Novel Treatment for ALS and Acute Spinal Cord Injury

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Technology description

Fenretinide, a retinoic acid analog, normalizes lipid imbalance and inhibits inflammatory mediators. In animal models of spinal cord injury and ALS, fenretinide decreased oxidative stress and the associated inflammatory response which resulted in improved survival of neurons and enhanced motor performance.

Description

It has been well established that after acute SCI there is increased oxidative stress that is associated with a strong inflammatory response of the tissues in close proximity to the damaged tissue. This primary insult triggers a cascade of pathological events, known as secondary injury, resulting in further tissue damage and functional impairments due to the death of neurons and glial cells and to the disruption of the axonal pathways. The inflammatory response contributes strongly to secondary damage after SCI by releasing cytokines, free radicals, eicosanoids and proteases, amongst other molecules.Using a spinal cord contusion injury mouse model we observeda significant reduction in tissue loss, improved neuron survival, enhancement of motor skills, a decrease in AA and an increase in DHA levels after fenretinide treatment as compared to vehicle-treated animals.
ALS is a neurodegenerative disorder that is also associated with elevated levels of reactive oxygen species and excessive inflammation leading to neural cell damage. We used two mouse models of ALS (SOD1G93Aand SOD1G37Rtransgenic mice) to test the efficacy of fenretinide inALS.Fenretinide treatment improved significantly motor performance and survival inSOD1G93Atransgenic mice as compared to vehicle-treated animals along with an increase in DHA levels and a decrease in AA levels.

Worldwide, there are over 20,000 new cases of SCI per year with a large portion of patients surviving more than 5 years requiring lifelong treatment that can exceed costs of $1,000,000.ALS affects 120,000 people each year worldwide and of these only 20% survive 5 years.Common to these conditions, is the absence of cure or effective medication,although riluzole has recently been approved for treatment of ALS, reduced quality of life (QOL) and progressively diminishing autonomy.

Advantages

Fenretinide treatment reduces inflammation-induced excessive oxidative stress resulting in :

•reduced tissue damage and paralysis and
•improved locomotor recovery in acute SCI
•delayed disease onset and
•improved motor function and survival in ALS.

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