

Identification of target molecules for cure of neuropathic pain accompanied with demyelination

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【Outline of survey】

Since the declaration of Decade of Pain Control and Research passed through US Congress, pain science has been one of major medical topics. Above all chronic neuropathic pain, resistant to morphine or anti-inflammatory drugs has been focused by many researchers. The presence of major symptom, allodynia, where tactile stimulus causes a burning pain, indicates that the chronic pain does not simply reflect long lasting symptomatic pain, but etiological pain. Although sprouting, ephaptic fiber cross talk and misconnect at the spinal dorsal horn could be involved, little has been known of underlying mechanisms. We have recently discovered that lysophosphatidic acid receptor plays major roles in the initiation of such neuropathic pain accompanied with demyelination. On the other hand, we have also identified several molecular markers for nociceptive fibers responsible for neuropathic pain, and established new method to visualize downstream neuronal networks started from the cell expressing specific molecules. Using these new strategies, in this project, we attempt to visualize the plasticity of nociceptive neuronal circuits from nociceptive fibers to the brain through spinal cord, and to identify molecules involved in such plasticity.

【Expected results】

By visualizing the neuronal circuits and its plasticity under the chronic neuropathic pain, we could prove the hypothesis that the chronic pain does not simply reflect long lasting symptomatic pain, but etiological pain. In addition, by discovering molecules responsible for plasticity of neuronal circuits and neuropathic pain from the visualized neurons, we could provide many neuroscientists important information useful for the study of neuronal plasticity and contribute to the development of new analgesics for intractable neuropathic pain.

【References by the principal researcher】

Initiation of neuropathic pain requires lysophosphatidic acid receptor signaling, Inoue, M, Rashid H, Fujita, R, Contos, JJA, Chun, J and Ueda H. Nature Medicine 10, 712-718, 2004

【Term of project】 FY 2005 - 2009

【Budget allocation】 83,300,000 yen

【Homepage address】 <http://www.ph.nagasaki-u.ac.jp/lab/neuro/index-e.html>