Background: We conducted this study from April 2012 to April 2014 examining the feasibility of a randomized trial of the homeopathic treatment for fatigue in children and youth receiving chemotherapy. Fatigue in this population is an area of interest due to the lack of effective interventions.

Methods: This was an open label pilot study of homeopathic treatment for fatigue in pediatric cancer patients treated at The Hospital for Sick Children (SickKids) in Toronto, Canada. Children (ages 2−18), diagnosed with any type of cancer who were receiving chemotherapy administered discontinuously in courses or cycles, were considered. Participants were given individualized homeopathic treatment for 14 consecutive days following a course of chemotherapy. Recruitment rates, adverse events and remedy selection were monitored and changes in fatigue was measured using the Symptom Distress Scale (SDS), the PedsQL Multidimensional Fatigue Scale and the PedsQL Generic Core Scales and Acute Cancer Module.

Results: 155 potential participants were assessed between April 2012 and April 2014. 45 patients were eligible to be approached, 9 consented to participate and eight participants received homeopathic treatment (one withdrawal prior to treatment). Eight participants completed 14 days of assessment. SDS scores, and proxy-report fatigue scores in general fatigue and sleep/rest fatigue had significant improvement. In spite of individualized case taking Cadmium Sulfuricum was the chosen remedy at the start of each case. One participant had a clinically observed homeopathic aggravation following a dry dose administration of a constitutional remedy.

Conclusions: In this setting, a future randomized trial of individualized homeopathy is not feasible for children with cancer for the purpose of fatigue reduction. There was a significant improvement of fatigue over the study period. Future study may consider an adult population, settings more familiar with homeopathy, or other study designs such as comparative effectiveness. The routine use of Cadmium Sulfuricum may be investigated.

Keywords: Homeopathy, Chemotherapy related fatigue, Cancer related fatigue, Fatigue, Complementary medicine

Microimmunotherapeutic administration of cytokines improve the clinical symptoms in EAE an animal model of multiple sclerosis

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Experimental Autoimmune Encephalomyelitis (EAE) is one of the most used animal models in the study of Multiple Sclerosis (MS). EAE is induced by the injection of myelin proteins and specific adjuvants and leads to an important inflammatory process with activation of resident glial cells, principally microglia, which interact with infiltrated peripheral immune cells, mostly T-cells. In this context, and as described in MS, cytokines, play a crucial role in the cross-talk between these cell populations and in the modulation of the associated neuroinflammatory response. The main objective of our research is to interact in this process by modulating the immune response. Our work hypothesis is that the microimmunotherapeutic administration of specific combinations of cytokines closely related with the neuroinflammatory response may improve the clinical symptoms in EAE. To accomplish that, EAE was induced in C57BL/6 mice by injecting MOG_{35-55} and Complete Freund's Adjuvant supplemented with *Mycobacterium tuberculosis* and *Pertussis Toxin*. As control some animals were injected with saline. Both, MOG-injected and saline animals, were distributed in three groups: 1) without treatment, 2) treated with placebo and 3) treated with a stimulatory/inhibitory/modulatory combination of cytokines The specific combination of cytokines and signalling molecules used in this study were: a) the pro-inflammatory cytokines $IL\text{-}1_{beta}$, IL-1r, $TNF\text{-}_{alpha}$, IL-12 and $IFN\text{-}_{gamma}$ at inhibitory dilution (30CH), b) the anti-inflammatory molecules IL-1Ra, IL-10, IL-4, PGE2, $TGF\text{-}_{beta}$ and IL-13 at stimulatory dilution (4CH) and c) the IL-6 cytokine at modulatory dilution (15CH). The clinical score of the animals were recorded daily and both the glial response and the infiltration of peripheral immune cells were evaluated using flow citometry and immunohistochemistry. Our results clearly demonstrated that the group administered with the cytokine combination presented a delay in the onset of clinical symptoms and a significant reduction of the clinical score during the chronic phase of the disease. These clinical changes correlated with a reduction in the microglial activation pattern and a low number of lymphocytes (around 50%). In conclusion, our results suggest that the microimmunotherapeutic administration of specific combinations of cytokines, exert a beneficial effect in EAE progress and could be a very good strategy for modulating the neuroinflammatory response associated with certain CNS-diseases such as MS.

Keywords: Immune System, Neuroinflammation, Microglia, Cytokines, Microimmunotherapy, Central nervous system, Very low doses

Carbo animalis and immune response to Ehrlich ascites tumor in mice: an experimental model

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