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PHARMACOLOGICAL MANIPULATION OF TRANSLATION AS A THERAPEUTIC TARGET FOR CHRONIC PAIN

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Pain is a distressing sensation that the body feels when it is under stress ("which is actually a protective signal"). Nosiseptive information is normally sent to the CNS, which interprets the signals and sends them to the peripheral organs. When the body experiences similar pain signals over a longer period of time, the brain may decide that the body requires the nerve fibers to be more sensitive and nerves to be adapted accordingly. As a result, the nervous system enters a vicious cycle, in which the longer the pain exists, the more difficult it is to cure. The idea behind Pharmacological Manipulation of Translation (PMT) is that chronic pain can be mediated by changes in the expression and/or function of specific proteins in the central nervous system. Translation has been used as a therapeutic target for chronic pain via pharmacological manipulation, with promising results in animal models. The mechanism underlying these effects is unknown, but changes in gene transcription and protein translation appear to be involved.

The economic impact of chronic pain exceeds the annual costs of heart disease, cancer, and diabetes combined. Treatment with currently available medications entails significant long-term negative effects. Translational mechanisms regulate the changes in gene expression that are essential for greater sensitization, according to preclinical study. In our work, we'll look at the regulatory mechanisms that limit translation initiation and how to change them to alleviate chronic pain. According to literary data, the role of mammalian/mechanistic target of rapamycin, mitogen-activated protein kinase – interacting kinase inhibitors, and AMPK activators in reducing pain hypersensitivity and regulating phosphorylation of eukaryotic initiation factor 2a. Specific translational regulatory systems could be targeted to reverse alterations in hypersensitivity in pain-related neurons.Apart from the development of nonaddictive, non-opioid analgesics,enhanced customized pain management approaches are one of the most major unmet needs in pain clinical treatment. There are currently no clinical diagnostic methods that can predict whether a person will develop chronic pain or whether drugs will be beneficial for a particular patient. Furthermore, we lack the tools necessary to investigate the underlying biological disease pathways in individual chronic pain patients. The advantages of developing such tools are evident. Because the molecular processes of chronic pain in people would be better understood, we would be able to better identify people at risk of developing chronic pain, treat certain types of chronic pain more effectively, and aid future drug development efforts.This rising ability to alter gene expression at this level with extremely specific pharmacological treatments is one reason to focus on translation regulation.