背側縫線核由来セロトニンおよび5－HT_{1A}受容体アゴニストのSM－3997による海馬CA_1ニューロンの抑制

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INHIBITION OF HIPPOCAMPAL CA_1 NEURONS BY 5-HYDROXYTRYPTAMINE, DERIVED FROM THE DORSAL RAPHE NUCLEUS AND THE 5-HYDROXYTRYPTAMINE$_{1A}$ AGONIST SM-3997

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ABSTRACT Electrophysiological studies, using chloral hydrate-anesthetized rats, were undertaken to determine whether hippocampal pyramidal neurons, receiving input from the medial septal nucleus, were affected by 5-hydroxytryptamine (5-HT) derived from the dorsal raphe nucleus. The pyramidal neurons in the CA_1 region of the hippocampus were classified into short- and long-latency neurons, based on their response to stimulation of the medial septal nucleus. Microiontophoretically applied atropine inhibited the generation of spikes upon stimulation of the medial septal nucleus in short-latency neurons, but had no effect on long-latency neurons. In the short-latency neurons, the stimulation-induced spikes of the medial septal nucleus were inhibited by conditioning stimuli applied to the dorsal raphe nucleus and iontophoretic application of 5-HT and the 5-HT_{1A} agonists, SM-3997 (3aα, 4β, 7β, 7aα-hexahydro-2-(4-(4-(2-pyrimidinyl)-1-piperazinyl)-butyl)-4, 7-methano-1H-isoindole-1, 3(2H)-dione dihydrogen citrate) and 8-OH-DPAT (8-hydroxy-2-(di-*n*-propylamino) tetralin). The conditioning effect of the dorsal raphe nucleus was antagonized by methysergide. However, in the long-latency neurons, the spikes elicited by stimulation of the medial septal nucleus were not affected by the conditioning stimulation of the dorsal raphe nucleus, or iontophoretically applied 5-HT. These results indicate that 5-HT, originating in the dorsal raphe nucleus inhibited hippocampal pyramidal neurons receiving

cholinergic input from the medial septal nucleus, but not those receiving non-cholinergic input from the medial septal nucleus. The drug SM-3997 inhibited the activity of hippocampal pyramidal neurous, that receive excitatory cholinergic input from the medial septal nucleus by acting on 5-HT_{1A} receptors.

抄録 内側中隔野より入力を受ける海馬錐体ニューロンが腹側縫線核（DR）由来セロトニンの影響を受けるか否かを検討する目的で，ラットを用いた電気生理学的研究を行った。CA_1 錐体ニューロンは，内側中隔野（MS）刺激により誘発される反応の潜時により単潜時と長潜時ニューロンに分類された。イオントホレーシス法により投与したアトロピンは単潜時ニューロンの発火を抑制したが，長潜時ニューロンには影響しなかった。単潜時ニューロンにおいて，MS刺激誘発スパイクは，DR条件刺激により抑制されるとともに，セロトニンおよび5-HT_{1A} アゴニストSM-3997の投与により抑制された。一方，長潜時ニューロンはこれらの処置により影響を受なかった。以上の結果は，SM-3997がMSよりアセチルコリン性入力を受ける海馬錐体ニューロンに対して，5-HT_{1A} 受容体を介し抑制作用を発現することを示唆する。

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