

Role of ryanodine receptors in the effects of hydrogen sulfide on transmitter release from the frog motor nerve ending

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Abstract

We studied the role of ryanodine receptors in the effects of hydrogen sulfide on transmitter release from frog motor nerve ending. Sodium hydrosulfide (300 μM), a donor of hydrogen sulfide, reversibly increased the frequency of miniature endplate current without changes in its amplitude-time parameters. These effects were associated with reversible increase in endplate current amplitude, which was abolished by activation of ryanodine receptors of intracellular Ca^{2+} stores with caffeine (3 mM) and ryanodine (0.5 μM). Under conditions of ryanodine receptors blockade with ryanodine (10 μM), sodium hydrosulfide had no effect on induced transmitter release, but its effects remained unchanged during ryanodine receptors blockade with dantrolene (25 μM). We concluded that an enhanced acetylcholine release induced by hydrogen sulfide is related to an increase of intracellular Ca^{2+} concentration due to activation of ryanodine receptors for intracellular Ca^{2+} -pool. © 2013 Springer Science+Business Media New York.

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Keywords

hydrogen sulfide, myoneural junction, ryanodine receptors, transmitter secretion