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Analgesic and anti-addictive compositions for treatment of chronic pain and opioid addiction

Strategically substituted agmatine derivatives as selective NMDA receptor subunit 2B (NR2B) antagonists for the treatment of chronic pain and opioid addiction.

IP Status: US Patent Pending; Application No. 17/291,345 / EPO Patent Pending ; Application No. 19888057.7

Applications

- Application
  Medications for relief of neuropathic or inflammatory pain
- Application
  Treatment or prevention of opioid analgesic tolerance, dependence and addiction

Key Benefits & Differentiators

- **Comparable efficacy to current NMDA receptor antagonists:** Preclinical data suggested strategically substituted agmatine (SSA) compounds displayed comparable efficacy to the current prescribed centrally acting NMDA receptor antagonists.
- **Reduced abuse liability** by targeting non-opioid analgesic or anti-hyperalgesic targets
- **Lower incidence of side effects:** SSA selectively target NR2B receptor, a subunit of NMDA receptor that has been demonstrated to have lower incidence of motor and memory side effects.

Antagonists of NMDA receptor subunit 2B reduce chronic pain without side effects

Chronic pain affects over 100 million Americans, costing the US economy $600 billion annually in health care and lost productivity costs. Although prescription opioid analgesics, such as morphine, fentanyl, hydrocodone and oxycodone, are the gold standard for management of chronic, post-surgical and post-traumatic pain, drug abuse, addiction and respiratory depression constitute a huge, current societal problem. Targeting non-opioid analgesic or anti-hyperalgesic targets represents an effective method to avoid those problems. Antagonism of the NMDA receptor reduces signs of chronic pain in preclinical models, however, adverse effects prohibit further pursuit of this target. Researchers at the University of Minnesota have developed a series of strategically substituted agmatine compositions selectively targeting NMDA receptor subunit 2B (NR2B) to avoid motor and memory side effects. These compounds have been proven to reduce chronic pain without opioid addiction in preclinical models.

Improved blood brain barrier permeability and analgesic outcome

Agmatine selectively antagonizes NR2B, exhibiting inhibitory effects on chronic pain without the

Technology ID
20170362

Category
Life Sciences/Biologics
Life Sciences/Biochemicals & Small Molecules
Life Sciences/Human Health
Life Sciences/Pharmaceuticals
Life Sciences/Therapeutics

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associated motor toxicity. In addition, agmatine reduces or prevents opioid-induced tolerance and dependence. However, agmatine is highly polar and cannot cross the blood brain barrier. In this technology, the strategically substituted agmatine derivatives have been shown with improved blood brain barrier permeability and the analgesic outcome with higher potency.

Phase of Development

TRL: 3-4
Efficacy tested in preclinical mice models.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

- **Carolyn Ann Fairbanks** Professor, Pharmaceutics