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LETTER TO THE EDITOR

ONE STEP UPWARDS IN THE MANAGEMENT OF CHRONIC MANIFESTATIONS OF MOTION SICKNESS WITH A COMBINATION THERAPY

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ABSTRACT

The gamma-aminobutyric acid tartrate, glutamic acid, dibasic calcium phosphate, thiamine, pyridoxine, and cyanocobalamin combination is an innovative way to manage Motion Sickness (MS). To assess the participants' clinical improvement, we measured their reduction in the mean MSAQ (Motion Sickness Assessment Questionnaire) score. We found significant improvements favoring the use of this association for the chronic treatment of MS.

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LETTER TO THE EDITOR

Kinetosis, also known as motion sickness, is an alteration of the vestibular system in response to a misperception of movement or motion (Golding, 2005). It is a chronic condition characterized by nausea when using means of transportation, or when moving according to unusual patterns (e.g., spinning), it can also be triggered in a variety of situations, including travel by car, train, ship or aircraft, in amusement park rides, in virtual reality and in simulators, as well as in the absence of gravity in space (Golding, 2016). It occurs in children as well as adults, yet more frequently with women and children aged 6 to 9 (Golding, 2005; Golding, 2016). The currently proposed mechanism of action is based on the conflict between the patient's expected invariant patterns – vestibular, visual, and kinesthetic – and the ones really taking place (Golding, 2012). Its incidence also varies according to the several types of environments that can trigger this condition, for example, car travels, trains, ships, or aircraft, amusement park rides, elevators, and simulators (Lackner, 2014; Matsangas, 2014). The treatment of motion sickness is divided into two strands: behavioral therapy and drug therapy. Behavioral therapy or habituation is often employed by the military and has the advantage of long-term effectiveness and being free of side effects (Matsangas, 2014). However, the desensitization process is time-consuming, can be prolonged for several weeks and is therefore impractical as a solution for the general population (Dobie, 1994). Drug therapy employs monotherapy combinations of substances belonging to three categories of drugs: antimuscarinics (e.g., scopolamine), HE antihistamines (e.g., dimenhydrinate), and sympathomimetics (e.g., amphetamine) (Levine, 2000). Other options used in the management of motion sickness include mint, vitamin B12, and ginger (*Zingiber officinale*).

GABA (gamma-aminobutyric acid) receptors are located in the exclusive vestibular neurons and their stimulation is associated with modulation of low-frequency aVOR (angular vestibulo-ocular reflex), as well as T_{VOR} (time-vestibulo-ocular reflex) and velocity stock time. Unique vestibular neurons on their turn can stimulate the velocity stock mechanism, triggering motion sickness, which is experimentally susceptible to inhibitory effects by baclofen, a GABAb agonist receptor. GABAb response to agonist stimulation could therefore mean that motion sickness could be amenable to pharmacological control through the inhibition of unique vestibular neurons (Cohen, 2019; Cohen, 2008; Holstein, 1992; Brady, 2012).

Thiamine is a cofactor in the synthesis of the neurotransmitter acetylcholine. It is also used to control gastrointestinal symptoms. Pyridoxine plays a role in the synthesis of neurotransmitters such as dopamine and tryptophan metabolism, resulting in increased serotonin availability, possibly bringing a sense of well-being. Cyanocobalamin in its turn can improve blood flow in the brain, potentially acting on vertigo (Brunton, 2017; Geller *et al*., 2017; Leuschner, 1992). Thiamine, a cofactor in the synthesis of acetylcholine, acts on nausea and vomiting, a property that makes this substance relevant in motion sickness control (Geller *et al*., 2017; Leuschner, 1992). In our recently finished double-blind, randomized, comparative, and self-paired study for the assessment of the association gamma-aminobutyric acid tartrate, glutamic acid, dibasic calcium phosphate, thiamine, pyridoxine, and cyanocobalamin, it was detected a significant reduction in the mean MSAQ (motion sickness assessment questionnaire) score in favor of the association. Motion sickness is a universal and ever-present complaint, for which conservative and pharmacological interventions are used with variable efficacy. We look forward to the official publication of the results of this study for it might unveil a significant and novel contribution for the management of this manifestation.

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