

time. PwMS had a worse performance in reaction time, presented higher scores of fatigue and depressive symptoms when compared to the control group. **Conclusions:** pwMS presented increased reaction time indexes, which were associated to depressive symptoms. However, perception of fatigue was not associated with reaction time. VR can be used not only during rehabilitation interventions but also to access motor response (i.e., reaction time during game tasks). In addition, measures of reaction time can be used to monitor disease progression and investigate the related factors of symptoms such as depression and anxiety.

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Seas of Clarity: the role of European brown seaweed extracts in combination with rehabilitation exercise in enhancing cognitive function in progressive MS

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Multiple sclerosis (MS) is an autoimmune disease of the central nervous system (CNS), ultimately leading to neurodegeneration. MS affects over 2.9 million people worldwide of which one million patients are in the progressive phase of the disease (pMS), featured by impaired remyelination and neurodegeneration. None of the currently available approved therapies can repair or regenerate CNS damage in pMS. Since cholesterol is the main component of myelin, alterations in cholesterol metabolism can drive myelin synthesis, facilitate remyelination, and hence protect neurons from degeneration. Noteworthy, the nuclear liver X receptors (LXR) are key players in the regulation of cholesterol and lipid turnover by regulating genes involved in cholesterol uptake, efflux, and transport. In addition, LXRs are implicated in modulating (neuro)inflammation, inducing a positive impact on the environment for remyelination. Recent research showed that the European seaweed *Hymantalya elongata* contains LXR-activating (oxy)phytosterols and is able to prevent cognitive decline and disease progression in a neurodegenerative mouse model, without inducing adverse side effects associated with synthetic LXR-agonists. These findings make them an interesting therapeutic intervention for neurodegenerative diseases, such as MS.

Here, we will investigate the potential (re)myelinating capacity of *H. elongata* extracts, hypothesizing that these extracts will enhance (re)myelination in vitro and in vivo, and ultimately

improve cognition in progressive MS patients. In particular, the latter will be investigated in combination with a rehabilitation exercise intervention, given its positive effects on physical performance, cognitive function, information processing speed, and general and local brain volumes. Currently, preliminary data are collected, which will be reported at the conference.

Keywords: Multiple sclerosis; seaweed extracts; cholesterol metabolism; rehabilitation exercise

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Project Active and Mindful: Mind-body exercise for people with Multiple Sclerosis

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Abstract

Problem: Multiple sclerosis has a significant influence on the individuals' health, well-being and quality of life. It is important to find non-pharmacological therapeutic approaches. This project takes into consideration the main barriers to the participation of individuals with Multiple Sclerosis in exercises, including few adapted programs, lack of information and counseling, symptom management, and transportation needs to health-care centers.

Objective: To design and implement a mind-body exercise program adapted for people with Multiple Sclerosis, using a holistic and online model with the aim of improving participants' quality of life, as well as their physical and mental health.

Methods: The mind-body exercise program will be exclusively developed online (synchronous and asynchronous). It will include groups of 3 to 6 participants with Multiple Sclerosis, organized based on their functional status. Sessions will be conducted in Portuguese and Spanish, twice a week for at least eight months. The program will consist of exercises involving physical fitness, Pilates, Tai-Chi, mindfulness and relaxation techniques. In the last months of synchronous sessions, clinicians will progressively introduce online resources to the participants during the exercise sessions, which will be hosted on a web platform. Pre- and post-tests will be administered to assess changes in participants' physical and psychosocial dimensions. Feasibility, satisfaction, and acceptability will be also assessed. The program will be carried out in two countries, Portugal and Spain

Keywords: Multiple Sclerosis, Physical activity, Home-based care, Mind-body program, Digital Approach