Roles of brain hydrogen sulfide in micturition of rats

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Peripheral hydrogen sulfide (H_2S) is reported as an endogenous relaxation factor in the bladder, while in the central nervous system, roles of H_2S in regulation of micturition is unclear. In this study, therefore, we examined effects of centrally administered GYY4137 (GYY, H_2S donor) or AOAA (H_2S synthesis inhibitor), on the micturition reflex in urethane-anesthetized (0.8 g/kg, ip) male Wistar rats. A catheter was inserted into the bladder to perform cystometrograms (CMG). CMG was started 2 h after the surgery and 1 h after the start, GYY (3 or 10 nmol/rat) or AOAA (30 or 100 μg/rat) was intracerebroventricularly (icv) administered. Effects of icv pretreated SR95531 (SR, $GABA_A$ antagonist, 0.1 nmol/rat) or SCH50911 (SCH, $GABA_B$ antagonist, 0.1 nmol/rat) on the GYY-induced responses were also examined. GYY dose-dependently prolonged intercontraction intervals (ICI), while AOAA dose-dependently shortened ICI. The AOAA-induced ICI shortening was reversed in the presence of GYY. Pretreatment with SR or SCH significantly attenuated the GYY-induced ICI prolongation. These results suggest that brain H_2S can inhibit the micturition reflex via brain $GABA_A$ and $GABA_B$ receptors in rats.