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Presentation Abstract

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Title: Modulation of sensory-evoked field potentials by monoamines in the hemisect spinal cord of the mouse

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Abstract: We reported previously (SFN abstr. 146.15/I11, 2006) that 5-HT, DA and NA depressed markedly sensory-evoked primary afferent depolarization (PAD), while excitability of afferent fibers inferred by Wall's technique, as well as orthodromic afferent volleys were not affected. However, it was not clear to what extent synaptic efficacy of low threshold afferent fibers or excitability of interneurons interposed in the pathways mediating PAD were modulated by these neurotransmitters. To this end we investigated in the mouse the effects of monoamines on the monosynaptic extracellular field potentials (EFPs) recorded at the dorsal horn of the hemisect spinal cord preparation with hindlimb attached. PAD was inferred from dorsal root potentials (DRPs) recorded at L4 and elicited by electrical stimulation of low threshold (4 xT) sensory afferents of selective the TIB nerve. Monosynaptic EFPs were simultaneously recorded at the dorsal horn 100-150 μ m depth below the cut surface of the spinal cord. In 5 preparations we found that 5-HT (10 μ M) depressed reversibly monosynaptic EFPs ($70 \pm 12\%$) and DRPs ($68 \pm 12\%$), and produced no change in the amplitude of afferent volleys. On the other hand, DA and NA (10 μ M) barely affected monosynaptic EFPs, depressed reversibly DRPs amplitude (36 ± 13 and $42 \pm 11\%$, respectively), and produced no change in the amplitude of afferent volleys. The lack of effect of monoamines on orthodromic afferent volleys suggests that the excitability of peripheral axons was not affected. Bearing in mind that 5-HT, DA and NA produce no change in the intraspinal excitability of afferent fibers, as reported

before, it can be suggested that the decrease of synaptic efficacy exerted by 5-HT is not due to direct changes in fiber polarization. Altogether these results suggest that 5-HT depresses EFPs and DRPs by decreasing synaptic efficacy and possibly by acting at postsynaptic level, whereas DA and NA have no effect on synaptic efficacy of afferent fibers but modulate the excitability of downstream events mediating PAD. This could include actions on interposed interneurons and/or on postsynaptic GABA-A receptors.

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