原著

新しいin vivo標本を用いた脊髄痛覚伝達機序の解析

吉村 恵* 古江秀昌* 成川圭太* 熊本栄一*

要旨：In vivoパッチクランプ法を用い，末梢皮膚刺激によって脊髄後角細胞に誘起されるシナプス応答を解析した．膠様質細胞は触刺激と機械的痛み刺激に応答し，それはグルタミン酸を介した速い経過のEPSCの頻度と振幅の増加であった．熱刺激には全く応答しなかった．一方，深層の細胞は，触刺激や機械的痛み刺激と共に熱刺激にも応答した．これらの応答も経過の速いEPSCで仲介され，ペプチドを介する緩除なEPSCは観察されなかった．

索引用語：in vivoパッチクランプ，膠様質細胞，EPSC，機械的痛み，熱応答

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In vivo patch-clamp analysis of pain transmission in the spinal dorsal horn

Megumi Yoshimura*, Hidemasa Furue*, Keita Narikawa* and Eiichi Kumamoto*

Abstract: We developed an *in vivo* patch-clamp recording technique to analyze nociceptive transmission in the adult rat spinal dorsal horn with mechanical or thermal stimuli applied to the hind limb. After male adult rats were anesthetized with urethane (1.2g/Kg, i.p.), artificial ventilation and bilateral pneumothorax were made. A rat was fixed in the stereotaxic apparatus and patch-clamp recordings were made from substantia gelatinosa (SG, lamina II) or the deep dorsal horn neurons. The noxious and non-noxious mechanical stimuli given were : blowing puffs of air onto the skin and pinching the skin folds with a pair of toothed forceps, respectively. A thermal stimulator with a radiant heat lamp was used to noxious stimuli. Application of the mechanical noxious or non-noxious stimuli resulted in an increase of EPSCs in amplitude and frequency in all the SG neurons tested. These EPSCs were depressed by CNQX and no slow response remained. Thermal stimuli (43-60°C) elicited an EPSC in the deep dorsal horn but not in the SG neurons. The responses in deep dorsal horn neurons were mediated only by fast EPSCs and no peptidergic slow EPSC was observed.

These observations suggest that the mechanical sensations are transmitted to the SG and deep dorsal horn neurons, while the thermal information is conveyed selectively to the deeper neurons.

Key words: *in vivo* patch-clamp recording, substantia gelatinosa, EPSC, mechanical response, thermal response