



# MOR/NOP dual agonists as safer pain killers

## INDICATIONS:

Moderate to severe pain

## PATENTS:

US and ROC (Taiwan) patent applications

## DEVELOPMENT STATUS:

Lead to Candidate

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## INVENTION DESCRIPTION

The present invention is an agonist with good safety which can activate the  $\mu$ -opioid receptor (MOR) and the nociceptin (NOP) receptor. This agonist can rapidly activate MOR receptor for pain relief with ED<sub>50</sub> value of 0.6 mg/kg (s.c.). In addition, this invention demonstrated less constipation, respiratory suppression, and heart rate decreasing via the route of activation of NOP.

## COMPETITIVE ADVANTAGES

Compare to the most famous opioid, morphine, this series of MOR/NOP agonists demonstrated potent antinociception in tail flick and cancer pain mouse models with fewer side-effects in respiratory suppression, heart rate decreasing, and constipation models than morphine. Four advantages of this invention are: 1. **A rapid period painkiller** - The onset of the antinociceptive effect of this drug was within one minute after intravenous injection, and within five minutes after subcutaneous injection. 2. **Slight affecting in the digestive system** - This drug caused less constipation. 3. **High level of safety** - This drug caused low and short-term effects on lung and heart function. This help to protect the frail elder patients and reduce the risk of drug usage.

## MARKET POSITIONING/OPPORTUNITY

Pain management is a global issue. Over 20% of the population in the world suffers from pain. According to the IMS Health report, the market of pain relievers in 2013 was 57.29 billion. Analgesics are the second prescription of pharmaceuticals and appear a rapid expansion in the global. However, some patients still not receiving adequate pain control due to the lack of safe pain relievers for treatment of moderate/severe pain. The usage of opiates causes many adverse effects (eg. constipation, tolerance, dependence, respiratory depression, hypotension and withdrawal symptoms). Currently, there is no MOR/ NOP receptor agonist in the market. The discovery of novel analgesic with high safety and fewer adverse effects has its own niche market.