A neuroprotective fish oil-based emulsion as an effective treatment for ischemic stroke

Ischemic stroke is a major cause of death in the United States that most severely affects the elderly and prematurely-born infants. In children in particular, brain development is compromised by the resulting lack of oxygen, which can lead to life-long neuropsychological disorders, including cerebral palsy, mental retardation, epilepsy, and learning disabilities. This technology is an emulsion of fish oil-based omega-3 fatty acids that utilizes a biomimetic approach to mitigate the damage caused by stroke. Introduction of this emulsion after an ischemic stroke improves tissue viability and provides long-term neuroprotection.

Extended effect of triglyceride emulsion reduces neurological damage following an ischemic stroke

The current standard of care for ischemic stroke is the application of thrombolytics, but their administration is accompanied by a significantly increased risk of hemorrhage, and the safety of thrombolytic therapy in children and neonates is unknown. This technology removes this risk of bleeding. It is comprised primarily of naturally anti-apoptotic and anti-inflammatory omega-3 fatty acid, docosahexaenoic acid (DHA), emulsified in water. It is appropriate for either enteral or intravenous injection, and can be administered in a slow-release vehicle, eliminating the potentially toxic effects of a free fatty acid bolus injection.

Uniquely, while this technology has a short residence time, its effects can be long-term. An approximately two-fold increase in tissue viability was seen after eight weeks in mice treated with the fatty acid-rich emulsion. Further murine studies demonstrate that this emulsion may also provide protection after other cardiac events including myocardial infarction (heart attack).

Lead Inventor:

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Applications:

• Protection of neural cell viability following ischemic stroke
• Prevention of cell death in the treatment of a myocardial infarction
• Organ (e.g., lung, intestine, liver, kidney, spinal cord) survival and function following hypoxic-ischemic injury
• Prevention of cardiac arrhythmias
• Treatment of traumatic brain injury incurred during athletics or military conflict
• Prevention of coronary artery stenosis following cardiovascular intervention

Advantages:

• Eliminates the risk of excessive bleeding associated with thrombolytic therapies
• Fatty acid emulsion displays sustained efficacy when injected during a specified window of time after trauma
• Releases DHA slowly so as to limit toxicity and maximize effect
• Has been shown to demonstrate long-term neuroprotective effects
• Emulsion formulation makes administration much safer than injection of free fatty acids
• Emulsion promotes cellular uptake of fatty acids

Patent Information:

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Related Publications:


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