Life Science

Towards a solution to the ‘opioid crisis’: Development of novel MOR antagonists derived from fentanyl

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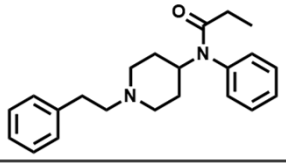
Purpose of Research

Recently, fatal opioid overdoses are increasing worldwide, giving rise to the “opioid crisis” and driving demand for μ-opioid feceptor (MOR) antagonists. Existing FDA-approved medications, such as naloxone (NLX) and nalmefene, have drawbacks including a short duration of action, side effects, and severe withdrawal symptoms. To overcome these shortcomings, novel MOR antagonists were synthesized based on fentanyl, aiming to develop a safe and effective treatment for opioid overdose.

Summary of Research

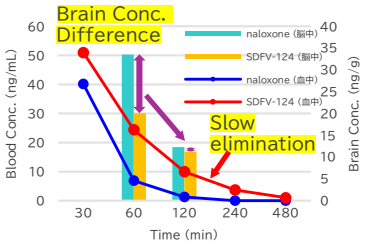
Our SDFV-series represents the world’s first MOR antagonists derived from the fentanyl scaffold. SDFV-114 and SDFV-124 demonstrated excellent brain residual compared to naloxone. These compounds have a long duration of action, provide sufficient therapeutic effect with a single dose, and have very mild withdrawal symptoms. They are cheap and easy to synthesize in large quantities. SDFV-series are highly promising candidates for treating acute opioid poisoning.

Fentanyl
MOR agonist



MOR antagonist
SDFV-series

MOR antagonist	Naloxone	Nalmefene	SDFV-series
Effect (Relative Potency)	–	4x NLX	1-10x NLX
Duration of action	×	○	○
Side effects	○	×	○
Withdrawal	×	×	○
Ease of structural modification	×	×	○



Comparison with Conventional or Competitive Technologies

- Longer duration of action
- Less severe withdrawal symptoms
- Easier and cheaper chemical synthesis

Expected Applications

- Antidote for acute opioid poisoning
- Treatment for opioid analgesic overdose

Challenges in Implementation

- Pharmacokinetic evaluation
- Safety assessment

What We Expect from Companies

- Funding acquisition
- Social needs assessment & market research
- Issue verification

We welcome support from your extensive experience and broad networks.

Points

- Longer duration of action
- Milder withdrawal profile
- Minimized side effects
- Low-cost, high-volume supply

Future Developments

April 2027: Non-clinical Studies
Company Founding
April 2030: Phase I Clinical Trial
April 2032: M&A

■Grant :AMED under Grant No. A476ATR
■ Awards:Next generation award, 41th Medicinal Chemistry Symposium, DMC, PSJ in 2024
■Patent :JP 2024-174109

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