Non-Opioid Solution to the Opioid Crisis: scFv Immunotherapeutics for Pain Management

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Technology description

Researchers at the University of New Mexico and Loyola University Chicago have engineered an endogenous peptide fragment (scFv) antibody as an alternative, non-opioid treatment for chronic pain management.
The antibodies were generated to an endogenous peptide from immunized mice spleens utilizing a cell-free ribosome display. Analyses of the antibodies were used to determine effectiveness on acute to chronic and chronic trigeminal nerve injury-induced pain and anxiety related behaviors. These analyses show direct correlation with chronic orofacial neuropathic pain in humans. Hence, the study will allow for the potential of scFv antibodies to reverse the effects of chronic pain and increase the possibility of targeted treatment for recognized syndromes with extensive pain.

Background

Effective non-addictive, non-opioid therapeutics for chronic pain remain a critical need in light of the national opioid crisis with 115 Americans dying daily from drug overdoses. Current pain therapies utilize various analgesics, the most common being opioids and NSAIDS (ibuprofen, Aleve, etc.). However, in some instances there is a poor therapeutic response to these treatments leaving the individual with severe chronic pain. A recently proposed alternative is the use of single-chain Fragment variable (scFv) antibodies. These antibodies were proven to be a promising interactive bio-therapeutic application for nervous and immune system related pain. Their small size and solubility allow them to penetrate the blood-brain barrier, further increasing their pain management capabilities.
Chronic neuropathic pain is a challenging area in pain management therapies, due to a lack of therapeutic response when treated. To address this challenge, various peptide receptors present in the brain circuitry have been analyzed as targets for pain management. These studies address the urgent need for novel non-opioid approaches for the management of all types of pain that show greater efficacy, better tolerability, and wider safety margins.

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Application area

Non-opioid approach
Cell-free ribosome display scFv antibody technology
Rapid selection and isolation of best antibodies with high affinity and selectivity
Minute structure, capable of crossing Blood-Brain Barrier
Numerous targets for prevention of chronification of pain
Wider safety margins
Greater efficacy in chronic pain treatment
Increased treatment tolerability

Institution

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