Description

Title of Invention

Composition for treating pain

Technical Field

The present invention relates to a composition for relieving or treating pain, the composition comprising a gene encoding glutamate decarboxylase and a gene encoding an anti-inflammatory cytokine and, in particular, use of the composition in the manufacture of a medicament for relieving or treating pain.

Background Art

The term “pain” used by the International Association for the Study of Pain is defined as “actual or potential tissue damage or an unpleasant sensory and emotional experience associated therewith.” Pain protects parts of the damaged body during the healing of the damage from the damage occurrence and motivates a human being to avoid similar experiences in the future. Most pain is relieved gradually if the cause of stimulus is removed, but sometimes the pain persists even though the damaged site has clearly healed as the stimulus has disappeared, or the pain develops in a state where no irritation, damage or disease has occurred.

Neuropathic pain is a type of non-malignant chronic pain that is induced by abnormality of a nerve, a spinal cord or a brain and is assumed that 1% or more of the population is suffering therefrom. The most common causes of neuropathic pain are trauma, metabolic and ischemic disorders, etc., which cause pathological nerve impulses to be transmitted to the brain through the spinal cord, resulting in pain occurrence. Neuropathic pain can be classified into peripheral neuropathic pain and central neuropathic pain depending on the location affected.

If such neuropathic pain persists for a long period of time, it may lead to mental

Holdings Inc. has developed a therapeutic agent in which a gene encoding enkephalin, an opioid peptide, was introduced into herpes simplex virus (HSV) gene carrier. However, in a clinical trial, the problem of declining in its analgesic efficacy has been found, and thus, its progression was halted at phase 2 study. HSV had the advantage of delivering genes to peripheral nerves even when subcutaneously administered, but, in fact, gene delivery efficiency is inferior and it seems to have difficulty in suppressing pain with only enkephalin, an opioid peptide.

Disclosure of Invention

The invention is defined in the independent claims. Some optional features of the invention are defined in the dependent claims. An example as disclosed herein relates to use of a composition in the manufacture of a medicament for relieving or treating pain, which composition comprises a gene encoding glutamate decarboxylase (GAD) and a gene encoding an anti-inflammatory cytokine, in particular a gene encoding interleukin-10 (IL-10).

An additional example relates to a composition comprising a gene encoding GAD and a gene encoding an anti-inflammatory cytokine, in particular IL-10, for use in the relief or treatment of pain.

Also disclosed herein is a pharmaceutical composition for relieving or treating pain, which comprises a gene encoding glutamate decarboxylase (GAD) and a gene encoding an anti-inflammatory cytokine, in particular IL-10; and the pharmaceutical composition for use in the relief or treatment of pain.

Advantageous Effects

A pharmaceutical composition as disclosed herein can exhibit analgesic effect with only a small amount of gene delivery, and the pain-relieving efficacy can be observed even with a smaller amount of gene delivery as compared to single administration. GABA, a product of the GAD gene, has the efficacy of blocking pain

Claims:

Claim 1. Use of a composition comprising a gene encoding glutamate decarboxylase (GAD) and a gene encoding interleukin-10 (IL-10) in the manufacture of a medicament for relieving or treating pain.

Claim 2. The use according to claim 1, wherein the composition comprises a first vector operably containing a gene encoding GAD and a second vector operably containing a gene encoding IL-10.

Claim 3. The use according to claim 2, wherein the composition comprises a first vector containing a gene encoding GAD and a second vector containing a gene encoding IL-10 in a virus titer-based mixing ratio per unit volume of 1: 1 to 1: 50.

Claim 4. The use according to claim 3, wherein the first vector and the second vector comprise at least one viral vector selected from the group consisting of adenovirus, adeno-associated virus, herpes simplex virus, lentivirus, retrovirus and poxvirus.

Claim 5. The use according to any preceding claim, wherein the GAD is at least one selected from the group consisting of GAD65 and GAD67.

Claim 6. The use according to claim 5, wherein the GAD consists of the amino acid sequence of SEQ ID NO: 1 or SEQ ID NO: 4.

Claim 7. The use according to claim 5, wherein the gene encoding GAD consists of the base sequence of SEQ ID NO: 2, SEQ ID NO: 3 or SEQ ID NO: 5.

Claim 8. The use according to any preceding claim, wherein the IL-10 consists of the amino acid sequence of SEQ ID NO: 6 or SEQ ID NO: 9.

Claim 9. The use according to any of claims 1 to 7, wherein the gene encoding IL-10 consists of the base sequence of SEQ ID NO: 7, SEQ ID NO: 8 or SEQ ID NO: 10.

Claim 10. The use according to any preceding claim, wherein the pain is nociceptive pain, psychogenic pain, inflammatory pain, or pathological pain.

Claim 11. The use according to claim 10, wherein the pain is neuropathic pain, cancer pain, postoperative pain, trigeminal neuralgia, idiopathic pain, diabetic neuropathic pain, or migraine.

Claim 12. The use according to claim 1, wherein the pharmaceutical composition further comprises a physiologically acceptable carrier.

Claim 13. The use according to any preceding claim, wherein the pharmaceutical composition is provided in the form of an injection.