

Methods for treating pain and predicting cancer immune therapy efficacy

Value proposition

Chronic pain is a major health problem that affects approximately 1.5 billion people worldwide. The annual economic cost of chronic pain in the United States, including both treatment and lost productivity is estimated at \$635 billion. Current non-opioids treatments are partially effective, while opioids are habit-forming, especially with long-term use. Therefore, there is an urgent demand for effective and safe pain medicine.

Technology

Dr. Ru-Rong Ji and colleagues have reported a method for treating pain intended to help treat inflammatory pain, neuropathic pain, and cancer pain. They have uncovered programmed cell death ligand-1 (PD-L1) as an endogenous inhibitor of acute and chronic pain. The checkpoint inhibitory protein PD-L1 inhibited acute inflammatory pain. Furthermore, PD-L1 reduced chronic pain effectively, including nerve-injury-induced neuropathic pain and bone cancer pain in rodents, via both peripheral and central actions. PD-L1 is produced not only by cancer cells but also by non-malignant tissues such as skin, dorsal root ganglion neurons, and spinal cord. Given the high potency of PD-L1 in suppressing pain, local targeting of PD-L1 signaling axis in sensory neurons may lead to the development of new analgesics. This invention was demonstrated in mouse models.

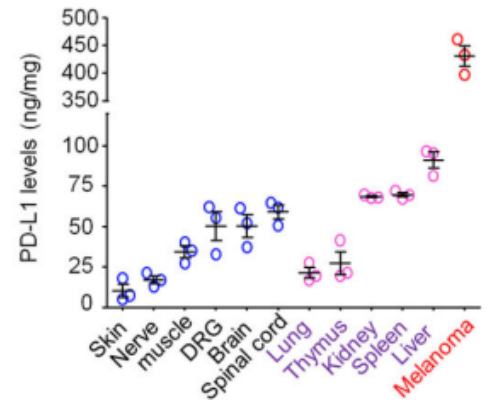
Other applications

The invention can also be used as a diagnostic tool to help predict the efficacy of immunotherapies in patients by performing a quantitative sensory test immediately after administration of a therapeutic capable of suppressing PD-1 -associated nociceptive neuron activity. This was demonstrated in melanoma-bearing mice studies.

Advantages

- A new therapeutic target for pain that provides an alternative to opioids
- The same target can be used to assess the efficacy of immunotherapies by measuring changes in pain levels
- Invention has been demonstrated in animal models

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Inventor(s)

- Ji, Ru-Rong

Links

- [From the lab of Dr. Ru-Rong Ji](#)
- [A review by the inventor - Neuroimmune modulation of pain and regenerative pain medicine \(JCI, 2020\)](#)

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Publications

- [PD-L1 inhibits acute and chronic pain by suppressing nociceptive neuron activity via PD-1 \(Nature Neuroscience, 2017\)](#)
- [PCT application \(PCT/US2018/032475\)](#)