

# Prevention Co+olumn

PHYSICAL ACTIVITY – AUGUST 2021

## Physical activity: Good for mind and body!

It's common knowledge that physical activity tones the muscles, contributes to bodily health and creates a feeling of well-being. But did you know that being active also produces changes in the structure of your brain?

- These changes **improve brain function** and protect us against neurodegenerative diseases.
- Benefits for cognitive capacity are obtained by **regular** moderate-intensity cardiovascular exercise.



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# The active brain

Activity can boost your spirits. That's right! In spite of the effort, shortness of breath and even discomfort, exercising can create a feeling of well-being. Depending on the length and intensity of the activity, the benefits may be felt for several hours afterwards. How is this possible?

An active body produces endorphins, which are the hormones that create a sensation of well-being, even of euphoria. Other substances also influence the messages transmitted by the brain to the rest of the body. The sensation of pain is reduced, as well as anxiety and stress levels.<sup>1</sup> Increasing certain neurotransmitters also improves your mood and your ability to concentrate.

## Tone up...your brain!

Exercise spurs the development of new muscle fibres and also intensifies blood flow to the muscles, improving their oxygen and nutrient intake. It's the same for the brain where, as a consequence, communication between neurons is increased and the formation of neuronal cells (neurogenesis) is stimulated.

At the same time, the brain produces growth factors whose function is to ensure survival and development of new neurons.<sup>1</sup> They influence certain zones of the brain to gain in volume and efficiency. Specifically, the development of the hippocampus and the prefrontal cortex has a favourable impact on productivity and efficiency:

- Increased long-term memory
- Improved attention span and concentration
- Better problem-solving capacity<sup>1,2</sup>

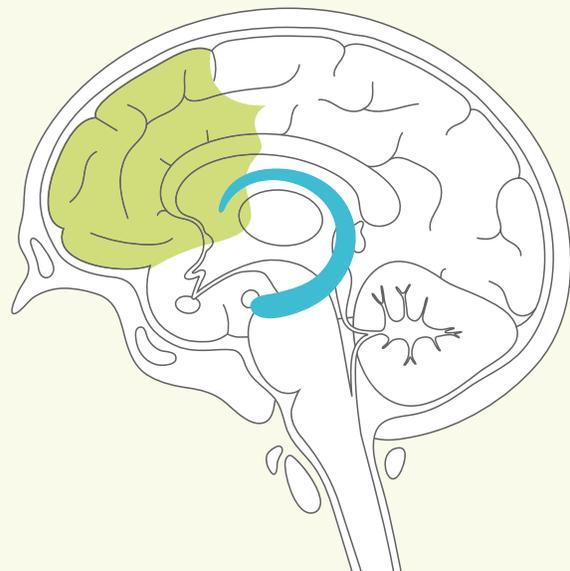
The brain is plastic, which means it changes according to the stimulation it receives. The benefits that are periodically experienced become permanent when an active lifestyle is maintained. ■

## THE HIPPOCAMPUS AND THE PREFRONTAL CORTEX

The **hippocampus** is embedded deep within the centre of the brain. It plays a role in attention span, orientation and memory.

As its name implies, the **prefrontal cortex** is located in front, just behind the forehead. It is involved in decision making, concentration and personality.<sup>2</sup>

Deterioration of these areas of the brain is directly related to the reduction of cognitive capacities associated with growing older, as well as dementia and other neurodegenerative diseases, particularly Alzheimer's disease.<sup>2</sup> What's the good news? These parts of the brain directly benefit from the activities mentioned above! ■



# PREVENT AND SLOW DOWN disease

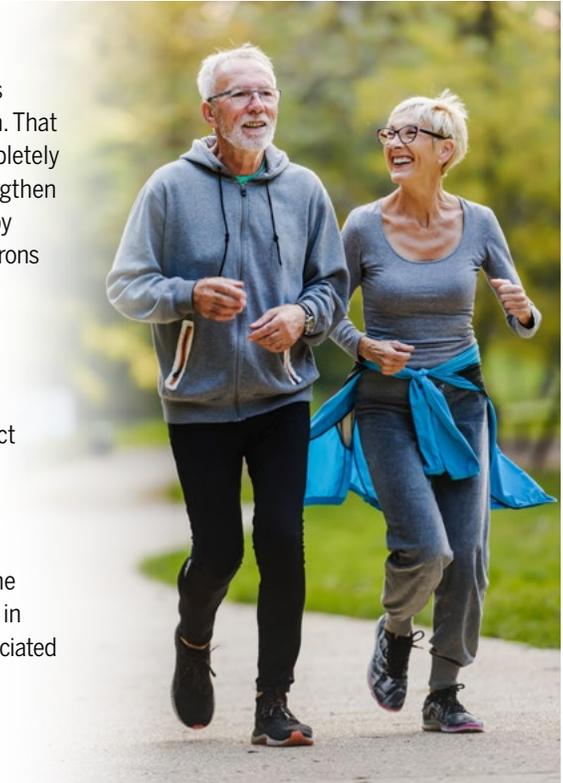
Greater hippocampus and prefrontal cortex volume can protect us from diseases associated with decreased brain function, or at least slow down their progression. That being said, even adopting an active lifestyle for one's whole lifetime doesn't completely prevent the deterioration and loss of neurons. However, it does allow you to strengthen your brain by increasing the volume of the two areas that are primarily affected by degenerative diseases. This means that there has to be a more significant loss of neurons before cognitive capacities are affected, delaying the onset of these diseases.

## Depression

It is possible that this mental health issue is associated with a reduction in neurogenesis, the growth of new neurons. Physical activity could therefore protect us against depression since it promotes neurogenesis.<sup>1</sup>

## Alzheimer's and memory problems

Active living reduces harmful inflammatory substances in the brain. It protects the neurons in the hippocampus, slowing down their deterioration and the reduction in cognitive capacities. A study suggests that increasing cardiovascular capacity is associated with improved memory in people in the early stages of Alzheimer's disease.<sup>3</sup> ■



## Get moving!

No specific guidelines have been clearly established regarding cognitive capacities and physical activity. However, current recommendations do promote brain health. For adults, the following is recommended:

- **150 minutes of cardiovascular activities per week.** This can be achieved at various times, but the World Health Organization recommends minimum periods of 10 minutes each.<sup>4</sup>
- **Two sessions of muscle strengthening activities per week.**
- **Less sedentary periods.** It is preferable to replace them with low-intensity movement.<sup>5</sup>

The recommendations vary according to age and must also be adapted to the individual's capacity and state of health. For this reason, they are defined in relative intensity and not in relation to a particular activity. The goal is moderate effort that causes shortness of breath but doesn't completely prevent you from carrying on a conversation. Another way to describe it: you should be able to speak, but not sing!

Short-term cognitive capacity benefits can be obtained by practising regular, moderate-intensity cardiovascular exercise. Periods of **30 to 50 minutes** are preferable. Such periods will provide the necessary stimulation, without the harmful effects of dehydration and metabolic changes caused by maximum intensity.<sup>6</sup> ■

## In conclusion

Adopting an active lifestyle today has short-term, as well as long-term, benefits for your brain. In addition to the immediate feeling of well-being, the structural changes will protect you from, or at least slow down the onset of, certain diseases. ■

1 Centre for Studies on Human Stress, Mammoth Magazine, Issue 21, Fall 2020 "Does playing sports have health benefits for our brain?" Also available online: <https://humanstress.ca/item/mammoth-magazine-issue-21-autumn-2020/>

2 Wendy Suzuki, TEDWomen 2017, "The brain-changing benefits of exercise." [https://www.ted.com/talks/wendy\\_suzuki\\_the\\_brain\\_changing\\_benefits\\_of\\_exercise/transcript?](https://www.ted.com/talks/wendy_suzuki_the_brain_changing_benefits_of_exercise/transcript?)

3 Di Liegro, Carlo Maria et al. "Physical Activity and Brain Health." *Genes (Basel)* 10(9): 720. 2019 Sep 17. doi:10.3390/genes10090720 Also available online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6770965/>

4 World Health Organization. "Global recommendations on physical activity for health." 2010. Also available online: <https://www.who.int/publications/i/item/9789241599979>

5 Canadian Society for Exercise Physiology. "Canadian 24-Hour Movement Guidelines for Adults Ages 18-64 years: An Integration of Physical Activity, Sedentary Behaviour and Sleep." Also available online: <https://csepguidelines.ca/wp-content/uploads/2020/10/24HourMovementGuidelines-Adults18-64-2020-ENG.pdf>

6 Tomporowski, Phillip D., "Effects of acute bouts of exercise on cognition." *Acta psychologica*, 2003 Mar; 112(3):297-324. Doi:10.1016/s0001-6918(02)00134-8. Also available online at: <https://pubmed.ncbi.nlm.nih.gov/12595152/>