A Peptidomimetic Modulator of the CaV2.2 N-type Calcium Channel for Chronic Pain

October 15

Tuesday, 12:30 pm

Billings Building—Rosedale Room

SPEAKER:

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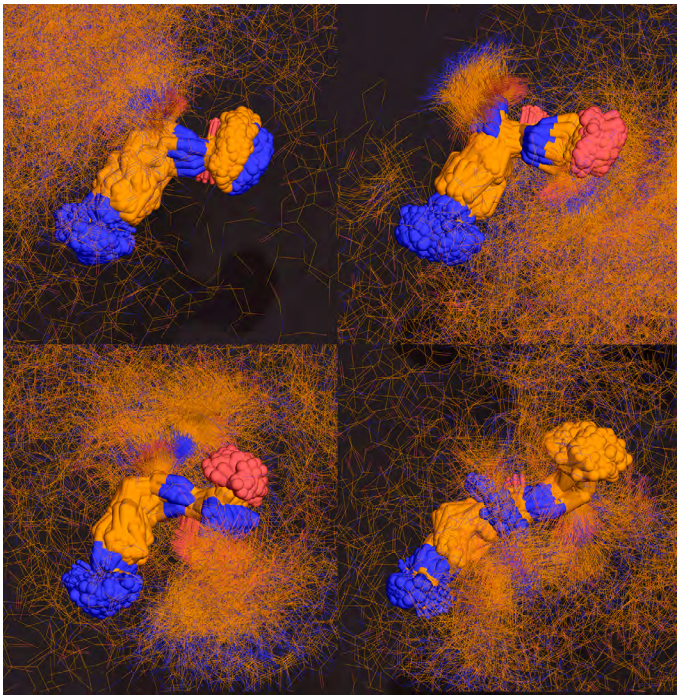
Abstract



Transmembrane Cav2.2 voltage-gated calcium channels play a central role in pain through providing the Ca2+ for sustained neuronal firing and neurotransmitter release. Therapeutics targeting Cav2.2 include the blocking peptide toxin Ziconotide and the gabapentinoids (e.g., Gabapentin), which target an auxiliary subunit of Cav2.2; however, both drugs are encumbered with numerous side effects. Collapsin response mediator protein 2 (CRMP2) is key cytosolic regulator of Cav2.2. CBD3063, a novel peptidomimetic we devised, selectively curbs Cav2.2 activity, paralleling Gabapentin in alleviating neuropathic and inflammatory pain across sexes. In contrast to Gabapentin, CBD3063 upheld the protective/adaptive role of pain, without negatively affecting sedative, depressive, or cognitive behaviors. In short, CBD3063 may be a superior successor in pain management.

Publications

1. Kimberly Gomez, Ulises Santiago, Tyler S Nelson, Heather N Allen, Aida Calderon-Rivera, Sara Hestehave, Erick J Rodríguez Palma, Yuan Zhou, Paz Duran, Santiago Loya-Lopez, Elaine Zhu, Upasana Kumar, Rory Shields, Eda Koseli, Bryan McKiver, Denise Giuvelis, Wanhong Zuo, Kufreobong E Inyang, Angie Dorame, Aude Chefdeville, Dongzhi Ran, Samantha Perez-Miller, Yi Lu, Xia Liu, Handoko, Paramjit S Arora, Marcel Patek, Aubin Moutal, May Khanna, Huijuan Hu, Geoffroy Laumet, Tamara King, Jing Wang, M Imad Damaj, Olga A Korczeniewska, Carlos J Camacho, Rajesh Khanna. *A peptidomimetic modulator of the CaV2.2 N-type calcium channel for chronic pain.* Proc Natl Acad Sci USA. 2023 Nov 21;120(47):e2305215120. doi: 10.1073/pnas.2305215120. Epub 2023 Nov 16.

2. Samantha Perez-Miller, Kimberly Gomez, Rajesh Khanna. *Peptide and Peptidomimetic Inhibitors Targeting the Interaction of Collapsin Response Mediator Protein 2 with the N-Type Calcium Channel for Pain Relief.* PMC11249630 (available on 2025-06-06).

3. Heather N Allen, Sara Hestehave, Paz Duran, Tyler S Nelson, Rajesh Khanna. *Uncoupling the CRMP2-CaV2.2 Interaction Reduces Pain-Like Behavior in a Preclinical Joint-Pain Model.* PMID: 39233208 DOI: 10.1016/j.jpain.2024.104664 2024 Sep 2:104664. doi: 10.1016/j.jpain.2024.104664. Online ahead of print.