nisms of barbiturate anesthesia.

10 Action of β-alanine and taurine on the Substantia Gelatinosa Neurons of the Adult Rat Spinal Cord

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Background: Some anesthetic effects on the glycine receptor are observed at pharmacologically relevant concentrations, it is possible that at least part of their acute effects are mediated by glycine receptor. In addition to glycine, at least two other endogenous amino acids activate glycine receptors, β-alanine and taurine which are structural analog of GABA and glycine. There is therefore the possibility that β-alanine and taurine acts as neurotransmitter and/or neuromodulator. However, untill now, little is known of the action of β-alanine and taurine on the substantia gelatinosa (SG) neurons of the Spinal Cord.

To clarify whether β-alanine and taurine has effects in the dorsal horn and whether the GABAergic system or the Glycinergic system is its major target, we investigated the action of β-alanine on the inhibitory synaptic responses in SG neurons of the rats spinal cord, where the glycinergic and GABAergic system has been reported to plays a major inhibitory roles.

Methods: Thick (500-600μm) spinal cord slices were prepared from adult rats (6-8 weeks), Blind whole-cell patch-clamp recordings were made from lamina Ⅱ neurons in voltage clamp mode. Membrane currents were amplified with an Axopatch 200B. Data were collected and analyzed using pClamp 9.0. Paired t-test was used where appropriate.

Results: β-alanine and taurine-induced currents revealed a reversal potential around -70mV indicating an increase in chloride conductance. The increase in amplitude caused by β-alanine and taurine were concentraion-dependent. The effect of β-alanine and taurine in SG neuron show no difference at the concentration of 0.3mM, but when the concentration increase to 3mM, the taurine-induced currents was much higher than β-alanine-induced currents. In SG neuron held at 0 mV, application of β-alanine (0.3mM) or taurine (0.3mM) induced outward currents and bath-application of bicuculline (20μM) did not significantly inhibit this currents while strychnine (2μM) inhibit it significantly.

Conclusions: β-alanine and taurine both increase the membrane C1-conductance in the SG neurons. The increase of amplitude caused by β-alanine and taurine were concentration-dependent.. β-alanine and taurine selectively activates postsynaptic glycine but not GABA receptors at low concentrations (0.3mM) in the SG neurons.

11 サイアミラールによる中枢神経興奮抑制の画像解析

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バルビタール系静脈麻酔薬のサイアミラールは$GABA_A$受容体を賦活し，興奮を抑制するとされている．$GABA_A$受容体が豊富な大脳皮質において，サイアミラールが神経興奮の伝搬，特に空間的な広がりをどのように抑制するのか，高速蛍光測定により可視化し，画像解析することを試みた．雄性C57BL6Jマウス（8-10週齢）大脳皮質体性感覚野の冠状切片を作成し，膜電位感受性蛍光色素RH414で染色した後，人工脳脊髄液で灌流しながら，大脳皮質Ⅴ層に電気刺激を与え，高速カ