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### Meet the Inventors

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### Department

Anesthesiology (Dept. and CRU)

### Publication(s)

### External Link(s)

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

## Suppression of neuropathic pain by intrathecal delivery of bone marrow stem cells

### Value proposition

Neuropathic pain is a chronic, often debilitating condition caused by damage or injury to the nerves. Neuropathic pain is a common condition that result from various conditions trauma, viral infections, cancer, neurological conditions such as multiple sclerosis and metabolic conditions such as diabetes. This chronic condition is difficult to treat effectively. The potential of treating chronic pain with stem cells via spinal implantation has been explored, but this is very invasive. Systemic injection of bone marrow stromal cells (BMSCs) may alleviate inflammatory and neuropathic pain, but pain relief may be short-lived. The BMSCs are short-lived after systemic administration to a subject (e.g. 2-3 days) and do not necessarily localize at the site of inflammatory and/or neuropathic pain. Currently available therapies produce limited pain relief and often cause undesirable side effects. Therefore, there is an urgent need for safe and effective treatment.

### Technology

Investigators at Duke have found a method to treat chronic pain intended to treat patients with neuropathic pain such as chemotherapy-induced peripheral neuropathy, diabetic peripheral neuropathy, and inflammation-related pain such as arthritis and low-back pain. Intrathecally injected bone marrow stem cells (BMSCs) migrates toward the site of injury and produces a long-term relief from nerve injury-induced neuropathic pain symptoms via TGF- $\beta$ 1 secretion. This invention alleviated neuropathic pain symptoms, such as allodynia and hyperalgesia, for several weeks in mouse models.

### Advantages

- This technology can sustain analgesic effectiveness for more than two months
- Intrathecal injection is minimally invasive compared to direct injection into the injured tissue
- The small intrathecal space allows for injection of small amounts of bone marrow stem cells (BMSCs) to reach therapeutic concentrations

