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Brainstem-cortex synaptic plasticity in the trigeminal neuropathic pain

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Mechanical allodynia and hyperalgesia are primary symptoms of trigeminal neuropathic pain (TNP) and are highly resistant to analgesics or surgical intervention. However, the mechanisms underpinning the transition of acute into chronic pain known as "atypical odontalgia" in TNP remain unclear. We optimize the infraorbital nerve chronic constriction injury (IOCCI) model and the behavioral testing conditions to create stable allodynia for 6-8 weeks. Electrical physiological recording in vivo were performed to characterize an increase in synaptic transmission in the trigeminal ganglia (TG)-SpV synapses and medial thalamus (MT)-ACC synapses in TNP state. To clarify that the mechanisms initiating neuropathic pain differ from mechanisms for its maintenance an Elvax containing tetrodotoxin will be implanted into the nerve injury area on different time points. Immediate following nerve injury local nerve blockade, Elvax-TTX, prevents the increase in the ACC synaptic transmission as well as allodynia. However, the same nerve blockade during the later phase (10 days after nerve injury) failed to prevent long-term tactile allodynia and ACC-LTP. This is the first evidence that cortical plasticity may be intimately developed during the initial phase of trigeminal neuropathic pain. Understanding changes in the CNS processing in human surrogate models of trigeminal neuropathic pain should contribute to a better understanding of the neurobiology of chronic facial pain disorders and to facilitate the identification of potential therapeutic targets in the brain cortex for human TNP.

Biography

Ying Li was a General Surgeon at the Qinghai and Oral-Maxillofacial Surgeon at Nanjing Medical School, China. He has completed his Post-doctoral fellowship in Department of Internal Medicine Hypertension, University of Michigan, where he was appointed as an Assistant Research Scientist in 1997 and Research Professor in the University of Michigan, Medical School Department of Internal Medicine in 2002. He has joined the Department Biomedical Science City, University of Hong Kong in December 2009.

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