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# Somatosensory Coding Gone Wrong: The Origins of Neuropathic Pain

Chronic pain affects about 1 in 5 people. Chronic neuropathic pain – or pain caused by damage to the nervous system – is particularly hard to treat and is often associated with light touch becoming mistakenly perceived as painful. Numerous neurobiological changes contribute and are often said to “increase gain”. Here I will describe how such changes distort coding. For instance, the hyperexcitability that develops in certain sensory neurons can switch their operating mode from high- to low-pass filtering; in other words, hyperexcitable neurons do not simply respond more to the same stimulus, they also start responding to different stimuli and become more prone to temporal summation. Reduced inhibition in the spinal cord likewise alters receptive field organization (i.e. spatial tuning), unmasking previously subliminal inputs and encouraging spatial summation. Beyond highlighting the experimental evidence for these changes, my talk will emphasize the importance of computational modeling to help decipher the basis for and consequences of those changes for the perception of tactile stimuli. I will also address how deeper mechanistic understanding of somatosensory coding can be harnessed to strategically refine therapeutic interventions, like spinal cord stimulation, to better treat chronic neuropathic pain.