

## **Molecular Approaches towards New Pain Therapeutics**

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Voltage gated calcium channels are important players in the transmission and processing of pain signals. N-type calcium channels are located in afferent nerve terminals in the spinal dorsal horn where they regulate neurotransmitter release. I will discuss how these channels are regulated in pain sensing neurons by opioid receptors, and how this regulation may be important for the development of morphine tolerances. T-type channels regulate afferent fiber excitability and their activities are enhanced during chronic pain conditions. I will discuss how these channels are regulated by ubiquitination, how this affects pain signaling, and illustrate ways by which this can be exploited towards the development of new pain therapeutics. I will describe optogenetic approaches towards elucidating pain processing in the afferent pathways and in the CNS.