Scientists chart spinal circuitry responsible for chronic pain

5 December 2014

Salk Professor Martyn Goulding and Jovanny Bourane, Salk research associate. Credit: Salk Institute for Biological Studies

Pain typically has a clear cause–but not always. When a person touches something hot or bumps into a sharp object, it's no surprise that it hurts. But for people with certain chronic pain disorders, including fibromyalgia and phantom limb pain, a gentle caress can result in agony.

In a major breakthrough, a team led by researchers at the Salk Institute and Harvard Medical School have identified an important neural mechanism in the spinal cord that appears to be capable of sending erroneous pain signals to the brain.

By charting the spinal circuits that process and transmit pain signals in mice, the study, published online November 20, 2014 in *Cell*, lays the groundwork for identifying ways to treat pain disorders that have no clear physical cause.

"Until now, the spinal cord circuitry involved in processing pain has remained a black box," says Martyn Goulding, Salk professor in the Molecular Neurobiology Laboratory and a co-senior author of the paper. "Identifying the neurons that make up these circuits is the first step in understanding how chronic pain stems from dysfunctional neural processing."

In many instances, people who suffer from chronic pain are sensitive to stimuli that don't normally cause pain, such as a light touch to the hand or a subtle change in skin temperature. These conditions, referred to generally as forms of allodynia, include fibromyalgia and nerve damage that is caused by diseases such as diabetes, cancer and autoimmune disorders.

More information: "Identification of Spinal Circuits Transmitting and Gating Mechanical Pain." DOI: 10.1016/j.cell.2014.11.003

Provided by Salk Institute