

Methods for Treating and Alleviating Neuropathic Pain Using ApoA-I Binding Protein (AIBP)

Tech ID: 29128 / UC Case 2016-150-0

BACKGROUND

Neuropathic pain is a type of persistent pain usually occurring longer than 3 months, associated with peripheral nerve problems, but also can arise from chronic inflammatory diseases like arthritis, chemotherapeutic-induced peripheral neuropathy in the treatment of cancer or a neurodegenerative disease or condition. The chronic pain has an extraordinary negative impact on quality of life. While opiates, NSAIDs, and anticonvulsants can relieve pain for short intervals, they are less effective for chronic therapy, particularly when components of the pain state involve persistent inflammation and/or injury to the peripheral nerve. Aside from efficacy, many of the potent agents are beset with limiting side effects and issues related to dependence and addiction. This relative lack of long-term efficacy of even approved agents is evident from clinical trial results, which often indicate that most subjects complete even successful trials with pain that is sufficiently severe as to permit reentry into the same trial. What is needed is a new treatment modality.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have demonstrated that TLR4 was critical in mediating the transition from acute to persistent pain. TLR4 and other receptors involved in inflammatory signaling localize, constitutively or upon ligand binding, to lipid rafts, which are membrane microdomains characterized by high content of cholesterol and sphingomyelin. AIBP binds to activated TLR4 and facilitates cholesterol removal from "pathologic lipid rafts," which in turn disrupts the raft platform for inflammatory receptors assembly and reduces neuroinflammation. Raising AIBP levels results in selective disruption of lipid rafts in inflamed but not normal cells.

APPLICATIONS

Delivering therapeutically effective amounts of AIBP (either in the form of AIBP polypeptide or AIBP-expressing nucleic acid) to specifically target inflammatory processes associated with pain. Besides neuropathic pain the technology can also lead to novel treatments for acute respiratory distress syndrome, atherosclerosis and vascular inflammation, Alzheimer's disease, epilepsy and rheumatoid arthritis.

ADVANTAGES

Single administration of AIBP can reverse chronic pain as validated in chemotherapy induced peripheral neuropathy. No adverse effects of intrathecal administration have been observed in mouse models; the mice retained normal motor and sensory function.

STATE OF DEVELOPMENT

The investigators have shown that the intrathecal delivery of an ApoA-I peptide reverses neuropathic pain in several mouse models.

INTELLECTUAL PROPERTY INFO

A PCT patent PCT/US2016/064938 has been published on June 15, 2017

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OTHER INFORMATION

KEYWORDS

Neruopathic pain, peripheral nerve,
TLR4, ApoA-I Binding Protein,
AIBP,cholesterol, neuroinflammation

CATEGORIZED AS

- **Medical**
- Delivery Systems
- Therapeutics

RELATED CASES

2016-150-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20180360993	12/20/2018	2016-150

Additional Patent Pending

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