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Research opens the way to new treatments for chronic pain and cancer

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In a recent paper published in *Nature Communications*, a group of Case Western University School of Medicine researchers presented their discovery of the full-length structure of a protein named Transient Receptor Potential Vanilloid subtype 2 (TRPV2). Taken in addition to their study of its molecular mechanism last year, published in the December issue of Molecular and Cellular Biology, Dr. Vera Moiseenkova-Bell's laboratory has revealed TRPV2 as a new target for pharmaceutical research treating chronic pain and cancer.

The two studies are unlike previous results because Moiseenkova-Bell's lab is the first to accurately model the structure of TRPV2 in its entirety. Additionally, the group used neuronal cells to reveal the previously uncharacterized molecular mechanism of TRPV2 function in the process of neurite growth.

"By combining our findings regarding both this protein's structure and molecular mechanism, we can investigate it with a more holistic understanding," says Principal Investigator Vera Moiseenkova-Bell, PhD, an assistant professor in the department of pharmacology at the School of Medicine. "This positions us to develop pharmaceutical compounds that target TRPV2 as treatment for chronic pain."

Unlike acute pain, which alerts to possible injury, chronic pain is a debilitating condition, which may persist for months or longer. It might be related to a number of different medical conditions and is often difficult to diagnose. The Moiseenkova-Bell lab has discovered that

TRPV2 is involved in outgrowth of sensory neurons under a neurotrophin-regulated signaling cascade. A neurotrophin release in response to spinal injury leads to inflammatory signaling and aberrant outgrowth in peripheral sensory neurons, resulting in potentially crippling chronic pain. By understanding the molecular mechanism and structure of the proteins which cause this aberrant outgrowth, such as TRPV2, it may be possible to develop new therapeutic treatments for chronic pain.

The potential benefits of this research are not just limited to treating chronic pain, but extend to the possibility of treating malignant cancer cells. Dr. Moiseenkova-Bell concludes, "TRPV2 is expressed everywhere in the body, and has been shown to be involved in malignancy in neuroblastomas, prostate cancer and bladder cancer. If we can study this protein in cancer cell lines, we could discover how it behaves and, in the long term, we may have more options to choose from when designing pharmaceutical compounds to treat these conditions."

Provided by Case Western Reserve University