Virus-like Particle Vaccines for Opioid Drugs

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Technology description

Researchers at the University of New Mexico have developed a novel treatment method for opioid use disorders.
This invention uses virus-like particles (VLPs) derived from bacteriophage. Bacteriophage VLPs are ideal in vaccines, due to their highly immunogenic, self-assembling protein structures. Derivatives of opioid drugs will be synthesized to chemically conjugate at a high density on the VLPs. These vaccines will be assessed for immunogenicity in mice over a period of time, through a range of doses and immunization schedules. The elicited antibody titers, longevity of the antibody response, and optimal dosing and immunization schedule will be assessed to achieve long-lasting and high titer antibodies to the drugs of interest. This treatment method can be used for prevention of opioid use disorder and addiction; as well as, a complementary treatment.

Background

The opioid crisis in the United States is a growing epidemic. Novel treatments for opioid use disorders are essential and imperative. Opioid vaccines with long-lasting antibodies and high titer with the ability to block opioid drug activity are a preferred approach. Vaccines currently entering the market are focused on generating derivatives of opioid drugs such that they can be conjugated to an immunogenic protein carrier. This conjugate approach has shown moderate success in eliciting antibodies to hydrocodone, oxycodone, morphine, and fentanyl. Despite the success, the conjugate vaccines are not highly immunogenic, requiring multiple boosts and the addition of adjuvants to elicit high titers. Additionally, they are not capable of eliciting long-lasting antibody responses. Presently, there is a growing demand for a novel treatment for opioid use disorder that has the ability to elicit high titer, long-lasting antibodies capable of blocking opioid drug activities.

Technology Description

Researchers at the University of New Mexico have developed a novel treatment method for opioid use disorders. This invention uses virus-like particles (VLPs) derived from bacteriophage. Bacteriophage VLPs are ideal in vaccines, due to their highly immunogenic, self-assembling protein structures. Derivatives of opioid drugs will be synthesized to chemically conjugate at a high density on the VLPs. These vaccines will be assessed for immunogenicity in mice over a period of time, through a range of

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Application area

Bacteriophage VLPs are highly immunogenic vaccine platforms
Exhibit long-lasting effects
Elicit high-titer antibodies
Alternative for opioid drugs
Multipurpose Treatment

Institution

The University of New Mexico

Inventors

Bryce Chackerian
Naomi Lee
Kathryn Marie Frietze

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com