Erythropoietin-Derived Short Peptide and Its Mimics as Immuno/Inflammatory Modulators

Published date: May 9, 2014

Technology description

Invention Summary

Erythropoeitin (Epo) is a hematopoietic growth factor widely used in the treatment of anemia and has been claimed to have direct neuroprotective effects. However, long-term Epo therapy can lead to the excessive elevation of platelets and red blood cells in non-anemic individuals. A short Epo-derived peptide has recently been shown to induce differentiation and prevent cell death in rodent and human neuronal cell lines while lacking the erythro-proliferative effects. The present invention is a method for treating inflammatory disorders and traumatic brain injury with Epo-derived short peptides. These Epo-derived short peptides have been found to be highly protective in mouse models of EAE, acute stroke, and brain injury. The protection was maintained during long term observation in EAE mice and was not associated with hematological side effects. These peptides protect against tissue damage by significantly diminishing tissue responses to injury which are mediated by the inflammatory network. They reduce the major histocompatibility complex (MHC) class I and II over-expression, reduce inflammatory cytokines, and suppress antigen-specific T cell function in peripheral lymphoid tissue and brain tissue as well as inin vitrotissue culture assays. Moreover, the addition of a small bicyclic compound to the N- or C- terminal of the short Epo peptides increases their stability without affecting their biological activity.

Application area

The Epo-derived peptides have potential for clinical application in the treatment of symptoms of CNS and PNS diseases and disorders associated with acute and chronic injury including demyelinating diseases, traumatic brain injury, spinal cord injury, and stroke. The beneficial effect of this peptide is not limited to the nervous system and can be useful in the treatment of autoimmune disorders, for the suppression of graft rejection following organ transplantation, and for tissue protection in other non-CNS or PNS systems such as the cardiovascular and musculoskeletal systems.

Advantages

First tool of its kind to analyze DNA profiles quantitatively

Low template mixtures can be analyzed, making process cost-effective

Allele frequency and stutter incorporation makes this method unique and effective

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