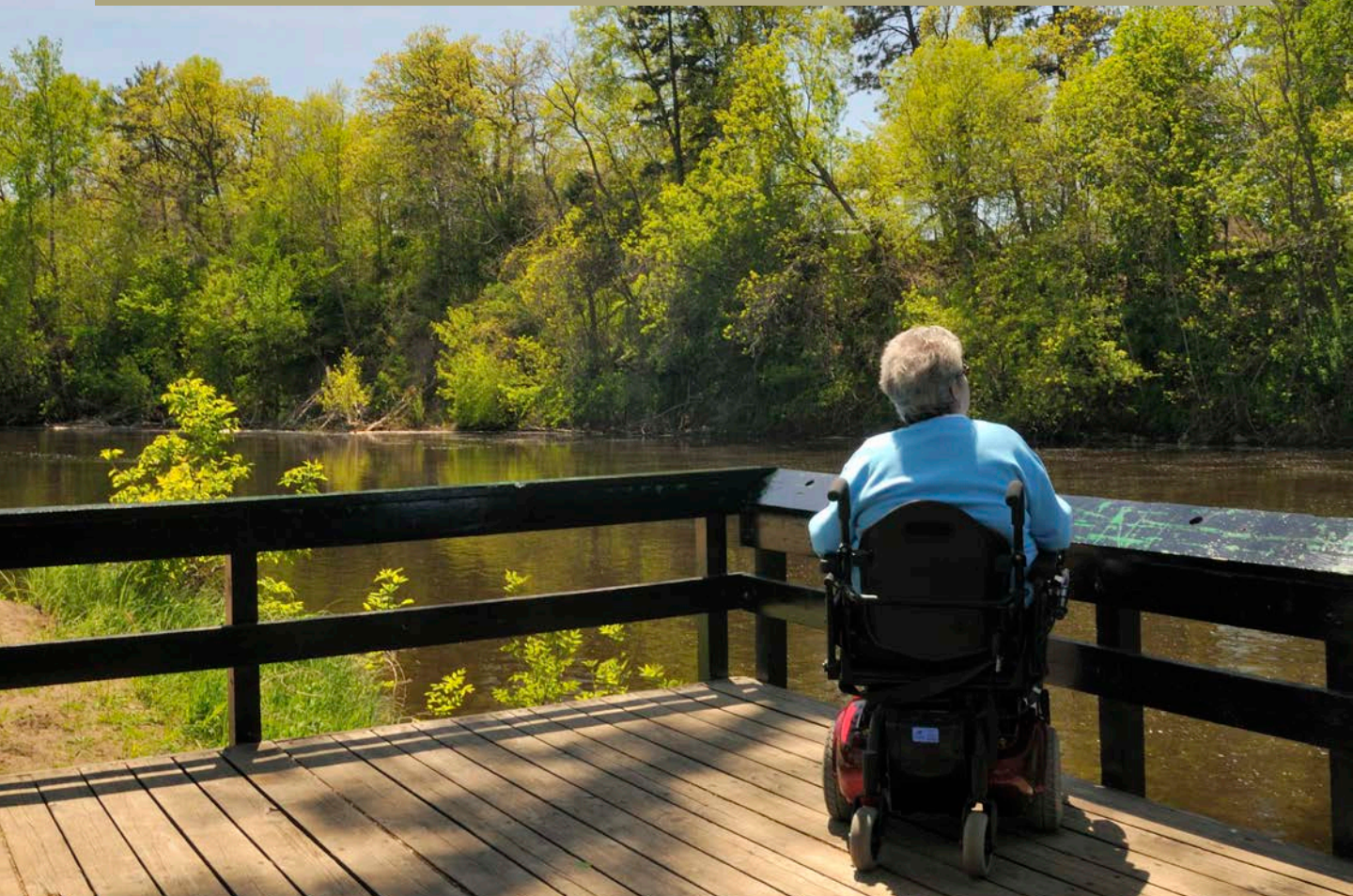
**TIME:** Call 911 or emergency medical services.

If you are experiencing one or more of the abovementioned symptoms, then you need to call an ambulance immediately. Do not drive yourself to the hospital. Time is truly of the essence: individuals lose approximately two million brain cells every minute during a stroke. Knowing the warning signs and symptoms of a stroke may be the difference between recovery and disability. 🧠



# MULTIPLE SCLEROSIS

## WHY ARE WOMEN MORE AT RISK?



**M**ultiple sclerosis (MS) is an autoimmune disease in which the body's immune system mistakenly attacks myelin, the "insulation" that surrounds and protects nerves in the brain and the spinal cord (i.e. the central nervous system or CNS). This process of demyelination can lead to neurodegeneration and the development of permanent disability.

Resulting MS symptoms vary widely from person to person, and can fluctuate within one individual over time, depending on which part(s) of the CNS is/are affected. Potential MS symptoms include dizziness, bladder or bowel dysfunction, cognitive impairment, depression, fatigue, optic neuritis (inflammation damaging the optic nerve), pain, numbness/tingling, sexual dysfunction, tremor, weakness, and/or difficulty talking, swallowing, or walking.

**RELAPSING-REMITTING MS (RRMS) IS THE MOST COMMON FORM OF THE DISEASE, CHARACTERIZED BY EPISODES OF SYMPTOM FLARE-UP (I.E. RELAPSES OR EXACERBATIONS) FOLLOWED BY PERIODS OF PARTIAL OR COMPLETE REMISSION.**

Over time (typically decades), individuals with RRMS often stop

experiencing relapses and remissions, and instead begin accumulating neurodegeneration slowly but consistently. When this occurs, these individuals are said to have secondary-progressive MS (SPMS).

A small number of people with MS (approximately 10%) do not experience an initial relapsing-remitting phase and instead experience steady neurodegeneration from the beginning of the disease. This type of MS is referred to as primary-progressive MS (PPMS).

### **MS IS BECOMING MORE PREVALENT, ESPECIALLY AMONG WOMEN**

The worldwide prevalence of multiple sclerosis was estimated as part of the Global Burden of Diseases, Injuries, and Risk Factors Study 2016 (GBD 2016). The researchers reported - in the March 2019 issue of *The Lancet Neurology* - that there were over 2.2 million cases of MS globally (or 30.1 cases per 100,000 people) in 2016. The prevalence rates were found to vary substantially from region to region, with Canada having the highest MS prevalence (estimated to be between 150 and 180 cases per 100,000 people). Overall, the global prevalence of MS was found to have increased by 10.4% since 1990.

## **IN FACT, THE NUMBER OF MS CASES HAS BEEN ON THE RISE FOR AT LEAST SIX DECADES, AND IT IS THE PREVALENCE OF MS AMONG WOMEN THAT IS DRIVING THE OVERALL INCREASE.**

It has been recognized for a long time that MS affects women in greater numbers than men, and the gap between the sexes has grown even wider in recent years. The ratio of women to men reported to have MS in 1955 was 1.4 to 1. By the 1980s, that ratio had shifted to 2 to 1, and, by the mid-2000s, for every man with MS, there were three women with the disease.

There is evidence that the increase in the female-to-male ratio of MS has occurred because of an increased incidence in women, not because of a decreased incidence in men. Although one driver of the rising prevalence of MS could be better detection and diagnosis, this does not explain why the incidence of MS has not risen as drastically in men.

### **WHY IS MS ON THE RISE?**

It is not clear why some people develop MS and others do not, and why the prevalence rate is on the rise among women. MS is not a contagious disease, nor is it directly inherited.

## **A COMBINATION OF GENETICS, ENVIRONMENTAL FACTORS, AND LIFESTYLE FACTORS ARE LEADING CONTRIBUTORS TO A DIAGNOSIS OF MS.**

"Because the rapid increase in MS prevalence has occurred over a fairly short period of time, genetics alone cannot account for what is happening," said Dr. Shannon Dunn, a scientist at the Keenan Research Centre for Biomedical Science in Canada who specializes in studying MS and, in particular, the role of sex in disease risk. "Genes could not have changed that quickly, so it is likely that changing environmental or lifestyle factors are interacting with female sex to increase MS risk."

While it remains unclear as to why women are at an increased risk of developing MS, researchers are exploring the various factors that may be involved.

### **>> AUTOIMMUNE RESPONSE**

Women have more robust immune responses than men. When women's immune systems are faced with an infectious agent, they typically respond in a pro-inflammatory way (except during pregnancy). Men's immune systems, on the other hand, tend to respond in an anti-inflammatory way. Inflammation is known to play a role in MS.

### **>> SEX HORMONES**

When a disease affects more women than men, researchers commonly consider the role of sex hormones. Immune cells have hormone receptors, so it is not surprising that sex hormones influence immune system function. There is a variety of evidence that suggests sex hormones do, in fact, play a role in MS. For example:

- » MS rates are similar (and low) between girls and boys before puberty, and after puberty the females begin to experience higher rates of the disease. Furthermore, young women who get their first period at a younger age appear to have an increased risk of developing MS compared to those who get it at an older age.
- » Pregnancy impacts remissions and relapses in MS. During →

Dr. Shannon Dunn is currently leading studies to examine why early onset of puberty increases one's risk for developing CNS autoimmunity, and why being overweight as an adolescent increases the risk predominantly in females.



pregnancy, women tend to experience a reduction in MS symptoms, which can be followed by flare-ups once the baby is born. (Pregnancy involves hormonal changes, and tends to suppress the mother's immune system so that her body does not reject the fetus.)

- » MS symptoms in women vary throughout the menstrual cycle.

There have been some shifts in women's reproductive patterns over the past 50 years that may be affecting MS risk by impacting hormone levels. Women are having fewer children, on average, than they once did, and there is a shift towards women having children at an older age. Preclinical studies using animals suggest that during pregnancy the hormones progesterone and estriol induce anti-inflammatory and neuroprotective effects, explaining why delayed or fewer pregnancies could be a disease-promoting factor.

An academic review conducted by Dr. Maunil K. Desai and Dr. Roberta Diaz Brinton - published in April 2019 in *Frontiers in Endocrinology* - looked at the risk of autoimmune disease (including MS) in women across the lifespan, and found



## CLEAR EVIDENCE FOR THE ROLE OF SEX STEROIDS IN THE IMMUNE DISTURBANCES THAT RESULT IN AUTOIMMUNE DISEASES.

The researchers emphasized that most women pass through the various endocrinological transition states (i.e. puberty, pregnancy, and menopause) without developing autoimmune diseases. However, a small percentage of women emerge from such transitions with an increased risk of the disease because of sustained hormonal changes combined with genetic susceptibility, exposure to environmental factors, and epigenetic influences.

### »» EXPOSURE TO SUNLIGHT & VITAMIN D

Evidence to date suggests that sunlight exposure, and the associated higher levels of vitamin D, offers protection against developing MS. And, the protective effects appear to be stronger in females than males. Studies with mice have shown that vitamin D3 supplementation significantly inhibits experimental autoimmune encephalomyelitis (EAE) in the females, but not the males. Further, when female mice had their ovaries removed, it eliminated the protective effect, suggesting a link between female hormones and vitamin D3 metabolism.

In addition, vitamin D has been shown to have a direct modulatory effect on the expression of the major MS risk gene. With the reconi-

tion that UV exposure puts individuals at an increased risk of skin cancer, sun exposure habits have changed at the population level over the last few decades. The resulting reduction in UV exposure could be yet another contributor to the rise in MS in women.

### »» OTHER POTENTIAL FACTORS

- » Studies have uncovered a link between having a **higher body mass index** in childhood and MS risk. Women usually carry more body fat than men, and obesity rates are higher for women.
- » **Gut microbiota** (i.e. the bacteria, viruses, and fungi that line the gastrointestinal tract) are known to affect immune responses. There may be sex-specific differences in gut microbiota that have consequences for the development of MS.
- » **Exposure to chemicals** may be playing a role in the increased MS risk experienced by women. Environmental estrogens, in particular, may be impacting the immune system, and can be found in some cosmetics and personal care products, which are more commonly used by women.
- » **Smoking** may be contributing to the increasing prevalence of MS among women. It is known to be a risk factor for MS, and the female-to-male ratio of smoking has been on the rise since the mid-1930s.

### »» COMPLEX COMBINATIONS OF FACTORS ARE LIKELY INVOLVED

Many factors potentially affecting the prevalence of MS among women are being researched, but it is likely that no single factor will be solely responsible for the increased risk women face. "This research is complex because MS is a complex disease. It is likely a combination of these factors, and maybe others that have yet to be identified, are at play. And, perhaps the factors differ from person to person," explained Dr. Dunn.

"This is why research in animal models of the disease are powerful in that we can modulate just one of these factors and see what the impact is on MS-like disease in the males and females. Certainly, more research is required not only in animal models, but also in humans to fully understand what is driving the female-dominated increasing MS risk, and to discover interventions to prevent, delay, and treat this disabling disease. Given the many sex-specific differences in so many of the factors known to affect MS, it's also likely that effective MS interventions will need to be catered differently for women and men." 🌐

Experimental autoimmune encephalomyelitis (EAE) is an illness used to model human CNS demyelinating diseases, including multiple sclerosis, in animal studies.



# HER GREY MATTER MATTERS

SEX DIFFERENCES SHAPE THE SEARCH FOR PRECISION THERAPEUTICS

**A**lzheimer's disease (AD) affects more women than men, and not just because women tend to live longer. Almost 70% of Canadians and Americans living with the disease are women. What is unique about women that makes their brains more vulnerable to AD? →

**Perimenopause** is commonly defined as the period of time starting when the first changes related to approaching menopause begin, and ending one year after the final menstrual period. Changes in the menstrual cycle can begin four to eight years before menopause, but the average length of perimenopause is four years.

Dr. Lisa Mosconi, Director of the Women's Brain Initiative and Associate Director of the Alzheimer's Prevention Clinic at Weill Cornell Medical College/NewYork-Presbyterian Hospital, has been investigating this question for some time and has made various discoveries that are informing the search for interventions targeting AD.

### CHANGES IN WOMEN'S BRAINS DURING THE MENOPAUSE TRANSITION THAT AFFECT AD RISK

Using brain-imaging techniques, Dr. Mosconi and colleagues have made several important findings about what transpires in women's brains during the menopause transition.

## PERIMENOPAUSAL AND POST-MENOPAUSAL WOMEN SHOW SIGNS OF CHANGES IN THEIR BRAINS THAT ARE CONSISTENT WITH WHAT HAPPENS DURING THE COURSE OF AD.

These changes are highest in the brains of post-menopausal women and intermediate in peri-menopausal women, and include:

- A decline in glucose metabolism (i.e. hypometabolism). Glucose is the primary fuel source for cellular activity in the brain;
- Increased accumulation of amyloid beta (A $\beta$ ). The amount of A $\beta$  accumulation is most pronounced in menopausal women who are APOE4-positive. APOE4 is the primary genetic risk factor for late-onset AD; and
- Reduced volumes of grey and white matter in AD-vulnerable regions of the brain.

Collectively, these findings indicate that AD-related changes in the brain begin early in the endocrine aging process for women, coinciding with the perimenopausal transition period. This is an important finding because it is known that AD develops over a long period of time and the outward symptoms of cognitive and memory problems do not become evident until much damage has already occurred in the brain.

These early physical changes discovered in the brains of middle-aged women will provide something for researchers to look for to indicate potential AD risk, rather than having to wait for symptoms of AD to become evident (at which time it may be too late for treatments to work effectively).

"Our results suggest there may be a critical window of opportunity, when women are beginning the menopause transition, to detect signs of higher Alzheimer's risk and apply interventions to help reduce the risk," noted Dr. Mosconi.

### THE ROLE OF ESTROGEN

What might be causing these changes in women's brains at this time in their lives? Estrogen plays an important role. "All hormones are involved, but estrogen is key to regulating the entire system for energy transformation in the brain," explained Dr. Mosconi.



## ESTROGEN LEVELS DECREASE AS WOMEN GO THROUGH THE MENOPAUSE TRANSITION. SO IT'S NOT SURPRISING THAT AS ESTROGEN LEVELS FALL, BRAIN CELLS BECOME MORE VULNERABLE TO AGING AND DISEASE.

If declining estrogen levels result in dysfunction in the brain, it would seem that treatments to boost estrogen levels during perimenopause and postmenopause could be beneficial for the brain. Yet, clinical trials of hormone replacement therapies (HRT) have reported mixed findings about the effects on dementia risk.

This may be because of differences in the type of estrogens used, as well as the timing and length of administration. Additional research is needed to determine whether there are situations in which HRT is consistently effective, and to address concerns about safety. (Some research has found links between HRT and



increased risk of heart disease, blood clots, and breast cancer.)

## THE ROLE OF GENETICS

As previously mentioned, APOE4 is a known genetic risk factor for AD. Dr. Roberta Brinton and colleagues investigated how the presence of APOE4 combines with poor metabolic profile (i.e. impaired glucose metabolism) and affects cognitive performance in postmenopausal women. The researchers found that the association between poor metabolic profile and a reduction in cognitive performance was more apparent in women with an APOE4 allele.

These findings - published in January 2019 in *Menopause* - suggest that APOE4 plays a role in cognitive function as women age in a complex way.

## NOT EVERY INDIVIDUAL WHO HAS AN APOE4 ALLELE DEVELOPS AD.

Accordingly, it is likely that there are other factors that interact with this genetic factor to influence AD risk.

## THE ROLE OF INFLAMMATION

Dr. Brinton and Dr. Aarti Mishra examined the role of inflammation in an academic review published in 2018 in *Frontiers in Aging Neuroscience*, concluding that the inflammatory immune response might be a unifying factor that "bridges" across other risk factors for AD - in particular, age, menopause, and APOE4 genetics.

It is known that inflammation is evident in the brain early in the AD process and worsens during the course of the disease. However, treatments targeting inflammation have failed in clinical trials. The complex relationship between inflammation, age, menopause, and genetics suggests a need for greater refinement when selecting patient populations to try anti-inflammatory therapies. In other words, it is possible that the effectiveness of anti-inflammatory therapies varies depending on the underlying cause of an individual's chronic inflammation.

## THE SEARCH FOR AD TREATMENTS

Earlier this year, the U.S. National Institute on Aging awarded Dr. Brinton's research lab US\$5.9 million over five years to study the sex differences that influence the prevalence of AD and to search for treatments. Dr. Mosconi is Co-Principal Investigator on the grant, focusing on the brain-imaging aspects of the research. The research team is looking for therapeutic targets for precision medicine interventions for both women and men during the early stage of AD, when there

is the best potential for preventing, delaying, and reversing disease progression.

Because AD is a multifactorial disease (meaning, it is a disease caused by many contributing factors), individual responses to interventions will vary. Women and men will likely require different interventions, and there may be further refinement needed even among women as a group, and men as a group.

## INDIVIDUALS WHO ARE AT AN INCREASED GENETIC RISK OF AD MAY REQUIRE DIFFERENT TREATMENT STRATEGIES THAN THOSE WHO HAVE AN INCREASED RISK DUE TO CERTAIN LIFESTYLE FACTORS.

All of this makes the search for treatments very complex.

## HOW TO REDUCE YOUR RISK OF AD NOW

It is important to keep in mind that while all women go through the menopause transition, not all women will develop AD. In fact, most women will transition through perimenopause "without experiencing any long-term adverse effects," emphasized Dr. Mosconi. "However, a substantial proportion of women do emerge from the transition with an increased risk of neurological symptoms."

It is reassuring to know that research is currently underway seeking targeted treatments for AD. In the meantime,

## THERE ARE STEPS THAT YOU CAN TAKE NOW TO IMPROVE YOUR ODDS OF NOT DEVELOPING AD.

Scientists have estimated that one in three cases of AD are the result of modifiable risk factors. For example, there is evidence that a healthy diet can help with some of the symptoms of menopause and minimize the risk of AD. Many foods (such as soy, flax seeds, chickpeas, and garlic) naturally boost estrogen production.

Antioxidants are important, too, and can be found in berries, citrus fruits, some nuts, and many leafy green vegetables. Other healthy lifestyle choices can help as well, including being physically active, participating in intellectually-stimulating activities, being social, and addressing hypertension and diabetes (if you have either of these conditions). 🍷



# MUM'S THE WORD

MATERNAL RISK FOR ALZHEIMER'S DISEASE



**A**dvanced age is the most significant risk factor for late-onset Alzheimer's disease, and having a parent with the disease is the second. It is estimated that individuals with a first-degree relative with Alzheimer's disease (AD) have a four- to ten-fold higher risk of developing AD than individuals who have no family history. However, research suggests that the level of AD risk might vary depending on whether a person's mother or father (or both) has the disease.

#### **AD RISK: CHILDREN OF AD-AFFECTED MOTHERS ARE AT HIGHER RISK**

Although it increases a person's risk of developing AD to have at least one parent with the disease, it appears that when that parent is the mother, the risk is even higher. →



## AMONG INDIVIDUALS WITH AD WHO HAVE ONE AFFECTED PARENT, THE RATIO OF MOTHER-TO-FATHER BEING THE ONE AFFECTED IS APPROXIMATELY 3:1.

It is important to note, though, that even though there is an increased risk for children of mothers with AD, many of these individuals do not go on to develop the disease.

### BRAIN PHYSIOLOGY: AD-LIKE CHANGES IN THE BRAIN MORE COMMON IN INDIVIDUALS WITH MATERNAL HISTORY OF AD

Numerous studies have examined the biological markers of AD (i.e. physical signs in the brain associated with the disease) to determine whether these markers vary in cognitively-normal individuals who have either a maternal or paternal history of AD versus individuals with no family history. Maternal history has been linked with alterations in the Alzheimer's biomarkers, while paternal history and no family history have not.

### HYPOMETABOLISM IN THE BRAIN

In an academic review published in February 2010 in *Human Genomics*, Dr. Lisa Mosconi and colleagues described how brain imaging studies using a particular kind of positron emission tomography (PET) scan revealed that cognitively-normal individuals with a mother with AD had reduced metabolic rate of glucose in regions of the brain associated with AD, compared to the rate in those with a father with AD or no family history. There was no difference found between the children of fathers with AD and children of parents with no AD. "Over a two-year follow-up interval, the reduction in glucose metabolism in participants with an AD mother got progressively worse," explained Dr. Mosconi, Director of the Women's Brain Initiative and Associate Director of the Alzheimer's Prevention Clinic at Weill Cornell Medical College/NewYork-Presbyterian Hospital. "This suggests that children of AD-affected mothers who have progressive reductions in glucose metabolism in AD-regions of the brain may be in the preclinical stages of Alzheimer's disease, although further studies are needed to confirm this."

### REDUCED GRAY MATTER VOLUME

In another 2010 academic study (published in the January 2010 issue of *Neurology*), Dr. Robyn Honea and colleagues used magnetic resonance imaging (MRI) scans to compare gray matter volume in cogni-

tively-normal adults with either a family history of AD on the mother's side or the father's side, or without any family history. Having less gray matter volume is associated with late-onset AD. The researchers found that a maternal family history of AD was associated with reduced gray matter volume in areas of the brain that are known to be AD-vulnerable.

### AMYLOID-BETA ACCUMULATION

Dr. Mosconi was also involved with research that used a type of PET scan to look for amyloid-beta in the brains of 42 individuals with healthy brain function. Amyloid-beta plaques are a hallmark of AD. While not everyone who has these plaques develops AD, their presence does increase the risk of the disease. Participants were divided into three equal groups: 14 with mothers who had AD, 14 with fathers who had AD, and 14 with cognitively-healthy parents. "The PET scans revealed that cognitively-normal individuals with a parental history of late-onset Alzheimer's disease - either mothers or fathers - had a higher amount of amyloid-beta plaques in AD-affected brain regions, as compared to people with no family history," explained Dr. Mosconi. "But, it was those with maternal history who were affected the most. They had a higher amount of amyloid-beta that was more widespread in their brains." These findings were published in March 2010 in *PNAS*.

### WHAT IF BOTH PARENTS HAVE AD?

Although having one parent with AD is a major risk factor, research suggests that a person with two AD-affected parents is at even greater risk of developing the disease (as compared to those with one affected parent, or none). Dr. Mosconi and colleagues conducted research - published in March 2014 in *Neurology* - that looked at common AD biomarkers in the brains of 52 participants who were split evenly into four groups: maternal AD history only, paternal AD history only, maternal and paternal AD history, and no AD history.

The participants, aged 32 to 72 and dementia-free, underwent MRI and PET scans to compare their gray matter volume, amyloid-beta accumulation, and brain glucose metabolism. The findings revealed that those with a maternal history of AD had higher levels of amyloid-beta and hypometabolism than those with a paternal history, while both of these groups had similar (i.e. intermediate) reductions in gray matter volume. "The biggest changes we found in all three of the AD biomarkers, though, was in the group where both parents had AD," said Dr. Mosconi. "These findings suggest that those with two AD-affected parents are at the highest risk of all."

### IDENTIFYING GROUPS AT HIGH-RISK OF AD HELPS IN DEVELOPMENT OF TREATMENTS

"Detection of these types of AD biomarkers in cognitively-normal individuals with parental history of AD represents a unique opportunity to research therapies and, in particular, preventive interventions, potentially decades before onset of any symptoms," explained Dr. Mosconi. "That's important because treatments have the potential to work better at that early stage of disease, well before significant neuronal loss has occurred." 🌐

**Hypometabolism is a decline in glucose metabolism. Glucose is the primary source of fuel for the brain.**



# MARRIED TO ALZHEIMER'S

## SPOUSES OF THOSE WITH DEMENTIA FACE DRASTICALLY ALTERED MARRIAGES

When Dr. David Kirkpatrick and his wife, Clair, were told by a neurologist that she had Alzheimer's disease, she insisted that they watch a film together. It was *Away from Her*, a 2006 independent drama starring Julie Christie and Gordon Pinsent, which recounts the journey of a husband and wife weathering the onslaught of Alzheimer's disease. The film includes a heart-breaking storyline in which Christie's character develops a relationship with a fellow resident at a care facility as her disease

progresses, further testing the love of their respective spouses.

Dr. Kirkpatrick recalls how he and Clair laughed and cried as they watched the fictional narrative unfold. Neither of them knew whether the film would presage their experience, even though they both understood the dreadful implications of the diagnosis. He was trained as a geriatric psychiatrist. She was a successful clinical psychologist. —>

But professional credentials were no balm for the reality of first-hand experience.

“I wasn’t really ready for it,” said Dr. Kirkpatrick in a telephone interview with Mind Over Matter® from his West Vancouver home. “When it happened, it was an earthquake.”

He kept a journal to document his experiences, which he eventually turned into a book entitled *Neither Married Nor Single: When Your Partner Has Alzheimer’s or Other Dementia*. In it, he combines his personal accounts and psychiatric insights in order to delve into a lightly-explored topic: the effect of dementia on couples. Dr. Kirkpatrick’s book tackles the challenging questions about caregiving, grief, loss, love, and sex for those whose partners have dementia, and provides effective strategies for living and loving in an Alzheimer’s marriage.

“It’s meant to comfort and to teach, to tell people facing this experience that they’re not alone, and also that it’s normal to be conflicted,” said Dr. Kirkpatrick.

As mental health professionals, he and his wife readily sought counselling to help them cope with the diagnosis and the disease’s progression. As Clair’s condition worsened, and she became less aware, she would sometimes sit in the next room watching television while Dr. Kirkpatrick spoke to the counsellor.

## AS OFTEN HAPPENS WHEN A SPOUSE DEVELOPS DEMENTIA, HE GRADUALLY EVOLVED FROM PARTNER INTO CAREGIVER, AND STARTED TO MAKE DECISIONS FOR BOTH OF THEM.

Dr. Joel Sadavoy, Medical Director at Toronto’s Reitman Centre for Alzheimer’s Support and Training, told Mind Over Matter® that couples facing these challenges often experience what is referred to as “disenfranchised grief.”

“The nature of the relationship dramatically changes,” explained Dr. Sadavoy. “Embedded in that is grieving for a relationship that is still alive, but no longer what it was. Nobody is dead, but it is an experience of intense loss. Something has died.”

Dr. Kirkpatrick ultimately experienced one of the most traumatizing aspects of Alzheimer’s disease when his wife started to no longer recognize him. She had grown wary around him, with her recognition of her husband coming and going. One day she called the police, telling them that he was an intruder in their home. It was a tipping point. He checked Clair into a hospital and then into a long-term care facility, where she spent the final six years of her life.

While he visited her regularly, he tried to take care of himself as well: exercising, spending time with his children, and joining support groups where he could seek comfort from others going through similar experiences.

At the outset of his visits, he would introduce himself to Clair and sometimes she would recognize him, sometimes not. He would try to remind himself that it was the disease that was erasing him from her memory, not anything that he had done or failed to do.



**SHE DOESN'T KNOW WHO I AM, BUT I STILL KNOW WHO SHE IS AND ON A GOOD DAY I KNOW WHO I AM MYSELF AND THAT MAKES ME A BETTER PARTNER. I'D SAY TO BE HONEST I HAD MORE DIFFICULTY AT THE END AS SHE RECOGNIZED ME LESS AND LESS.**

Similar to the plot of *Away from Her*, Dr. Kirkpatrick recalled how Clair bonded with another resident in the care facility. On one particular visit, he walked into the common room only to find Clair holding hands with a male companion as they watched television. He chuckled at the memory.

“It was kind of sweet. He reassured me, ‘we’re just holding hands.’ I said, ‘that’s all right.’ We all need somebody, even in the darkest, latest stages of our deterioration. Often, but not always, we’ll still need somebody for comfort. To bond with, to hold hands with.”

Dr. Kirkpatrick noted that the relationship never progressed beyond the handholding stage, but there have been other prominent cases that have raised sensitive issues about the ways in which Alzheimer’s disease can reshape marriages.

The husband of retired U.S. Supreme Court Justice Sandra Day O’Connor, for instance, fell in love with another resident in a care facility. Justice O’Connor supported his relationship, noting that it brought him happiness after the disease had made him suicidal.

After American model, restaurateur, and lifestyle guru B. Smith developed early onset Alzheimer’s and lost her memories, her husband Dan Gasby publicly announced that he had struck up a



new romance. He and his girlfriend shared caregiving duties for his wife and described it as a loving and supporting relationship, even as they faced blistering attacks in the media.

Scottish media recently reported that an Aberdeen man named Bill Duncan, who was diagnosed with Alzheimer's disease in 2011, forgot that he had been married to his wife, Anne. But he fell in love with her again (believing that she was a new girlfriend), proposed for a second time, and got remarried in their backyard.

"It was absolutely magical," Anne told STV news. "I felt like I really was getting married again."

Dr. Sadavoy of the Reitman Centre noted that it is less common for those with Alzheimer's disease to begin a new relationship. More often they will withdraw and become less communicative.

## IN SOME INSTANCES, THERE IS A PHENOMENON KNOWN AS "SHADOWING," IN WHICH THE INDIVIDUAL WITH DEMENTIA LATCHES ON TO HIS OR HER SPOUSE, NOT WANTING TO BE SEPARATED.

Caregivers dealing with shadowing often report a feeling of claustrophobia, where they are constantly with their loved ones and are never allowed to do anything alone. Even taking a shower without interruption can be a challenge for a caregiver.

Dr. Sadavoy said that each relationship is different and requires a unique approach. "Some people just recognize that the disease has taken their partner away from them and have to accept that this has happened. There's a grieving process that needs to go on. It's a very complex thing."

### HE OFFERS FOUR KEY PIECES OF ADVICE FOR CAREGIVERS:

- 1 Learn as much as you can about the specific kind of dementia that your partner has developed;
- 2 Search for resources that will lead you to the kind of help that you will need;
- 3 Seek training for ways that you can develop the skills required to care for a person with dementia; and
- 4 Get emotional support for yourself.

The Reitman Centre offers special training programs for care-

givers, but Dr. Sadavoy worries that, in general, there are not nearly enough resources and tools available to the public.

Dr. Kirkpatrick struggled to deal with the challenges of the disease and is self-critical in his book.



PERHAPS IF I HAD BEEN A LITTLE LESS GRIEF-STRICKEN, IN LESS EMOTIONAL SHOCK OVER LOSING CLAIR ONE TEASPOONFUL AT A TIME, I MIGHT HAVE DONE SOME MORE MENTAL OR COGNITIVE HOMEWORK BACK THEN, MAYBE A LITTLE MORE READING ABOUT WHAT SHE WAS LIKELY EXPERIENCING.

He said that doctors and health care professionals tend to focus on the individual diagnosed, but could use more training in how to support the caregiver. His advice to couples who suspect dementia is to seek out a definitive diagnosis, as painful as it might be. He says to beware of the "punishing, altruistic trap that caregiving can become." Certainly support your partner, but also be proactive in finding professional care and support groups. He urges caregivers to "take care of [themselves] physically, emotionally, and socially." And, while the support of family and friends is crucial, do not hesitate to seek professional help.

Dr. Kirkpatrick wrote *Neither Married Nor Single* over the last three years of Clair's life and it was published nearly two years after she passed away in January 2017.

"I found it comforting and almost healing. My fingers are my therapist."

Through his book, he hopes that other couples facing the devastation of an Alzheimer's diagnosis can learn from his experiences and be reminded that they are not alone. 🌍

For more information about the Reitman Centre's programs to assist caregivers, please visit: [www.dementiacarers.ca](http://www.dementiacarers.ca).

A woman is performing a handstand against a white brick wall. She is wearing a white tank top and grey leggings. Her legs are straight and together, pointing upwards. Her arms are extended downwards, supporting her weight on a blue mat. Her head is tucked down, and her hands are clasped together near the floor. The background is a white brick wall.

# TAKE A STAND

THE UPSIDE & DOWNSIDE OF GETTING UPSIDE-DOWN

**H**eadstand (also known as “sirsasana”) is often referred to as the “king” of yoga poses because of its many health benefits. It can be an energizing inversion that strengthens the entire body, particularly the upper body and the core. Other benefits of headstand include improved blood and lymph circulation, stronger lungs, toned abdominal organs, better digestion, and relief from menopause symptoms. Beyond the physical benefits, though, headstand contributes to brain health and function. According to the editors at *Yoga Journal*, the pose calms the brain, reduces stress, and helps alleviate mild depression.

## HOW TO DO A SUPPORTED HEADSTAND SAFELY

If you are interested in giving headstand a try, it is strongly recommended that you do so with hands-on guidance from an experienced yoga teacher. Denise Davis-Gains – a seasoned yogi who teaches both yoga students and yoga teachers-in-training through her business, *Altas Studio*, in Cambridge, Ontario – has provided some tips on what you might expect as you work with a yoga instructor to add headstand to your practice.

»» “Headstand is an intermediate-to-advanced level pose so you may have a lot of work to do before you’re ready to attempt it,” explained Davis-Gains. “You’ll need to build strength in your shoulders and core, and ensure you have adequate shoulder mobility for starters. So, your instructor may have you practice other poses initially, to prepare your body for headstand eventually. Patience and perseverance are key.” Davis-Gains also pointed out that some individuals may not need a lot of training, though; some will be able to do a headstand on their first try and find ease in the pose quickly.

»» “Your instructor may have you practice headstand using props to modify the pose slightly and ensure safety,” Davis-Gains continued. “For example, you might be encouraged to try a ‘headless headstand’ where you use two stacks of blocks or two chairs to support your shoulders and take all of the weight out of your head and neck.”

»» “When you are ready to attempt headstand, you will likely begin by holding the pose for a very short period of time,” said Davis-Gains. “You will then increase the time you stay in the pose very gradually as you gain experience and strength. Remember, the goal is a sense of ease in the pose. You should be able to breathe evenly and not feel like you’re straining at all.” →

## HEADSTAND INSTRUCTIONS

As Denise Davis-Gains notes, there are several different forms of headstand. “The one that I teach is **supported headstand**, where the forearms are resting on the floor and support a significant amount of the body’s weight,” she explained. If you plan to try headstand on your own at home, Davis-Gains provided the following instructions to help you do so safely:

- » Find a corner where you can practice. This provides two walls of support to help you balance once you are up.
- » Warm up your neck and shoulders before attempting the pose.
- » Get down on your hands and knees, with your head pointing toward the corner. Place your hands, with fingers interlaced and wrists rolled inward, eight to ten inches from the corner. Rest your forearms on the ground with elbows shoulder-width apart.
- » Place the top of your head on the ground, with the back of your head pressed up against your firmly-clasped hands.
- » Press your legs straight and begin walking your feet toward your hands.
- » Raise your legs up into the air until they are aligned directly above your head/torso. You can raise your legs either one at a time or both at once. You may need to rest your heels against the walls from time to time to maintain balance. If you find it too challenging to go directly up to a straight-leg position, you might try initially bending at the knee joint and placing your feet on the walls until you feel steady.
- » Breathe slowly and deeply while you are in the pose, focusing on keeping most of your weight in your forearms. Only stay up for five breaths or less on your first attempt.
- » To come down, slowly lower your feet back to the ground, returning to a hands and knees position with the crown of your head still touching the floor. Pause there briefly, then slowly lift your head and come to kneeling or sitting. Pause again for a breath or two before getting up. Taking your time to come out of the pose is important in order to allow your body to reacclimate slowly to being upright again.



## SAFETY IS CRITICALLY IMPORTANT

Working with an experienced yoga teacher or making sure that you approach headstand in the safest way possible at home (as described above) is critical. “While headstand, when done correctly, can be amazing, it also has the potential to cause injuries,” warned Davis-Gains.

According to a 2019 research paper published in the *American Journal of Respiratory and Critical Care Medicine*, by P. Chabra and colleagues, there have been reported cases of headstands causing multiple injuries, including musculoskeletal, neurological, and ophthalmic injuries. Some of these injuries are caused by exposing the head and neck to weight, and others are caused by increased blood pressure in the upper body.

## WHO SHOULD AVOID DOING HEADSTAND?

While headstand has the potential to provide wide-ranging benefits, the pose is not suitable for everyone. For instance, people with back or neck injuries, high blood pressure, stroke, eye problems, or a heart condition should not attempt the posture. Also, people who experience migraines or balance issues might want to avoid headstand as it may aggravate those conditions. The pose should be avoided during pregnancy, unless the woman already has a well-established headstand practice (in other words, pregnancy is not the time to begin doing headstand).

## ALTERNATIVES TO HEADSTAND

If headstand is not suitable for you for any reason, there are many other inversion poses that you could try that provide similar benefits, including:

- » **Dolphin;**
- » **Tripod headstand with knees on elbows;**
- » **Bridge;**
- » **Legs-up-the-wall;**
- » **Downward-facing Dog.**

These inversion poses can help you build a solid foundation for doing headstand in the future, or they may be performed as an alternative to headstand.

Davis-Gains emphasized that there is no need to fear headstand, and pointed out that the pose can be instrumental in helping people build confidence off the yoga mat. While the pose definitely is not for everyone, it is not something we should all shy away from.

“When our kids go out to play and try new things with their bodies like somersaults and cartwheels, they often come home with minor ‘injuries’ but we don’t discourage them from continuing their play-based experiments. We recognize that sometimes to learn something new and experience benefits in our bodies, we need to take some chances in life,” she said. “Sometimes we have to be willing to take a calculated risk to learn and grow. Headstand can be like that. It’s a pose that many people could do safely if they approach it with patience and, ideally, expert guidance.” 🧘



**DOWNWARD-FACING DOG:** This pose provides a partial inversion, with the head below the hips. It also opens and strengthens the upper body;

**DOLPHIN:**

This pose provides a partial inversion while strengthening the core and upper body, and opening the shoulders.



**TRIPOD HEADSTAND WITH KNEES ON ELBOWS:**

This variation of tripod headstand is a partial inversion that allows you to build upper body strength, work on balance, and experience placing some weight on the crown of the head.

**BRIDGE:**

This pose is a partial inversion, with the head slightly below the hips. It will help you open through the front line of the body, from collarbones to knees.



**LEGS-UP-THE-WALL:**

This is a relaxing partial inversion, with the feet above the head/heart. If done with the lower back resting up on a bolster, it also elevates the heart slightly above the head.

# STAND AHEAD™

## FOR WOMEN'S BRAIN HEALTH

On **December 2nd**, in support of **Women's Brain Health Day**, join thousands of others and take part in the Stand Ahead™ Challenge to stand up against research bias and stand ahead for women's brain health.

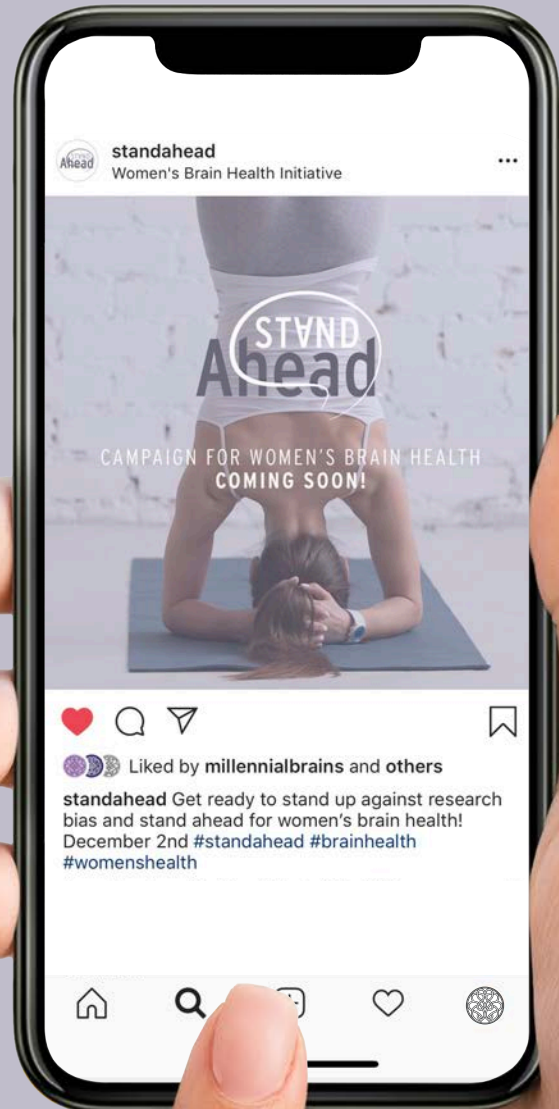
### DID YOU KNOW....

- Almost 70% of those with Alzheimer's disease are women.
- Women with early memory changes decline about twice as fast as men and end up worse off, too.
- Women suffer from depression, stress, and anxiety twice as much as men.
- Women take longer to recover from concussions and have more severe symptoms than men.
- Four times as many women have multiple sclerosis as men, and more and more women are developing it.
- Stroke disproportionately affects women: more women die of stroke, women have worse outcomes after stroke, more women are living with the effects of stroke, and women face more challenges as they recover.

Despite these alarming statistics, the vast majority of research into these disorders focuses on men.

Women's Brain Health Initiative (WBHI) helps protect women's brain health by focusing its resources on **research** to combat brain-aging disorders that disproportionately affect women, and by creating compelling **preventative health programs**, grounded in science, so that there is a greater understanding of the best ways to **protect our brain health** and **prolong our cognitive vitality**.

*\*Safety is critically important and the headstand pose is not suitable for everyone. Individuals participating in the Stand Ahead™ Challenge do so at their own election and at their own risk. Women's Brain Health Initiative is not responsible, and specifically disclaims responsibility, for any loss, injury, liability, cost, damages, and/or claims arising from or in relation to the Stand Ahead™ Challenge. For further details, please visit [standahead.org](http://standahead.org).*





## WHAT YOU DO

Post date for the Stand Ahead™ Challenge is  
**December 2, 2019**



1. Film yourself (or have someone film you or your designate) safely doing a headstand
2. On December 2, 2019, post the picture or video and use the hashtag **#StandAhead**
3. Follow and tag **@StandAhead** on Instagram
4. Explain who you/your company or group is/are Standing Ahead for (i.e. your mom, grandmother, sister, friend, boss, women's brain health, etc.)
5. Donate individually or collectively to the cause at [standahead.org](http://standahead.org)
6. Challenge two others to participate (they will have 48 hours to take the challenge)
7. Direct viewers to **standahead.org** to donate and learn more

## FIND OUT MORE

If you would like to learn more about the Stand Ahead™ Challenge, please visit **standahead.org**.

If you are unable to complete a headstand, simply nominate someone to **#StandAhead** on your behalf, and share a photo of you beside him or her as you stand up for women's brain health.

## YOU CAN HELP

The Stand Ahead™ Challenge aims to increase awareness and donations that allow WBHI to reach more - and teach more - through a dynamic and interactive experience, giving you the opportunity to share how you are standing up against research bias and standing ahead for women's brain health, supporting the vital work that we do, and challenging others to participate.



## EXAMPLE INSTAGRAM CAPTION

I/We are participating in the Women's Brain Health Initiative **#StandAhead** Challenge to stand up against research bias and stand ahead for women's brain health! [I am/We are] standing because [insert reason]. Who are you standing for?

\*Do a Headstand\*

I/We challenge [list two other friends or another company/branch and tag them on the Instagram post] to **#StandAhead**! You have 48 hours to complete the challenge and donate to **@StandAhead**. Time starts now!

View all comments



**wanderfulsoul** Challenge accepted 🙌

2s Reply

**FOR MORE POST EXAMPLES, VISIT STANDAHEAD.ORG**

## WHERE DOES THE MONEY RAISED GO?

Funds raised through the Stand Ahead™ Challenge support the research and education programs of Women's Brain Health Initiative.

## LEVERAGING YOUR GIFT

Funds raised for women's brain health research through the Stand Ahead™ Challenge will be matched by Brain Canada.

# BEST BRAIN BOOSTS

## TAKE CONTROL OF YOUR COGNITIVE DESTINY

WE ALL WANT OUR COGNITIVE HEALTH SPAN TO MATCH OUR LIFESPAN. FORTUNATELY, THERE IS INCREASING EVIDENCE THAT DEMENTIA IS NOT INEVITABLE AND EXCEPTIONAL HEALTH INTO OLD AGE IS POSSIBLE. THE FOLLOWING ARE SOME OF THE BEST WAYS TO HELP BOOST YOUR BRAIN HEALTH, PROVIDE A BUFFER AGAINST COGNITIVE DECLINE, AND KEEP YOUR BRAIN FUNCTIONING THE WAY THAT YOU WANT.

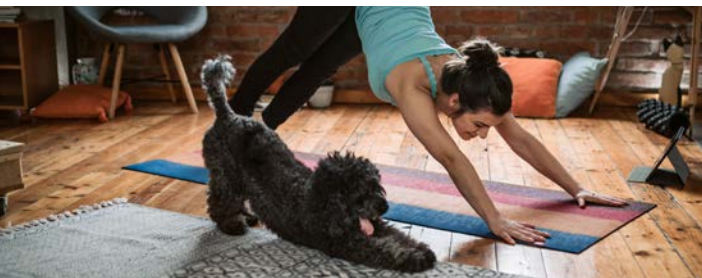


### EXERCISE

Aerobic exercise increases blood flow and oxygen to your brain, reduces inflammation, and enhances the birth of new neural stem cells. Incorporate flexibility and balance exercises, as well as weight training, in your workout routine to guard against brain shrinkage.

### SLEEP

A good night's sleep - approximately seven hours - helps remove the toxins associated with Alzheimer's disease from your brain, assists in the consolidation of memories, and improves focus, coordination, and overall mood.



### RELAX

Chronic levels of stress prematurely age your brain and increase your risk of cognitive impairment. Controlled breathing, meditation, or yoga can help alleviate stress and anxiety, and can also increase brain density.

### MENTAL STIMULATION

Learning a new, challenging skill strengthens the neural networks in your brain and builds cognitive reserve. Try learning a musical instrument, a new dance, or even another language in order to protect your memories.







## SOCIALIZE

Having an active social life increases brain activity and reduces stress and depression, both of which are risk factors for Alzheimer's disease. Social isolation can be as detrimental to our health as smoking or being overweight.

## NUTRITION

The "MIND" diet - which combines a Mediterranean-style diet (fish, fruit, vegetables, olive oil, nuts, and whole grains) with the "DASH" diet (low sodium to control hypertension) - contributes to a healthy brain and a healthy heart. Even moderate adherence to the MIND diet has brain-boosting benefits.



## CREATIVITY

A creative outlet can improve your mental clarity. Creativity relieves stress, increases and renews brain function, improves communication between different parts of the brain (which is vital to preventing cognitive deterioration), and improves overall mood.

## GREEN SPACES

Consistent exposure to urban environmental factors (such as air pollution and noise), as well as living a stressful, sedentary lifestyle, may contribute to cognitive deterioration. Living near green spaces appears to have the opposite effect.



## POWER DOWN

Our brains are not programmed to be "switched on" all of the time, so a digital detox can be an effective way to give your brain a rest and reduce stress levels. Unplugging on a regular basis can help maintain a healthy balance between "real life" activities and the digital world.

## HEART HEALTH

Not surprisingly, what is good for your heart is also good for your brain. The same measures that protect against cardiovascular disease (such as engaging in regular exercise, maintaining a healthy diet, lowering cholesterol levels and blood pressure, and quitting smoking) also protect against Alzheimer's disease.







### DAYDREAM

Daydreaming not only lights up the brain areas that handle routine daily activities, but also activates the executive network of the brain, where complex problem-solving happens. So, do not be afraid to let your mind wander occasionally.



### READING

Whatever your reading choice may be, reading is a stress-reducing activity that can lower your heart rate and blood pressure, improve your memory, enhance your brain's connectivity, increase your brain power, and even enhance your empathic skills.

### MUSIC

Music can be medicine for your mind, with benefits from memory improvement to stress relief. Musicians tend to have bigger, better-connected, and more sensitive brains, and older adults with musical backgrounds score higher on cognitive tests and show greater mental flexibility.

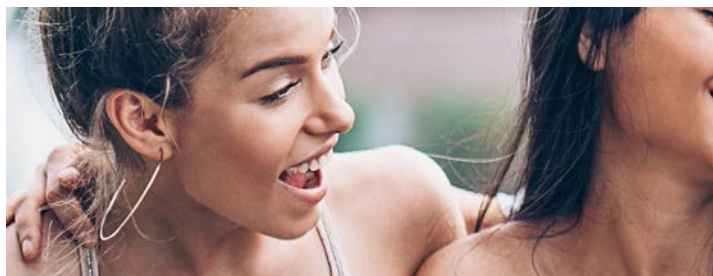


### DANCING

Dancing prepares your brain for prime learning by pumping blood to your brain and boosting your mental capacities by building new neural paths that make information transmission faster and better. Dancing also helps you have a better outlook in life, decreasing your risk of stress and depression.

### START YOUNG

Do not wait until the signs of cognitive decline appear. Be proactive now. Good brain health is a lifetime commitment. The earlier you start making healthier lifestyle choices, the stronger the protective effect will be.





## GUT HEALTH

Organisms in our guts (gut microbiota) also influence our brains. There is a relationship between digestion, mood, health, and the way we think. Consuming fermented foods, high-fiber foods, and oily fish may help increase the beneficial bacteria in your gut and improve brain health.

## HOBBIES

Spending downtime on your favourite hobbies can make you happier, less bored, less stressed, and can lower your heart rate. Leisure activities are also a great way to increase productivity and job performance because they help boost creativity and give your brain a much-needed break.



## BILINGUALISM

Experts believe that you can slow the signs of dementia an additional five years by learning another language. Your brain builds cognitive reserve and stronger neural connectivity.

## DECLUTTER YOUR MIND

Focusing on the negative and worrying about things that are beyond your control wastes time and mental energy. Decluttering your mind from those mental habits is key to building more mental muscle.



## SMILE

Having a positive attitude, sense of humour, being optimistic, easygoing, extroverted, and expressing emotions (rather than bottling them up) can play a role in preserving neurons and creating new ones, lowering stress, and increasing your mood state.







# BY TRIAL & ERROR

## A PERSONAL DEMENTIA CLINICAL TRIAL JOURNEY

It was when she got lost on the way to the only cemetery in town that Cynthia Huling Hummel realized she had to leave the life that she knew and loved. She was a minister who was supposed to be leading a graveside ceremony, but she forgot how to get there.

“I had to give up my ministry because I couldn’t remember my people and their stories.”

Cynthia had noticed her own increasing forgetfulness. Her mother was living with Alzheimer’s and her mother’s brother had died of the disease. But until the day that she missed the funeral she believed that she was coping. Tests ensued and in the spring of 2011 came a hard diagnosis: mild cognitive impairment (MCI). Her beloved vocation as a minister was over at age 57. A woman of deep, abiding, and sustaining faith, Cynthia was devastated. But out of her heartbreak she found a new path, a new way to contribute to society.

“It’s easy to focus on all the losses and the things you can no longer do as well as you once did, but I’m trying to focus on what I can do

to make a difference,” she said in a telephone conversation with Mind Over Matter® from her home in Elmira, a small city in southern New York State.

She contacted the American Alzheimer’s Association and learned about its program called “Trial Match,” which connects researchers with individuals wishing to volunteer for clinical studies. Cynthia was led to the University of Rochester and Dr. Anton Porsteinsson, a professor of psychiatry and neurology. He is a contributor to a massive, multi-year study called the Alzheimer’s Disease Neuroimaging Initiative (ADNI), a public-private project involving researchers at 63 sites across the U.S. and Canada.

ADNI is a longitudinal study, which means that it is tracking the progress of the volunteer participants over several years and observing changes in their brains and behaviour. ADNI provides invaluable baseline data that is freely made available to researchers across the globe - data that has formed the basis for more than 1,000 scientific papers.



Cynthia made the two-hour drive to Rochester to meet Dr. Porsteinsson and to undergo several hours of examination. She was briefed on the study, asked to complete a consent form, and given the opportunity to consider whether she still wanted to participate. There were memory tests, an electrocardiogram, and blood work. The researchers needed to ensure that there were no other underlying medical conditions, that she did in fact suffer from cognitive problems, and that she fit into one of the specified test groups.

That was in 2011. Now Cynthia stands out as one of Dr. Porsteinsson's most inspiring volunteers.

"She kind of had to reinvent herself and she sure did," he said in an interview from his campus office.

"She's been incredible, not only with her participation, but also with her advocacy. She's been the epitome of resilience and adaptability."

Once a year, Cynthia drives to Rochester and visits the clinic where she has volunteered for the full range of tests, including a spinal tap. "I'm in it totally, everything they want I do. I love the doctors and nurses. They know about my life and family. I feel their care, their love."

## **SHE BECAME FASCINATED BY THE SCIENCE OF WHAT IS OCCURRING IN HER BRAIN. SOME PARTICIPANTS DO NOT WISH TO KNOW ALL OF THE DETAILS OF WHAT THE RESEARCHERS ARE OBSERVING.**

Not Cynthia. She wanted to know everything, even when a 2016 positron emission tomography (PET) scan revealed that her diagnosis had changed from MCI to early onset Alzheimer's disease.

Through her journey, Cynthia found a new calling as an advocate for Alzheimer's research and for those living with this devastating disease. She speaks at conferences, churches, and community organizations. Despite her prognosis, her voice is effervescent, her stories punctuated with laughter. A minister no longer, she still comes across as a joyous preacher.

"Just being able to guide other people, I think that's probably the biggest blessing, to walk with other people who've had a diagnosis and to help them on their journey. I always tell people this is my ministry. Alzheimer's is my ministry. It's not one I really wanted, but it's the one I got."

## **WHILE SHE STILL LIVES INDEPENDENTLY, CYNTHIA HAS HAD TO DEVELOP MECHANISMS TO HELP HER COPE WITH THE DISEASE.**

She relies heavily on her telephone, constantly setting reminders of appointments. She is surrounded by a circle of close friends who form her support network. She has asked them to closely observe changes in her behaviour and to be frank with counsel as the disease takes its inevitable course. She knows that the day will come when one of them will have to take away her car keys and when she will have to move from her home into a care facility. She is constantly in touch with her son and daughter, who both live a few hours' drive away.

"It's great she found this study. It's an outlet for her," said her daughter Emily Kawasaki in an interview from her home in Brooklyn. "I love it because her whole life, whatever she's done, she's looked for something with a mission. I'm really happy she's found this new passion."

It is also a comfort to Emily that her mother has strong support nearby. Caregiving can be a debilitating burden for the adult children of individuals with dementia. "She's found this right combination of self care and healthy living that works for her," she said. "Leaving the ministry was very unfortunate because that was her life, but in some ways her unintentional early retirement had this weird silver lining."

Finding willing participants for clinical studies is an endless and crucial challenge for researchers. Dr. Porsteinsson advertises for new participants across various media platforms and regularly conducts outreach sessions at community organizations. The ADNI project offers no direct benefit to volunteers, other than extensive information about their health. It is an observational study, as opposed to one that is testing a cure. But participants are motivated and committed. Very few drop out.

"They want to make a difference, to contribute to the field of knowledge," he said. "They find a sense of pride of purpose, a sense of value in what they do. And that does a lot for the human psyche."

## **THE RESEARCHERS VOCALIZE THEIR ADMIRATION AND GRATITUDE FOR THE CONTRIBUTION OF VOLUNTEERS. →**

"The research cannot be done without our research participants," said Dr. Jennifer Campos, senior scientist at the Toronto Rehabilitation Institute. "You can have the fanciest infrastructure and funding, but if you don't have the individuals, you won't go anywhere."

She and her research team seek out volunteers through extensive advertising via the internet and printed posters at hospitals, libraries, and community centres. The Alzheimer's Society of Canada's website has a helpful platform that allows researchers to post information about their studies and connect with volunteers.

Dr. Campos says that she and her colleagues do all that they can to make the research environment as welcoming as possible for participants, to ensure that they have a good experience, and to know that their contribution is valued. Some of her best volunteers are retired professionals, a few are in their 90s and were engineers, scientists, and teachers – people who understand the importance of research and who can offer learned perspectives.

"Research studies often don't pay that much. It requires people to be intrinsically motivated. It's a very unselfish endeavour," said Dr. Campos. But she laments that finding participants remains a great challenge for researchers.



## DESPITE THE FACT WE'RE USING ALL OF THESE MULTI-PRONGED APPROACHES, WE HAVE A POOR SUCCESS RATE WITH RECRUITMENT.

Dr. Campos noted that the national research network AGE-WELL is particularly effective in attracting volunteers for research projects. Its mandate is to promote the development and implemen-

tation of new technologies to assist individuals as they age.

AGE-WELL Scientific Director Alex Mihailidis told Mind Over Matter® that the network engages with older adults and caregivers in many ways, not only through research projects. They are invited to AGE-WELL's regular pitch competitions, where start-up companies show off their innovations. There are also less formal events, like pub nights, where older adults can mingle with young researchers. "A lot of it is driven by the students, they're the ones who want to establish these relationships," said Mihailidis.

AGE-WELL believes that it is essential to have meaningful participation and input from the people who will be using technological innovations. The network has an advisory committee comprised of older adults and caregivers. A person with dementia sits on AGE-WELL's Research Management Committee, which advises the board on all matters pertaining to the network.

"That's one thing we've been pushing, having end users involved from the beginning, getting their buy-in as to what we're achieving, not just with the end product, but also with the research," said Mihailidis.

While all research volunteers deserve the gratitude of the research community, few are such a force of nature as Cynthia Huling Hummel. On the day of her Mind Over Matter® interview, she had just returned from the Dementia Action Alliance Conference in Atlanta, where individuals with dementia gathered to share their insights and experiences.

"It was wonderful to be there and to see all the things that folks are doing in their communities to live a life of service." Although relentlessly positive on the telephone, she admitted to moments of sadness.

## SHE IS PAINED BY THE KNOWLEDGE THAT ONE DAY SHE MAY NOT RECOGNIZE HER OWN CHILDREN OR GRANDCHILDREN, JUST AS HER MOTHER EVENTUALLY DID NOT RECOGNIZE HER.

"But the heart remembers. Even if we might not remember their names, love never dies."

Cynthia has a care plan in place, her affairs are in order, and after her passing she will make one final contribution to research. "I'm going to donate my brain so that I can keep fighting this disease after my death. It makes me happy that I can continue. It's empowering." 🌍





# DON'T GET YOUR TINSEL IN A TANGLE

## TIPS FOR CAREGIVERS DURING THE HOLIDAYS

**W**hen you are actively caregiving, the holiday season may bring additional responsibilities to an already stressful situation. You may be feeling less than festive this year, which is completely understandable. In fact, it is common to feel more stress than usual around the holiday season – between food preparation, gift-giving, and social outings – and when you are a caregiver, the stress is amplified. “There are no holidays during caregiving. The care continues,” said Denise M. Brown, founder of CareGiving.com, a website dedicated to helping those who care for a family member or friend. “What changes during the holidays, typically, is there’s more to do.” The following article explores common issues that arise during the holidays, and offers useful tips for helping your holiday season go more smoothly. —>





## COMMON ISSUES THAT ARISE DURING THE HOLIDAYS

### 1. FEELING OVERWHELMED

The holiday season can be particularly overwhelming for caregivers, said Brown, between the stress of making a “perfect” holiday (because you are not sure if there is going to be another one), organizing events, and possibly hosting family. You may feel compelled to maintain family holiday traditions, but do not have the stamina or the desire to pull it off this year.

### 2. MIXED EMOTIONS

Your feelings may not align with how you think you should feel during the holiday season. Planning a holiday celebration on top of your normal caregiving responsibilities can be exhausting. What’s more, instead of the joy, happiness, and peace that those around you may be espousing, you could feel extreme grief about the changes that have happened in your family, which, in turn, can lead to disconnection and a “sense of loneliness and deep sadness,” Brown noted. Guilt can also surface when you realize that celebrating the holidays may not be a top priority for you this year, or when you are struggling to meet external expectations, said Lise Leblanc, a registered psychotherapist who practices in Ontario, and author of the book *Conscious Caregiving Guide*, which will be out in November 2019.

### 3. FAMILY FRICTION

If family members are coming in from out of town and they have not seen the caree (i.e. the individual being cared for) in a long time, they may be surprised by the changes in the person. Those family members may experience a variety of emotions, observed Leblanc, including sadness, grief, and/or shock. You may therefore have the extra work in advance of any celebration of “educating the family about a caree’s decline or preparing the family for what could be a difference in terms of a caree’s abilities or appearance,” added Brown. Alternatively, a family member could be in complete denial, which only adds to the caregiver’s emotional load. Difficult family dynamics that are normally present may be exacerbated during the holidays.

### 4. FORGETTING YOURSELF

With all of the additional tasks that you have to complete, it can be easy to forget to take care of yourself. “We don’t really take good care of ourselves during the holidays,” said Leblanc, and often the self-care that we do take time for (such as getting our nails done or taking a relaxing bath) can be nice, but they are often mere distract-



tions. “They don’t provide us with the permanent solutions that we need.” Leblanc suggests asking some deeper questions regarding self-care: “Are you reaching out? Are you letting other family members get involved in holiday preparations? Why are you over-extending yourself? Are you being the family hero?” Since the holidays intensify the day-to-day, they can expose routine issues that require greater attention.

## 5. JUST NOT IN THE MOOD

You may not be up to celebrating the holidays at all. “We hear this all the time,” noted Brown about her holiday open chatroom on CareGiving.com. “We open up the chatroom at noon Eastern Standard Time on Christmas Eve, and we keep it open for 36 hours.” Through this online platform, volunteers provide caregivers with extra support during the holiday season. People across the globe can access the chatroom and are encouraged to connect with others and learn useful information.

# CAREGIVING TIPS TO SAFEGUARD YOUR MENTAL AND PHYSICAL HEALTH DURING THE HOLIDAYS

## 1. PLAN AHEAD

Consider how you want your holiday season to look and plan early. “Start thinking about the Christmas holiday on December 1st, for instance, as opposed to on December 23rd,” recommended Leblanc. This way, you will have ample time to set realistic goals for your holiday season, reach out to family members or friends for assistance, and think about the ways in which you can make your experiences as positive as possible for yourself and your caree. “If you’re not having fun, your care recipient is probably not having fun either,” Leblanc noted. Schedule time for who and what you value above other non-essential obligations.

## 2. SET BOUNDARIES AND MODIFY TRADITIONS

Ask yourself what kind of holiday is going to work for you this year, and consider delegating certain tasks and activities to family members or friends. “You don’t have to do it all,” said Brown, “I think that’s the big message for family caregivers.” Go minimal with the décor, re-think gift-giving, or plan a potluck, for instance. While you may wish to keep everything the same, it is important to recognize that traditions can be “scaled back, tweaked, or revised.” Set your personal priorities and be flexible about what you may need

“moment to moment, day to day.” Keep your explanations simple regarding why your holiday celebrations might look different this year, and remember that you do not need to apologize to others.

## 3. REFRAIN FROM BIG TOPICS

Refrain from engaging in more difficult discussions about caregiving until after the holiday season. This is particularly important if some family members or friends have not seen the caree in several months or longer. You may wish to tell others in advance that you will not be talking about care plans, or having any kind of discussion related to caregiving, during the holidays. Alternatively, you can advise others in the moment that you would like to defer talks until the New Year, and instead focus on enjoying the festivities.

## 4. CHOOSE A COMFORTABLE ENVIRONMENT FOR THE CAREE

Consider having a smaller celebration where the caree lives, so as to cause the least amount of disruption to his or her day-to-day routines. If the care recipient feels uncomfortable outside of his or her own living arrangement, he or she may not be able to relax at the holiday dinner table. Leblanc recalls her own experience caregiving for her grandmother fifteen years ago, who was anxious when she was outside of her own living arrangement. “She would just pace around the house the entire time, repetitively asking where she was, not to mention toileting accidents,” Leblanc recalled, which made it difficult for everyone to enjoy the celebration. It may be preferable to do a smaller visit in the caree’s own environment and then another celebration elsewhere, if desired. Doing so may help avert any sense that the holidays have been ruined.

## 5. NOURISH YOURSELF

Put yourself first. Heading into the holidays, ask yourself whether you are getting enough sleep, eating well, and exercising. Keep connected to what grounds and nourishes you, whether that is prayer, journaling, or meditation. Reach out to your support system and consider joining a holiday chatroom.

## 6. ASK FOR HELP

Beyond the self-care basics, consider getting outside support. “I encourage people who are in caregiving situations to get a coach or a counsellor. Or it can be another caregiver or a friend, as long as it is someone who can really challenge you on why and what you’re doing,” said Leblanc. Where can you relieve yourself a little bit here and there? Look into secondary caregivers and explore all options in order to avoid burning out. The additional stress of the holidays may well propel you into seeking out the extra help you may need year-round. 🌍

# HERE'S THE RUB

## HEALTH BENEFITS OF SAUNAS, AROMATHERAPY, & MASSAGES

### SWEAT IT OUT

Sauna bathing, a form of passive heat therapy, is a traditional activity in Finland that is primarily used for relaxation purposes and is becoming increasingly common in many other populations. The typical Finnish sauna is characterized by dry air and relatively high temperature. The recommended temperature for a sauna bath is from 80 to 100 degrees Celsius at the level of the bather's head, but is lower at the floor level, which helps ensure efficient ventilation and comfortable bathing conditions.

**EMERGING EVIDENCE SUGGESTS THAT BEYOND ITS USE FOR PLEASURE, SAUNA BATHING MAY BE LINKED WITH SEVERAL HEALTH BENEFITS, INCLUDING A REDUCTION IN THE RISK OF HIGH BLOOD PRESSURE OR HYPERTENSION, STROKE, NEUROCOGNITIVE DISEASES, AND PULMONARY DISEASES.**

Research conducted in Eastern Finland by Dr. Jari Laukkanen and colleagues - published in *JAMA Internal Medicine* in April 2015 - found that middle-aged men (between the ages of 42 and 60) who had sauna bathing sessions four to seven times per week were at a reduced risk of sudden cardiac death, fatal coronary heart disease, and fatal cardiovascular disease, as well as a considerable decreased risk of all-cause mortality events.

More recently, the research team investigated the association between sauna bathing and the risk of dementia using the same cohort of middle-aged men. Their findings were published in the March 2017 issue of *Age and Ageing*. **The researchers discovered a strong inverse association between the frequency of sauna bathing and the risk of dementia and Alzheimer's disease, which was independent of known risk factors.**

The more frequently a participant used a sauna each week, the lower the risk of dementia. More specifically, among those participants who used a sauna four to seven times per week, the risk of dementia was 66% lower than among those who used a sauna just once a week, and the risk of Alzheimer's disease was 65% lower. **Dr. Laukkanen and colleagues noted, however, that these results are still early and further studies are needed to replicate these findings in different populations.**





After conducting a comprehensive review of the existing evidence (up until February 2018) on the various health benefits of sauna bathing, Dr. Laukkanen and colleagues concluded that “sauna bathing may be a remedy to the call for additional lifestyle interventions needed to enhance health and wellness, particularly in populations that have difficulty exercising, and also as an adjunct to exercise.”

The review article - which was published in the *Mayo Clinic Proceedings* in August 2018 - notes that the responses produced by an ordinary sauna bath correspond to those produced by moderate- or high-intensity physical activity such as walking.

Although the research team notes that sauna bathing is generally a “safe activity,” individuals should consult with their physicians before engaging in sauna sessions.

### THE SWEET SMELL OF SUCCESS

Aromatherapy is based on the theory that essential oils, derived from plants, have beneficial properties. Aromatherapy scents are released by warming oil in oil burners, adding it to baths, dripping the scent onto pillows and tissues, or massaging infusions of the oil into the skin with cream.

## THERE IS CLINICAL EVIDENCE TO SUGGEST THAT AROMATHERAPY MAY BE EFFECTIVE IN HELPING TO TREAT THE BEHAVIOURAL SYMPTOMS OF ALZHEIMER'S PATIENTS, SUCH AS AGGRESSION AND AGITATION.

Currently, the management of these symptoms often relies on the employment of antipsychotic drugs, which are usually used to treat people with schizophrenia or depression. However, not all antipsychotics have the same benefits, and risperidone is the only antipsychotic that is currently approved for the treatment of aggression in Alzheimer's disease (and is only licensed for short-term use).

Treating Alzheimer's behavioural changes with drugs intended for other mental health conditions - as opposed to its own discrete disease process - poses a significant problem, observed Dr. Giacinto Bagetta, a professor in the department of Pharmacy, Health Science and Nutrition at the University of Calabria in Italy. “It's a problem of unmet needs. We don't know how to treat Alzheimer's. We are trying to treat it with what we have.”

Long-term treatment with antipsychotics “may damage exactly what remains of the neural network,” warned Dr. Bagetta. What's more, these drugs have only a “modest” effect in treating those

with dementia, according to a study published in *JAMA* in 2005, “and [is] further complicated by an increased risk of stroke.” Because of the complexity of this issue and the lack of targeted pharmaceuticals, Dr. Bagetta and his colleagues are looking at aromatherapy for treating the behavioural effects of the disease.

**DR. BAGETTA IS QUICK TO NOTE THAT, EVEN THOUGH IT HAS BEEN AROUND FOR AGES, “VERY LITTLE IS KNOWN ABOUT AROMATHERAPY” SCIENTIFICALLY, AND THEREFORE ADDITIONAL RESEARCH MUST BE CONDUCTED IN ORDER TO BETTER UNDERSTAND THE WAYS IN WHICH ESSENTIAL OILS AFFECT THE BODY.**

According to Dr. Bagetta, there is evidence that most essential oils have anti-inflammatory properties, and many also have analgesic (i.e. pain-relieving) qualities. “Animal models have shown this, but good clinical evidence is still needed on humans.”

Some limited work with lavender essential oil has been shown to help improve symptoms of agitation in dementia patients. For instance, in one study published in the *International Journal of Geriatric Psychiatry* in April 2002, Dr. Clive Holmes and colleagues administered lavender essential oil through a steam diffuser for two hours per day, every other day, for a total of ten treatment sessions. **The researchers found that most patients experienced a lessening of agitation, though the sample size was quite small.**

Lemon balm has also been used to treat behavioural symptoms with success. In one study involving lemon balm - published in the July 2002 issue of the *Journal of Clinical Psychiatry* - participants with severe dementia experienced a lessening of what is referred to as “clinically significant agitation” when this essential oil was added to lotion and applied to the skin by caregivers.

**ALTHOUGH AROMATHERAPY CANNOT PREVENT OR CURE ALZHEIMER'S DISEASE, THE OUTCOMES AND EFFECTS OF ESSENTIAL OILS IN THESE LIMITED STUDIES “ARE NOT LESS THAN WHAT WE SEE WITH NEUROLEPTICS,” SAID DR. BAGETTA, AND THEY OFFER A SAFER TREATMENT OPTION FOR DEMENTIA PATIENTS THAN THE DRUGS CURRENTLY USED.**

What is still needed, Dr. Bagetta noted, is a large-scale, international clinical trial to test the efficacy of aromatherapy in humans. More →

work needs to be done, though, to change the composition of the essential oils in order to mask their well-known smells (so as to ensure proper placebo control).

Another challenge with using aromatherapy in clinical trials is guaranteeing the consistency of the particular oil components being tested, since many oils have different degrees of purity and complexity. These are expensive problems for scientists, and because aromatherapy is a “natural” treatment option, they do not attract significant investor or industry interest or funding.

Nalini Sen, Director of the Research Program at the Alzheimer Society of Canada, noted that research in aromatherapy and dementia to date has shown “that aromatherapy may be effective in helping people with dementia to relax,” and it can have a calming effect in some individuals “in the early to middle stages of the disease,” just as it does for those without dementia. (For instance, a review article published in 2018 in the *Journal of Contemporary Chiropractic* found that aromatherapy used in testing environments helped reduce “test anxiety” for college students.)

## AS ALZHEIMER’S DISEASE PROGRESSES, THOUGH, AN INDIVIDUAL’S SENSE OF SMELL CAN BECOME IMPAIRED, WHICH MAY ALTER THE EFFECTIVENESS OF AROMATHERAPY.

Sen nevertheless believes that no harm has been identified in using aromatherapy or experimentation with safe, familiar scents that might trigger memories, such as pine needles, chocolate, and cinnamon (often emitted through candles or microwaveable heating pads). However, with respect to any measurable effects in terms of disease progression, much more research needs to be done, she said, “as there is no concrete evidence that demonstrates that to date.”

### RUB IT IN

Similar to aromatherapy, massages may be useful for treating the behavioural symptoms of dementia. “There’s a small amount of evidence that massage therapy can help to manage symptoms associated with dementia, such as anxiety, agitation, and depression,” noted Sen.

A pilot study published in *Applied Psychophysiology and Biofeedback* in December 2018 investigated the effect of hand massage on stress and agitation levels in individuals with dementia. Nurses were asked to administer seven hand massages to male and female dementia patients over the course of three weeks, while the

researchers monitored salivary cortisol and alpha-amylase levels (both of which are indicators of stress).

After an initial increase in levels, cortisol and alpha-amylase levels had dropped by the end of the three-week period, which is a positive outcome. Agitation levels in the intervention group decreased as well in comparison to the control group, but just marginally.

The researchers concluded that multiple massages were needed to experience results, and they also called for more work to be done on the nurse-patient relationship and how that connection may be implicated in the positive results.

Another recent study - published in the *Evidence Based Care Journal* in 2018 - found that head and face massages applied to Alzheimer’s patients who were agitated had a beneficial effect on agitation levels.

## THESE PRELIMINARY FINDINGS SUGGEST THAT MASSAGE-BASED PRACTICE MIGHT BE AN EFFECTIVE TOOL FOR CAREGIVERS TO QUELL BEHAVIOURAL OUTBURSTS.

“Massage has been shown to relax the body and trigger a state of well-being,” said Sen. One study published in *Pain Medicine* in December 2018 examined the effectiveness of hand massage on the pain and anxiety of the “cardiac surgery critically ill” patients in a Quebec hospital. Those who received two 20-minute hand massages had significantly lower scores on “pain intensity, pain unpleasantness, and anxiety” than the control groups.

With Alzheimer’s disease specifically, patients may not be able to communicate their likes and dislikes as easily as they once did. “It depends on the stage of the disease that they’re in, in terms of how much feedback people may have, or the ability to express their preferences,” explained Sen.

Therefore, “it’s important to ask if they want to try it and see if there are any sensitivities they may have as it relates to being touched.” The goal is for the individual to enjoy the experience and hopefully feel calmer.

Like many of the complementary therapies, though, more research needs to be conducted to quantify results. **“Although massage therapy shows promise, so far studies haven’t been rigorous enough to provide solid evidence,”** Sen noted. It is always important to discuss options with doctors and primary care advisors before engaging in complementary therapies. 🌿



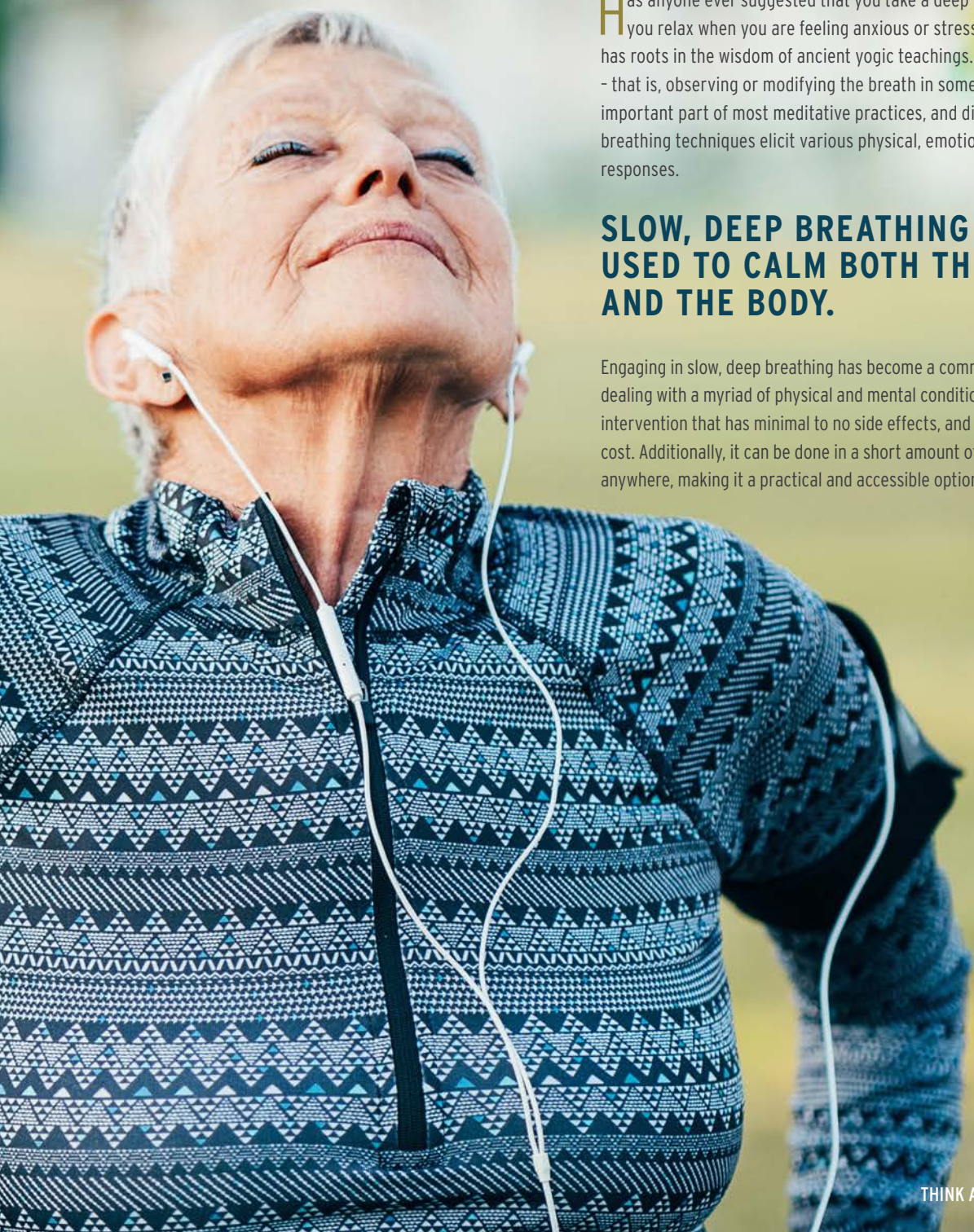
# IN THE SAME BREATH

TAKE A DEEP BREATH (OR TWO) FOR BETTER PHYSICAL & MENTAL HEALTH

Has anyone ever suggested that you take a deep breath to help you relax when you are feeling anxious or stressed? That advice has roots in the wisdom of ancient yogic teachings. Breathing - that is, observing or modifying the breath in some way - is an important part of most meditative practices, and different types of breathing techniques elicit various physical, emotional, and mental responses.

## **SLOW, DEEP BREATHING CAN BE USED TO CALM BOTH THE MIND AND THE BODY.**

Engaging in slow, deep breathing has become a common tool for dealing with a myriad of physical and mental conditions. It is an intervention that has minimal to no side effects, and has low to zero cost. Additionally, it can be done in a short amount of time almost anywhere, making it a practical and accessible option. Not →





Pranayama (breath control) is one of the “eight limbs of yoga.” It can be a standalone practice or performed as part of a yoga class. It involves becoming conscious of your breathing and using various techniques to regulate your breath. For example, during a pranayama practice, you might:

- » **change the pace/speed of your breathing (i.e. slowing it down or speeding it up);**
- » **manipulate your nostrils (i.e. hold one side closed while you breathe in the other);**
- » **create slight airway resistance in your throat;**
- » **hold your breath at certain points; and/or**
- » **chant humming sounds.**

surprisingly, then, breath work has expanded beyond yoga studios and is now being taught by doctors, counsellors, and other health professionals, who are familiar with the growing body of scientific research that is supporting what ancient wisdom has been telling us.

### **SLOW BREATHING LOWERS BLOOD PRESSURE**

Researchers in the U.S. recently conducted a meta-analysis of randomized controlled trials in order to learn more about the effect of slow breathing interventions on blood pressure. Dr. Ashish Chaddha and colleagues reviewed over 100 academic papers on the subject and included 17 studies in the meta-analysis (which pools results and analyzes them collectively).

All 17 studies involved a slow breathing intervention that had participants take ten or fewer breaths per minute, for five or more minutes, on at least three days each week, for a minimum of four weeks. (On average, people tend to breathe about 15 to 20 times a minute naturally.)

Each of the studies had a control group for comparison. The meta-analysis showed that the participants who took part in the slow breathing interventions experienced a modest reduction in blood pressure - an average reduction of 5.62 mmHg in systolic blood pressure, and 2.97 mmHg in diastolic blood pressure. These findings were published in the August 2019 issue of *Complementary Therapies in Medicine*.

A different group of researchers - Dr. Ananda Balayogi Bhavanani and colleagues from India - conducted a study that examined the immediate effect of a very short breath work session on blood pressure. The researchers had 22 participants with hypertension breathe slowly and deeply, at a rate of six breaths per minute, for

just five minutes. Each inhalation and exhalation was of equal length. Heart rate and blood pressure were measured before and immediately after the breathing session.

**The results showed that post-intervention, participants experienced a significant reduction in heart rate and a highly significant reduction in systolic blood pressure.**

“A fall in diastolic pressure was also noted, but it was statistically insignificant,” explained Dr. Bhavanani, Professor of Yoga Therapy at the Sri Balaji Vidyapeeth University. “Our findings suggest that it doesn’t take much time at all for slow, deep breathing to have an effect, although more research is needed to determine how long the beneficial effect lasts.” This research was published in 2011 in *International Journal of Yoga Therapy*.

### **BREATHING AGAINST RESISTANCE LOWERS BLOOD PRESSURE AND BOOSTS COGNITIVE FUNCTION**

A different kind of breathing research - which examines the effects of using a handheld device that provides resistance while you breathe, to help “strength train” your breathing muscles - has also demonstrated that deep breathing can lower blood pressure. This unique breath workout is referred to as “Inspiratory Muscle Strength Training” (IMST).

The experience of using the device has been described as similar to sucking hard through a straw, but with the straw sucking back. Multiple studies conducted to date by different groups of researchers have shown that using an IMST device for just five minutes per day over a six-week period results in a reduction in blood pressure.

Dr. Daniel Craighead, a postdoctoral fellow at the University of Colorado Boulder, and colleagues are currently involved in a study looking at the impact of IMST (performed for five minutes per day, six days a week, for six weeks) on blood pressure and cognitive function. Although their research will not be completed until late 2020, they recently shared some preliminary findings.

“Like other researchers before us, we’ve found that IMST training helps to lower blood pressure,” said Dr. Craighead. “We’ve also found that those in our IMST group are performing better on certain cognitive and memory tests compared to those in the control group, who are using a sham-breathing device that delivers low-resistance. Until the final results are in next year, we need to view our findings with some caution. However, so far, we’ve seen high compliance rates for using the device and no real side effects, so we’re very optimistic about the usefulness of this breath-training tool.”

### **DEEP BREATHING IMPROVES MOTOR MEMORY**

Another interesting study - conducted by different researchers in India - examined the impact of a 30-minute session of deep breathing on the retention of a newly-learned motor skill. In this experiment, all 30 participants learned to trace a circular path in

a fixed amount of time. Afterwards, one group of 16 participants completed a 30-minute breathing practice while the remaining 14 individuals (the control group) simply rested for the same duration.

The deep breathing group used an alternate-nostril technique and, with guidance from an auditory tone, made each inhalation last two seconds, and then held the breath for two seconds, followed by exhaling for four seconds. Both groups were retested on the previously-learned drawing task, immediately after the breathing (or rest) session and 24 hours later. Their findings were published in 2016 in *Nature Scientific Reports*.

"We discovered that the group that received the breathing practice retained the motor skill strikingly better than the control group, both immediately and 24 hours later," explained Dr. Pratik K. Mutha, an associate professor at the Indian Institute of Technology Gandhinagar and one of the authors of the study.



## OUR FINDINGS SHOWED, FOR THE FIRST TIME, THAT SIMPLE BREATHING PRACTICES CAN HAVE REMARKABLE EFFECTS ON COMPLEX FUNCTIONS SUCH AS MEMORY FOR MOTOR SKILLS.

### SLOW BREATHING PROVIDES A MULTITUDE OF BENEFITS

The previously-described studies only hint at some of the benefits of engaging in different kinds of slow, deep breathing. There are actually many more ways that this type of breathing can boost your physical and mental health.

An academic review conducted by Dr. Andrea Zaccaro and colleagues looked at 15 studies that explored the psycho-physiological benefits of slow breathing. Their review, entitled "How Breath-Control Can Change Your Life: A Systematic Review on Psycho-Physiological Correlates of Slow Breathing," was published in 2018 in *Frontiers in Human Neuroscience*.

The researchers found that slow breathing techniques promote changes in the physical body, which translate into changes in psychology/behaviour, including increased comfort, relaxation, pleasantness, vigor, and alertness, as well as reduced symptoms of arousal, anxiety, depression, anger, and confusion.

The authors note, though, that more research is needed in order to disentangle the effects of breathing control on its own, as opposed to the potential effects of other aspects of meditation (such as focused attention and mental imagery).

For a description of how to perform alternate-nostril breathing (nadi shodhana pranayama), visit <https://www.yogajournal.com/poses/channel-cleaning-breath>.

### WHAT'S HAPPENING IN THE BRAIN WHEN BREATHING IS CONSCIOUSLY CONTROLLED?

Innovative researchers - Dr. Jose L. Herrero and colleagues - made use of a rare opportunity to provide a glimpse into what is happening inside the brain when individuals pay attention to, or consciously adjust, their breathing in different ways. In the experiment, the researchers examined the brain activity of individuals who had electrodes implanted inside their brains as part of a medical treatment for epilepsy.

First, the researchers watched as the participants breathed normally while completing a simple task to take attention away from the breath. Then, they observed what happened when participants were asked to breathe more quickly or more slowly, while counting each breath.

### THE RESEARCHERS DISCOVERED THAT CHANGES IN BREATHING ACTIVATED DIFFERENT PARTS OF THE BRAIN.

There was some overlap between the parts involved in normal (i.e. automatic) breathing and those involved in intentional (i.e. consciously-altered) breathing. These findings - published in 2017 in *Journal of Neurophysiology* - provide scientific support for the age-old advice to take a deep breath when you are feeling stressed. Doing so actually alters your brain activity and allows access to areas of the brain that are not typically accessed through normal breathing.

### GIVE CONSCIOUS BREATHING A TRY

There is still much to learn about conscious breathing. For example, what types of breathing techniques (and for what duration) elicit which responses, and what exactly is transpiring inside the body to create those changes? However, there is no need to wait for science to have all of the answers before enjoying the bliss that ancient yogis told us that breathing can bring.

So, go ahead and try taking a slow, deep breath in now...and slowly release...and notice how you feel. It is quite remarkable that something so simple can help us shift our mood and mindset so quickly! Hopefully, now that you have learned about how powerful breathing can be, you will be inspired to pause and take a deep, mindful breath (or two) periodically throughout each day, or to experiment with some longer pranayama techniques. 🧘

# RAY OF HOPE

## VITAMIN D & BRAIN HEALTH

It has long been known that vitamin D - often referred to as the "sunshine vitamin" - is one of the most essential vitamins for our overall health because it regulates calcium in the body and maintains the integrity of bones. Over the past decade, though, our understanding of this vitamin's importance has expanded in response to a flood of research suggesting an association between vitamin D deficiency and a wide range of physical health problems such as cancer, cardiovascular disease, diabetes, and autoimmune diseases.



## VITAMIN D DEFICIENCY HAS ALSO BEEN LINKED WITH DISEASES RELATED TO MENTAL HEALTH AND BRAIN FUNCTION, INCLUDING DEPRESSION, SCHIZOPHRENIA, COGNITIVE IMPAIRMENT, AND DEMENTIA.

These interesting findings have been shared widely in the news, and, in response, sales of vitamin D supplements have skyrocketed as people try to prevent or treat health conditions by boosting their intake.

However, the public's enthusiasm for vitamin D supplementation may not be justified by the evidence collected to date. Yes, associations have been discovered between vitamin D deficiency and many illnesses (meaning, researchers have found that individuals who are deficient in vitamin D are more likely to have certain illnesses than those with sufficient vitamin D levels), but such associations do not prove causality. In other words, these research findings do not make it clear if vitamin D deficiency plays a role in causing the various illnesses, or if having one of the illnesses plays a role in causing vitamin D deficiency. Alternatively, it is possible that a separate variable could be at the root of both the vitamin D deficiency and the illnesses.

In this article, we'll examine some of the latest research findings about vitamin D's impact specifically on brain health.

### IS VITAMIN D LINKED TO DEMENTIA?

The research findings about the association between vitamin D deficiency and dementia have varied from study to study. This has led many researchers to consolidate and analyze evidence collected by others, in an attempt to reach a definitive conclusion. This type of consolidated research is called a "systematic review" or "meta-analysis." Below are summaries of two recent examples of this type of research:

➤➤ Researchers from China Medical University conducted a meta-analysis that analyzed the collective findings of ten studies, published between 2011 and 2017, which examined the relationship between 25-hydroxyvitamin D levels and dementia and Alzheimer's disease. 25-hydroxyvitamin D (25(OH)D) is the form that vitamin D takes after being processed in the liver. It can be measured in the blood, and is considered a good indication of the amount of vitamin D in a person's body.

When the data from the studies - involving more than 28,000 participants - was pooled and analyzed, a significant inverse relationship was found. For every 10 nmol/L increase in 25(OH)D level, the researchers found the risk of dementia decreased by 5% and the

### HOW MUCH VITAMIN D IS SUFFICIENT?

There is a lack of consensus in the medical community about what constitutes a "sufficient" level of 25(OH) D. Some consider levels of 20 ng/mL (50 nmol/L) sufficient, and levels below that deficient. Yet, others, including the Vitamin D Council, suggest 40 ng/ml (100 nmol/L) should be the cut-off between deficient and sufficient.

### HOW COMMON IS VITAMIN D DEFICIENCY?

It is estimated that 1 billion people worldwide are deficient in vitamin D. Older adults are more likely than other age groups to have vitamin D deficiency for several reasons, including low dietary intake, inadequate sun exposure, and decreased ability of the skin to synthesize vitamin D from the sun.

risk of Alzheimer's disease decreased by 7%. (Note that all of the studies were used in calculating the dementia risk, but only some of the studies looked specifically at Alzheimer's disease - a subtype of dementia - so the Alzheimer's risk percentage is based on a smaller set of data.) The researchers - Hanze Chen and colleagues - concluded that

## MAINTAINING ADEQUATE 25(OH)D LEVELS MAY LOWER RISK OF DEMENTIA AND ALZHEIMER'S DISEASE.

These findings were published in November 2018 in *Frontiers in Aging Neuroscience*.

➤➤ A research team from Canada and Australia undertook an assessment of the quality of systematic reviews that had been conducted up to June 2017 about the association between vitamin D and dementia. "Out of six meta-analyses we reviewed on the association between low vitamin D levels in the blood and dementia risk, five showed a positive association," said Dr. Fariba Aghajafari, an associate professor at University of Calgary and lead author of the study. These researchers concluded that **there may be an association between vitamin D status and dementia risk, but the strength of evidence collected to date is low.**

"Although the results of the reviews we assessed suggested a positive association between lower vitamin D levels and the development of dementia, our assessment of the quality of that research suggests that the findings should be interpreted with caution," continued Dr. Aghajafari. "More research, using well-designed meth-

odology, is needed to fully understand the nature of the relationship between vitamin D status and dementia risk." This research was published in June 2018 in *BJPsych Open*.

## IS VITAMIN D NEUROPROTECTIVE?

It seems likely that there is a relationship of some kind between vitamin D status and dementia. Accordingly, could increasing vitamin D levels provide some kind of a boost to brain health? This is a question that researchers have also explored extensively in studies involving both animal and human subjects.

Australian researchers conducted a systematic review - published in July 2018 in *Nutritional Neuroscience* - of over 70 studies that examined the role of vitamin D across multiple neurodegenerative diseases, including multiple sclerosis (MS), Parkinson's disease, and Alzheimer's disease. The evidence they reviewed, from research conducted up to 2016, did not suggest that vitamin D is a protective agent for the brain.

"Our analysis of the research showed that the link between vitamin D and brain disorders is likely associative," explained Dr. Mark Hutchinson, a professor at the University of Adelaide and one of the authors of the study. "It's not likely a directly causal relationship." Accordingly, the researchers concluded that **strong recommendations cannot be made about the therapeutic benefits of dietary vitamin D supplementation in neurodegenerative disease, based on the evidence to date.**

## PERHAPS SUN EXPOSURE IS KEY

The body produces most of its vitamin D in response to ultraviolet B (UVB) radiation from sun exposure on the skin. It can also be obtained from a few foods such as oily fish and fortified foods (e.g. milk and orange juice), as well as from vitamin D supplements. It may be that sunlight creates other "x-factors" that are neuroprotective, separate from the sun's contribution to vitamin D levels.

Dr. Hutchinson and his colleagues considered this possibility and concluded that it has merit. "Our research indicated that it's possible sensible and safe sun exposure is good for the brain in ways we have yet to identify, ways that may not have anything to do with vitamin D, meaning we cannot yet put sunlight into a supplement tablet," he explained. "Some early studies suggest that UV exposure could have a positive impact on some neurological disorders such as MS, but more research is necessary to fully understand what's happening."

## SUN EXPOSURE GUIDELINES FOR VITAMIN D

Because most of our vitamin D comes from sun exposure, and sun exposure may have additional health benefits beyond being a source of this essential vitamin, it appears that we may benefit from spending some time outdoors with exposed, bare skin (i.e. without sunscreen).

But how can one maximize the benefits of sun exposure while minimizing the risk of skin cancer? Recommendations about safe sun exposure vary widely, with some experts advocating for zero sun exposure (i.e. getting all of your vitamin D intake from food and supplements) and others recognizing the need for some sunshine.

The amount of time that each person needs to spend outdoors in order to achieve a sufficient vitamin D level and enjoy any other health benefits of sun varies based on a number of variables, including season, latitude, time of day, amount of exposed skin, age, weight, and skin colour. Consequently, there is no single recommendation for safe, healthy sun exposure that is suitable for all. However, a mobile application called "dminder" (<http://dminder.ontometrics.com/>) has been created to help individuals determine how much sun exposure is enough on any given day, factoring in the user's unique variables.

Although the exact amount of sun exposure that is safe and ideal varies, the amount of time required is minimal for most individuals. For example, the National Health Service in the U.K. suggests that most people can produce enough vitamin D from being out in the sun daily for short periods with their forearms, hands, or lower legs uncovered and without sunscreen from late March or early April to the end of September, especially between the hours of 11:00 a.m. and 3:00 p.m. There are parts of the world where there are no UVB rays in the colder months. If you live in one of these places, your body may make and store enough vitamin D in the warmer months to get you through the colder months. It is important, though, to check with the country-specific recommendations about vitamin D levels.

## MUCH MORE TO LEARN

Although researchers are discovering interesting findings about vitamin D and sunshine, much more research is needed. In the meantime, the following are some key messages from the research to date:

- **Vitamin D is essential for health** - certainly one's bone health, and possibly other areas of physical, as well as mental, health (including brain health). Any vitamin D deficiencies should be addressed through either safe exposure to sunlight and/or increased dietary intake of vitamin D (food and/or supplements).
- **Safe exposure to sunlight is key** - be sure to take steps to avoid getting too much sun. For instance, seek shade, cover up, and use sunscreen for much (but not all) of your time outdoors.
- **More is not necessarily better** - if you are taking vitamin D supplements, taking more than is necessary to reach a "sufficient" level may not provide any therapeutic benefit, particularly for brain health. Nevertheless, vitamin D supplements are fairly inexpensive and they are safe to take in recommended dosages. 🌞

A person is running on a sandy beach at sunset, carrying a large, colorful bunch of balloons. The balloons are in various colors including purple, blue, green, orange, red, and pink. The person's legs are in mid-air, and their shadow is cast on the sand. The background shows the ocean with gentle waves and a bright, golden sky.

# WELL GROUNDED

BALLOONS AS EXERCISE RESISTANCE TOOLS

**B**everley Burdeyney is an active 79-year old personal fitness trainer and lifestyle dynamo who does not believe in “quick” fixes, but rather a long-term common sense approach to achieving and maintaining good health. Prevention, she says, is the key word to optimizing one’s health. —>



Beverley has developed an innovative program using ordinary balloons as resistance tools for engaging in core-strengthening exercises. She calls her program “Balloonology” - a unique, balanced series of simple and effective exercises using balloons for physical fitness, body rehabilitation, mindfulness, and relaxation. Individuals, both young and old, can benefit by participating in any one of the appropriate programs.

“With the balloons, I have created revolutionary, safe, simple, sequential, and effective techniques and movements that can be done in a lying, sitting, or standing position,” explained Beverley. “These techniques not only keep upright the entire spinal column and neck, but also reinforce and strengthen the core of the body. These exercises are most complementary and compatible with the body.”

Beverley’s mantra is “life is a challenge, but life is a gift.” She comes by that mantra honestly, having faced some significant health adversity.

Beverley was born with a variety of congenital conditions, including spina bifida (L3-L5), upper back scoliosis, and unequal and unbalanced hips. All ailments left her with misaligned and misshaped legs of two different lengths. A number of years ago, she experienced a significant fall that left her with a twisted body and a slight hair-line fracture to her hip. The years of pain that Beverley endured, together with her time in a wheelchair and being in a body cast, motivated her search for alternative treatment solutions.

## BEVERLEY BEGAN TO THINK OUTSIDE THE BOX, BEYOND WHAT HER FAMILY DOCTOR OR ORTHOPEDIC SPECIALISTS RECOMMENDED, AND CAME UP WITH A CREATIVE SOLUTION THAT WAS NOT RELIANT ON MEDICATION.

While attending a birthday celebration in a room filled with balloons, she began developing her idea for Balloonology.

Dr. Howard Winston, the Medical Director of the Centre for Health and Sports Medicine, fully endorses Beverley’s Balloonology therapy. “There’s different types of exercises - there’s isometric, isotonic, and isokinetic - and this is more of an isometric exercise, so you’re not going to see much motion, but certainly the muscles are working, and that’s what I like about it.”

Many of Beverley’s clients credit her program with being innovative in helping them restore health and well-being. They appreciate the simplicity of using the balloons and love that the exercises can

be tailored to their own pace and schedule. The program does not require a gym, equipment, or supervision. And, most importantly, no matter what your ailment or age, the exercises can benefit everyone.

Her clients also agree that the older Beverley gets, the more extraordinary she is, and it does not seem like she is interested in slowing down. “I have been blessed with a rewarding and interesting life. Above all, I kept myself vertical, functional, and am still striving to help others.”

Beverley professes that a balanced life requires “practicing good nutrition and performing a sensible exercise program daily. Just move and move more, but also rest, relax, and cultivate a sense of purpose, gratitude, and joy. Gratitude reinforces power, peace, and purpose.” 🌍



One of the simplest exercises for those who sit for long periods of time can be tried at home or at the office.

1. Sitting upright in a chair, place a balloon in between your knees and under each arm, with elbows bent at a 90-degree angle.
2. Gently squeeze the balloon in between the knees, and simultaneously squeeze the balloons under your arms towards the body.
3. Look straight ahead and gently push yourself forward, squeezing and release.
4. Repeat.

For greater impact, an additional balloon can be placed behind the back in between the shoulder blades (or behind the neck if in a chair with a high back rest). For a live demonstration of this exercise, visit <http://bit.ly/balloonology>.

*One should always check with a health care professional before beginning any exercise program.*



# ALL YOU CAN EAT

OUR NUTRITIONAL NEEDS CHANGE AS WE AGE

Our bodies change as we age - partly due to natural physiological aging and partly due to lifestyle choices. As early as our thirties, we begin to lose a small amount of muscle mass, and, as we get into our sixties and seventies, this process (known as sarcopenia) speeds up and by then we may have lost up to half of our muscle mass. (If you implement strength training under the care of a professional, you can regain some of the loss.) →

Our vital organs also change. For example, according to Dr. Heather Keller, a professor in the Department of Kinesiology at the University of Waterloo and a Schlegel Research Chair in Nutrition and Aging with the Schlegel-University of Waterloo Research Institute for Aging, our skin “thins and the fat layer below the skin changes as well.” Theories about changes in our kidneys include that they lose some of their function due to use over time or because of a “free radical build-up issue.” Free radicals damage cells in the body and may also contribute to the formation of cancer.



## **BUT ONE OF THE MOST SIGNIFICANT CHANGES AS WE AGE IS TO OUR ENDOCRINE SYSTEM (OUR HORMONES).**

For women, menopause means a decrease in levels of estrogen and progesterone. For men, many over the age of sixty will experience some testosterone loss. For both sexes, there is a chance that thyroid function will decline. Notably, the body’s ability to make or process insulin can change as well. “We tend to get more insulin-resistant as we get older,” said Dr. Keller. Risk for disease increases, and scientists are still exploring why aging often leads to illness.

With all of these bodily changes due to age, paying closer attention to our diets becomes even more critical as the years pass.

## **BECAUSE OF THE MUSCLE LOSS, AND THE FACT THAT WE TEND TO MOVE LESS AS WE AGE, OLDER INDIVIDUALS NEED TO CONSUME FEWER CALORIES THAN THEIR YOUNGER COUNTERPARTS.**

Muscles are a big driver of our energy consumption in the body. Additionally, “we lose muscle and gain fat, even if our weight remains stable,” noted Dr. Alice H. Lichtenstein, senior scientist and director of the Cardiovascular Nutrition Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University. This change means that “older adults need to eat fewer calories, yet get the same amount of nutrients as younger adults,” she added.

To achieve this, older adults need to be “more careful about food choices,” Dr. Lichtenstein continued. Choosing “nutrient-dense”

foods - those with a high number of vitamins and/or minerals per calorie - needs to be a priority. At the grocery store, look at the “colour of the flesh” of the fruits and vegetables you are purchasing - the more deeply coloured, the higher the nutrient density. For instance, consider buying kale, chard, and romaine over iceberg lettuce, or adding berries and other colours of fruits to your apples and pears.

“Another helpful shift is from full-fat to low-fat dairy products,” said Dr. Lichtenstein, so that you still get the nutrients that you need, but are consuming fewer calories. Adding more fibre to your diet is also important to keep your gut from becoming sluggish. Choose whole grain breads and pasta instead of white, and eat whole fruit instead of drinking fruit juice.

## **TO BE EFFICIENT AT CREATING NEW MUSCLE AS WE AGE, WE NEED TO CONSUME MORE PROTEIN.**

Twenty to thirty grams of protein at every meal is important, according to Dr. Keller. Foods such as low-fat milk, Greek yogurt, and skinless chicken are all good sources of protein without being too high in fat. It is also important to try to balance out your protein consumption over the course of the day, as opposed to consuming one big steak at suppertime. You can incorporate plant proteins as well, said Dr. Keller, but there is a challenge for older adults: beans, for instance, are not an efficient source of protein because you need a lot more of them in order to satisfy your protein requirement (which means that you will be eating more calories).

## **BECAUSE OF THE SKIN AND KIDNEY CHANGES THAT OCCUR AS WE AGE, WE NEED TO BE EXTRA CAREFUL ABOUT OUR VITAMIN D LEVELS.**

“We get a preform vitamin D from the sun,” explained Dr. Keller, “and then the kidneys change it into something our body can use.” However, since both the skin and the kidneys lose some functionality as we age, it becomes increasingly important to take vitamin D supplements in order to achieve sufficient levels of this essential vitamin. Our bodies need vitamin D in order to absorb calcium, which means osteoporosis risk increases when levels of both calcium and vitamin D are low.

“Other micronutrients are not as well studied, unfortunately,” noted Dr. Keller. Antioxidants in general are getting more atten-



tion because of their ability to fight free radicals. Berries and orange vegetables (such as sweet potato), as well as dark, leafy greens, are high in antioxidants. Supplementation with antioxidants has not shown promising results in early studies, so it is best to get your antioxidants from food sources.

In general, while there has been an increased focus on nutrition in recent years, "it's often driven by weight instead of health," observed Dr. Keller. What diets such as the "MIND" diet or the "FINGER" diet (similar to the Mediterranean diet) - recommended for Alzheimer's disease or dementia prevention - or the "DASH" diet - recommended for healthy blood pressure - have in common, said Dr. Keller, is "a healthy, wholesome diet."

## THE "YO-YO" DIETING THAT MANY YOUNG ADULTS PARTICIPATE IN CAN BE DETRIMENTAL AS THEY AGE.

"It resets the body at a lower level of what we need for energy, so we're setting ourselves up for failure," explained Dr. Keller. We should instead be asking ourselves "are we eating well, are we feeling well, and are we moving well." Reducing our intake of good quality food and protein in our fifties and sixties in order to lose a few pounds (for instance, eating a salad without chicken or toast instead of a cooked meal with a variety of vegetables) can contribute to overall poor health as we age. It might be best to forget about the scale and focus on nutrition for our long-term health.

Another consideration as we age is nutrition risk and malnutrition, which is an underdiagnosed issue with older adults. According to a paper published in *Advances in Nutrition*, adults over the age of 65 are more prone to nutritional deficiencies, which, on the biological side, is due to some of the bodily changes previously mentioned, as well as the fact that an older body can have difficulty absorbing certain nutrients.

The social reasons for the malnutrition risk, though, can be more challenging to conquer. As we age, we tend to eat less with others. "Family has moved away or a spouse may have died and cooking might not be a priority anymore," explained Dr. Keller. Taking a trip to the grocery store becomes difficult in the winter months, for instance, due to fears around falling, so individuals "will live on what they have in the house" or just purchase a few items at a corner store, which often do not sell perishable foods.

All of these factors contribute to an older person's diet becoming poor, and, over time, can lead to frailty.

### TOOLS TO REFINE YOUR DIET

In 2016, Dr. Alice H. Lichtenstein and her colleagues at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University released an updated MyPlate for Older Adults, which provides food, fluid, and physical activity guidance specifically tailored for older adults. MyPlate emphasizes the importance of consuming fruits and vegetables (which includes frozen and canned products that have a longer shelf life for those who cannot get out to the grocery store as often), low-sodium meals, and lean protein. For more information, visit <https://hnrca.tufts.edu/myplate/>.

Dr. Heather Keller, in collaboration with the Dietitians of Canada, developed an online tool in 2012 called Nutri-eScreen, which assesses older adults' appetite, eating habits, and changes in weight to identify those who may be at nutritional risk. The tool involves 14 short questions about eating habits and takes approximately ten minutes to complete. Upon completion of the questionnaire, users will receive recommendations for improvement based on the responses provided. For more information, visit <http://www.nutritionscreen.ca/escreen/default.aspx>.

## IT IS IMPORTANT TO UNDERSTAND, THOUGH, THAT YOUR NUTRITION - ESPECIALLY WHEN OLDER - IMPACTS YOUR INDEPENDENCE.

"Maintaining a quality diet that is rich in micronutrients, sufficient protein, and balancing calories with their energy output is really important for people to stay independent for as long as they can," noted Dr. Keller.

We now know that diet can be preventative when it comes to Alzheimer's disease and dementia. An antioxidant-rich diet (such as the "MIND" or "DASH" diet) might even slow dementia progression once an individual is already diagnosed, said Dr. Keller. Never underestimate just how important it is to your long-term health to trade in the empty calories for a wide variety of micronutrient-rich foods, low-fat proteins, and good fats as you age. 🌱



# MIND WHAT YOU EAT

HOW CELEBRITY CHEF MICHAEL BONACINI STAYS HEALTHY

**Q: WHEN DID YOU START TO GET SERIOUS ABOUT YOUR HEALTH?**

**A:** This happened to me five or six years ago. I felt sluggish, so I made a concerted effort to lose weight. I started to choose what I wanted to eat more wisely, and began to maintain a modicum of exercise, none of which I had ever been particularly good at before.

When you're a young buck running around and living life to its fullest, you don't tend to think about your health and physical well-being as much. I'm turning the ripe old age of 60 this year.

As I have gotten older, my perspective has changed. I think more and more about making specific efforts to live a healthy lifestyle. This includes cooking with good, wholesome, and fresh ingredients, maintaining a balanced diet, and getting enough exercise.

**Q: HOW DO YOU KICK OFF EACH MORNING ON A HEALTHY NOTE?**

**A:** My most important meal of the day has always been breakfast. I will not leave home without it, regardless of early meetings or flights. Even while traveling, breakfast is so important in terms of getting my day started right. I take great pleasure in refueling

while I pore over the newspaper or catch up on emails.

Perhaps because of my English roots, I always go for a good pot of tea, toasted bread with honey, natural and unsweetened peanut butter, and a banana. It's been that way for decades. It addresses my sweet tooth, gives me energy and protein, and I feel satisfied!

**Q: HOW DO YOU MAINTAIN YOUR ENERGY THROUGHOUT THE DAY?**

**A:** I often skip lunch, but enjoy a snack in the afternoon, whether that's a handful of nuts, fresh fruit, or an Americano or skinny latte. If I do have time for a proper lunch, it will often be something on the lighter side, like a simple, fresh salad with lots of greens, tossed with hard-boiled eggs, cucumber, and a light dressing. On the weekend, I love throwing a few great quality sardines on toast, or enjoying some smashed avocado on rye crisps.

I also make sure to skip alcohol at lunch. Maybe I'll indulge in a glass of wine on vacation, but then I'll usually need a siesta, so I'd rather not!

**Q: WHAT DOES A TYPICAL DINNER AT HOME LOOK LIKE FOR YOU?**

**A:** For me, one of life's greatest satisfactions is coming in at the end of a long day and either cooking or sitting down at the table to enjoy something that my wife has prepared. Roast chicken is one of my favourite meals. I like to break down the chicken into the legs and breast, remove the skin, and chew and gnaw every bone clean. It annoys my wife to no end, but I just love those juicy chicken-flavoured morsels!

**Q: YOU MUST DINE OUT A LOT. HOW DO YOU MAINTAIN YOUR DIET AT RESTAURANTS?**

**A:** Dining out is certainly a lucky pleasure I get to enjoy. I always try to choose wisely from the menu, and often gear towards something lighter. I usually opt for fish at least twice a week, which is a great choice as it's packed full of flavour, omega-3 fatty acids, and protein.

If a dish sounds rich, I will ask for the sauce on the side. My days of enjoying five, six, or seven-course tasting menus are few and far between. They're just too rich and too much. I prefer less, and my stomach appreciates that too.

**Q: WHEN IT COMES TO FOOD, WHAT IS YOUR BIGGEST GUILTY PLEASURE?**

**A:** Whenever there are desserts around, I have to dig deep for some extra willpower. Just the other night, my son made a tempting batch of Rice Krispie squares, and my wife made banana chocolate chip muffins. My Achilles Heel is definitely my horrid sweet tooth!

**Q: HOW DO YOU MAKE SURE YOU GET ENOUGH PHYSICAL ACTIVITY INTO YOUR SCHEDULE?**

**A:** When I was younger, my exercise came from working in a kitchen

and being on my feet for many consecutive hours. Today, I maintain an active lifestyle by finding ways to walk to downtown meetings, or taking the stairs instead of the elevator or escalator. Every little bit counts!

I fall in and out of love with the gym and gym equipment. I live in a condominium that has a gym, and I built a gym at my country home, but I'm procrastinating on investing in the equipment.

**Q: DO YOU HAVE ANY OTHER HOBBIES OR INTERESTS THAT KEEP YOU FIT?**

**A:** My preferred form of exercise is doing tasks around my country home like raking leaves, gardening, cleaning, or pruning trees. It's very satisfying and also helps me exercise mentally. It's nice to learn how much your body can take in terms of stresses, strains, creaks, and cracks, and it also encourages the important routine of stretching.

I also recently joined a group of fellas called the "FAT Boys" (Fridays At Three). We go cycling for about 40 to 60 kilometres every Friday afternoon. Once a year, we raise money for a local hospital by cycling to the Elora Mill and back (about 110 kilometres in total). It's an inspiring group, in which the two eldest cyclists are 76 years old. This summer, we're all going cycling in France with our wives and partners. The women in the group are wisely referred to as the "FIT Ladies"!

**Q: HOW DO YOU FIND WAYS TO RELAX AND MANAGE YOUR STRESS LEVELS?**

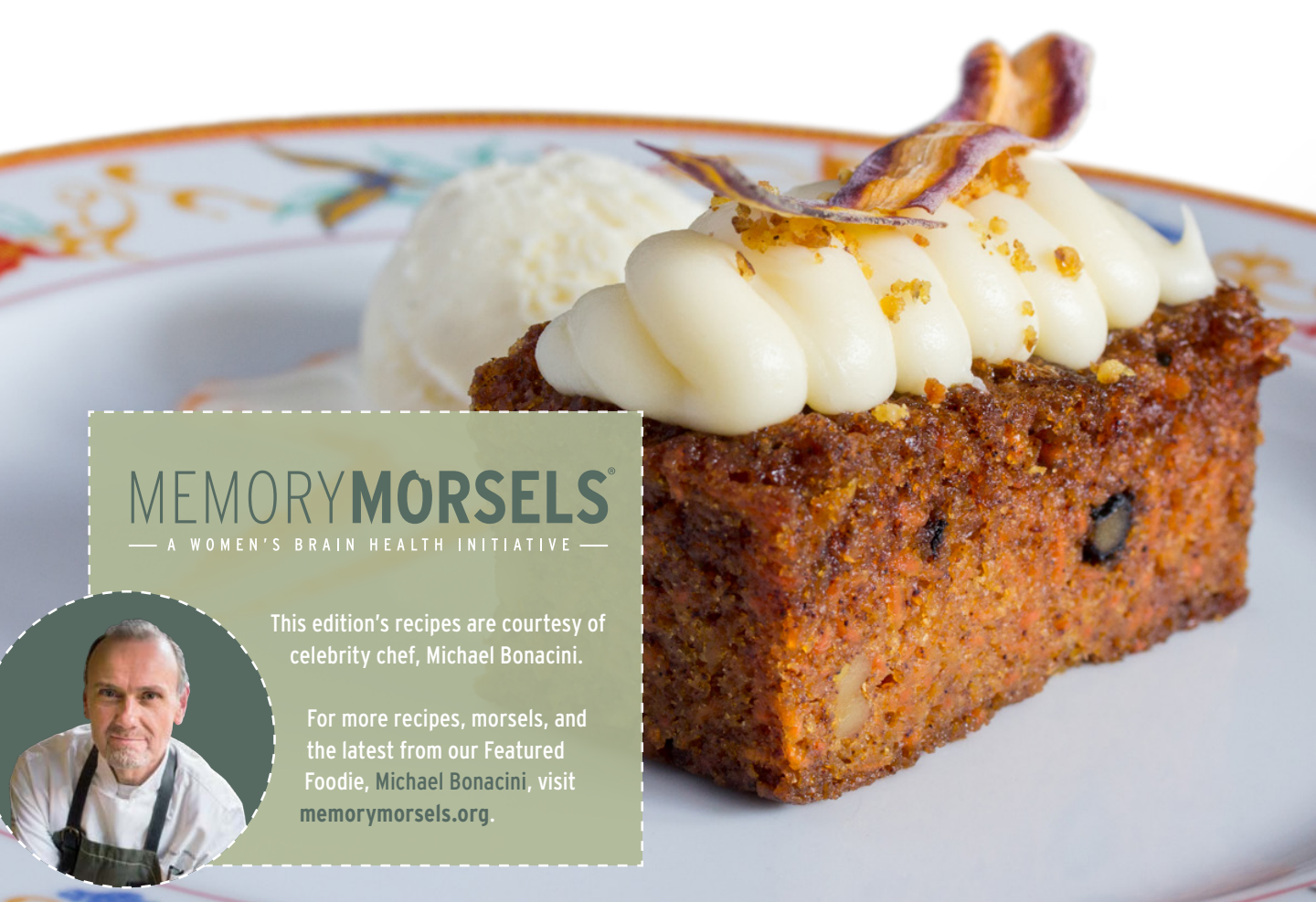
**A:** I can tell you that the idea of sitting on a beach all day doesn't do it for me. I despise swimming pools and hot tubs. I can't spend two hours on a crossword puzzle. I would much rather spend my downtime sanding and staining hardwood floors, or repainting or wallpapering a room. I have lots of to-do lists. If I did not keep active, I would erode from within! I have to have projects on the go.

Stress has certainly taken its toll over the years. As you get older, you gain more perspective on these things. My business partner, Peter Oliver, has been a huge source of inspiration for me in terms of his attitude to life's curveballs. When something unfortunate happens, he turns it around and looks at it as an opportunity. He makes things feel less heavy.

**Q: WHAT ADVICE WOULD YOU GIVE TO SOMEONE LOOKING TO SUPPORT A MORE HEALTHY LIFESTYLE?**

**A:** We're all different and we all have a different lifestyle that works for us. I have found something that works for me, for the most part. I think it's important to listen to your body, your mind, and your cravings. At the end of the day, you just want to feel comfortable within your own skin. It's incumbent upon everyone to figure out the best lifestyle for them. Everyone has an opportunity to try and make healthy and rewarding life changes. 🌱





# MEMORY MORSELS®

— A WOMEN'S BRAIN HEALTH INITIATIVE —



This edition's recipes are courtesy of celebrity chef, Michael Bonacini.

For more recipes, morsels, and the latest from our Featured Foodie, Michael Bonacini, visit [memorymorsels.org](http://memorymorsels.org).

## Oliver's Famous Carrot Cake MAKES 14 TIME: 18 MIN

### INGREDIENTS

#### Carrot Cake

- 1 2/3 cups canola oil
- 2 3/4 cups white sugar
- 6 eggs
- 3 cups bread flour
- 1.5 tbsp baking powder
- 1 tbsp baking soda
- 4 tsp ground cinnamon
- 1 tbsp ground nutmeg
- 1.5 tsp salt
- 1 cup walnut pieces
- 1.5 lbs carrots, peeled and grated

#### Cream Cheese Icing

- 1 cup butter, very soft
- 3 1/4 cups cream cheese (750g or 3 packages), softened
- 4 1/4 cups icing sugar, sifted

### INSTRUCTIONS

#### Carrot Cake

1. Heat oven to 325°F
2. Spray 2 8" or 9" round cake pans and line the bottom and sides with parchment paper
3. In a large bowl, combine oil, sugar, and eggs. Mix gently with a wooden spoon, hand mixer, or the paddle attachment of a stand mixer
4. In a separate bowl, combine flour, baking powder, baking soda, cinnamon, nutmeg, and salt
5. Add dry ingredients to oil and sugar mixture. Add walnuts and carrots
6. Mix on medium speed for 2 minutes. If mixing by hand, mix vigorously for 4 mins

7. Divide batter evenly between pans

8. Bake for 25 to 35 minutes until a toothpick inserted in the centre comes out clean

#### Cream Cheese Icing

1. In a large bowl with a hand mixer or in a stand mixer with a paddle, cream butter until super smooth
2. Add cream cheese in 3 stages, pulsing to incorporate and scraping well after each addition. Do not over mix! (Overmixing between additions can result in splitting)
3. Add icing sugar and pulse on low speed to incorporate. Once icing sugar is incorporated, mix on medium speed for up to 30 seconds until smooth

# Seared Salmon with Green Lentils, Roasted Beets, Wilted Kale and Sauce Vierge

 SERVES 4  TIME: 30 MIN

## INGREDIENTS

### Green Lentils

- 1/4 bunch thyme
- 500 g green lentils
- 2 L water
- 30 g kosher salt

### Sauce Vierge

- 50 shallots, small dice
- 45 g olive oil
- 225 g sherry vinegar
- 10 coriander seeds, toasted and crushed
- 15 g salt
- 10 g tarragon
- 10 g chives

### Roasted Beets

- beets
- olive oil
- salt

### Seared Salmon

- 6 oz piece salmon
- green lentils
- roasted beets
- red grapes
- kale, picked and cleaned
- sauce vierge
- 15 ml canola oil
- butter
- 30 ml white wine

## INSTRUCTIONS

### Green Lentils

1. Cook lentils with thyme until 90% cooked
2. Transfer on sheet tray to cool
3. Portion to 90 g

### Sauce Vierge

1. In a mixing bowl, add shallots, sherry vinegar, coriander seeds, and salt
2. Slowly add in olive oil, mixing to emulsify
3. Add tarragon and chives to finish
4. Adjust seasoning as needed

### Roasted Beets

1. Preheat oven to 375°F
2. Wrap beets (whole, not peeled) in foil with a bit of olive oil and salt
3. Place in oven for about 1 hour or until fully cooked. Cook time can vary depending on the size of the beets
4. Set aside to cool. Once cooled, peel and cut into medium-sized cubes

### Seared Salmon

1. Heat frying pan on high heat until smoky. Once smoking, turn the pan to medium heat and place Canola oil in pan, enough to cover the bottom (about 15 ml)
2. Place salmon skin side down in pan and cook until skin is golden brown
3. Add a knob of butter into pan with salmon and place into 375°F oven until cooked to desired temperature
4. Place a separate pan on medium heat. Once pan is heated, add in a knob of butter, add in cooked lentils, cooked beets and grapes and sauté until everything is warmed through and soft
5. Once cooked through, add in kale and deglaze with about 30 ml of white wine
6. Cook on medium heat until kale is soft
7. Adjust seasoning as needed
8. Warm up sauce vierge in separate pan or bowl and set aside for plating
9. When plating, place lentils and beets at bottom, then place salmon skin side up, on top
10. Top dish with sauce vierge and enjoy!



## Salmon

Gluten free, this pure protein is loaded with fiber, iron, and vitamin B2, to support brain health.





APRIL 2019 |  
**HEALTHY BODIES**  
(L-R) Inez Jabalpurwala, Dr. Kelly Metcalfe, Lisa Borsook,  
Dr. Beth Abramson, Dr. Gillian Einstein, Lynn Posluns



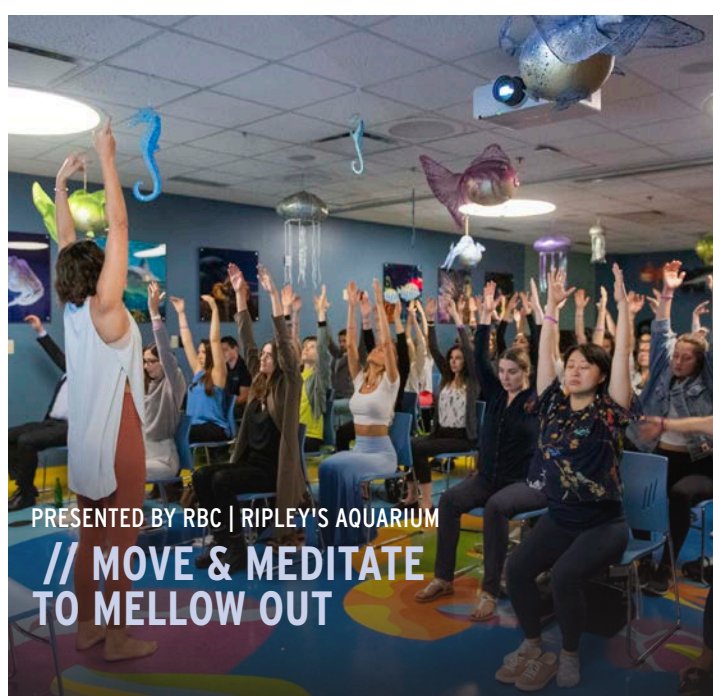
THE GLOBE AND MAIL CENTRE  
**HEALTHY MINDS**  
(L-R) Monica Burger, David Walmsley



Support for WBHI and women's brain health continues



SEPT 2019 |  
**ENGAGING MILLENNIAL MINDS**  
(L-R) Lyndsay McDonald, Matteo Tino, Laura Best, Vitina Blumenthal,  
Nicole Roberts, Erin Kudla, Matthew Earl, Laurie Piltz



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**// MOVE & MEDITATE  
TO MELLOW OUT**





(L-R) Chuck Edmond, Brenda Dee, Janet Lougheed, Mary Edwards, Sally Sebben



Eliza-Jane Scott



(L-R) Andie MacDowell, Jane Seymour



JULY 2019 | LA

**CELEBRATING  
THE POWER OF  
WOMEN'S BRAINS**



Rumer Willis



(L-R) Dr. Roberta Brinton, Dr. Pauline Maki



(L-R) Kelly Lynch, Jessica de Ruiter, Garcelle Beauvais



# GIVE THE GIFT OF BRAIN HEALTH

SO YOU CAN REMEMBER THE WOMEN IN YOUR LIFE. WE'VE CREATED AN ICON YOU WON'T FORGET.

The Hope-Knot is an icon to create awareness and escalate concern over the unchecked growth of dementia and other brain-aging diseases that disproportionately affect women.

This holiday season and every day, celebrate the women in your life - your mother, wife, daughter, sister, or best friend - with a gift of brain health.

Proceeds from each Hope-Knot sold support sex- and gender-based brain-aging disease research.

Order yours at [HOPEKNOT.ORG](https://HOPEKNOT.ORG) or 1-888-927-2011

SUPPORT THE INITIATIVE. WEAR A HOPE-KNOT.  
WILL YOU FORGET? WE HOPE-KNOT!



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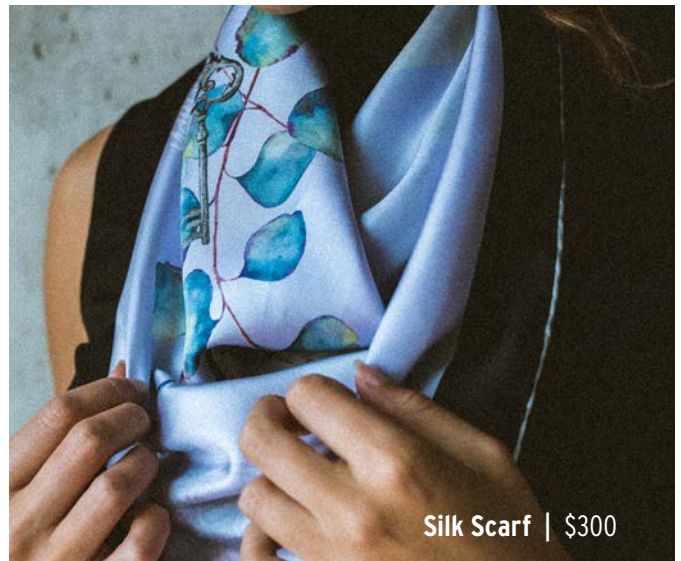


PHOTOGRAPH BY ALAN WATSON

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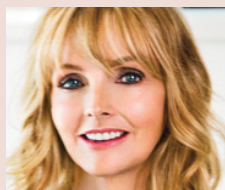
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# BE A CHAMPION FOR WOMEN AND THEIR BRAIN HEALTH

Women's Brain Health Initiative is a charitable non-profit organization that funds research and develops preventative health education programs to combat brain-aging diseases that affect women. We rely on philanthropic gifts to support these endeavours.

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.

*Care to join us?*

WE ARE TRULY GRATEFUL TO



Brain Canada Foundation

and all those who generously supported this publication:

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Women's Brain Health Initiative

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