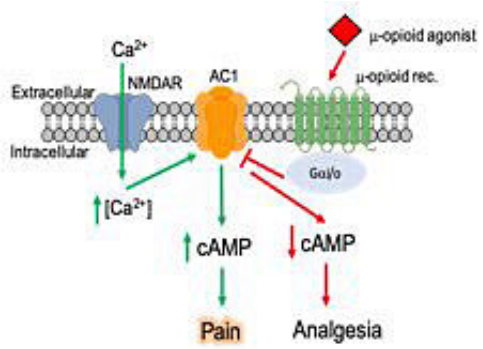
# The power of the brain to fight opioid addiction, treat chronic pain

10 July 2019, by Chris Adam




This figure shows a simplified model of chronic pain signaling and opioid analgesic signaling. Credit: Purdue University

The annual cost of chronic pain in the United States is estimated to be more than $635 billion in direct medical costs, lost productivity and disability programs. One in five adults—50 million Americans—report living in chronic pain.

The increasing number of patients is leading to a major push to develop non-opioid treatments for chronic pain. The Centers for Disease Control and Prevention estimates that an average of 130 Americans die each day from an opioid overdose.

Researchers at Purdue University are developing compounds to provide effective pain relief without the risks associated with opioids. The compounds selectively inhibit adenylyl cyclase 1 (AC1), an enzyme that has previously been validated to target chronic inflammatory pain.

"I have had chronic back pain for more than 30 years," said Val Watts, a professor of medicinal chemistry and molecular pharmacology and the associate dean for research in Purdue's College of Pharmacy, who helps lead the research team. "I have a long-standing interest in understanding the mechanisms for AC1 in opioid dependence."

AC1 is a brain enzyme that becomes overactive in chronic pain states and is found where the pathways for chronic pain signaling and opioid analgesic signaling intersect.

"Our technology bypasses the opioid receptor and directly inhibits AC1 activity," Watts said. "Because compounds that target AC1 will be non-addictive and have the potential to treat opioid withdrawal they could be used to transition patients from opioids to AC1 inhibitors."

Watts said the technology being developed at Purdue also could help in treating cancer pain and tooth-related pain.

Provided by Purdue University