Docket #: S22-299

Allosteric Modulators of the Mu-Opiod Receptor and Cannabinoid Receptor 1

Researchers at Stanford have synthesized a potential novel class of pain relief drugs.

Traditional opioids, while highly effective for acute pain management, have historically been prescribed as long-term analgesic treatments despite their well-known addictive properties. Fully synthetic opioids such as fentanyl are even more potent than traditional opioids and have further fueled the opioid epidemic. Both synthetic and traditional opioids act as agonists against the mu-opioid receptor (MOR). Considering the far-reaching socioeconomic impacts of the opioid epidemic, new pain relief therapeutics are needed to quell further morbidity and mortality. In another vein, it has been shown that cannabinoid receptors (CB1 and CB2) are essential components of pain modulation.

Stage of Development
Research -

in vitro

Stage of Research
The inventors have discovered and characterized novel modulators of MOR and CB1. These compounds have the potential to act on the same biological systems as opioids with potentially reduced addictive properties. Additionally, these compounds have potential roles in treating opioid overdose. Some compounds disclosed in this patent are positive allosteric modulators (PAMs) and some are negative allosteric modulators (NAMs) of MOR. Rather than acting as direct agonists and binding to the binding site of these receptors, they bind at alternative locations on the protein to effect function. This provides a distinct benefit of these compounds over traditional or synthetic opioids in that molecules that bind at allosteric sites can signal more

specifically through the MOR or CB1 to avoid off-target effects, including potential psychoactive effects.

Technology Reference Nos.
CZ Biohub ref. no. CZB-264S
Stanford ref. no. S22-299

Applications

- Novel therapeutic avenues for the treatment of acute and chronic pain
- Development of non-addictive medications for pain relief

Advantages

- These compounds have potentially less psychoactive or addictive effects when compared to currently available opioid medication.
- More specifically, target receptors involved in pain modulation, reducing off-target effects.

Patents

- Published Application: WO2024112721
- Published Application: 20260191856

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