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Differences in hydrogen sulfide-induced relaxation of the bladder between hypertensive and normotensive rats

Suo Zou¹, Takahiro Shimizu¹, Shogo Shimizu¹, Hideaki Ono¹, Yohei Shimizu¹, Masaki Yamamoto¹, Takaaki Aratake¹, Yoshiki Nagao¹, Tomoya Hamada¹, Yusuke Ueba¹, Youichirou Higashi¹, Motoaki Saito¹

¹*Dept. of Pharmacol., Kochi Med. Sci., Kochi Univ.*

Our recent report showed that hydrogen sulfide (H₂S) is a possible relaxation factor in the rat bladder. Because we have shown bladder dysfunctions develop in spontaneously hypertensive rats (SHRs), we compared effects of NaHS and GYY4137 (H₂S donors) on the bladder contractility and the micturition reflex, and H₂S contents in the bladder between 18-week-old male SHRs and normotensive Wistar rats (Wistars). Effects of NaHS (1×10^{-8} to 3×10^{-4} M) were evaluated on carbachol (10^{-5} M)-induced pre-contracted bladder strips. Under urethane-anesthesia, effects of intravesically instilled GYY4137 (10^{-8} to 10^{-6} M) on the rat micturition reflex were examined. Tissue H₂S contents were measured by the methylene blue method. NaHS-induced maximal relaxation was significantly higher in the strips of Wistars than those of SHRs. GYY4137 significantly prolonged intercontraction intervals in Wistars, but not in SHRs. The H₂S content in the bladder of SHRs was significantly higher than that in Wistars. These results suggest that H₂S-induced bladder relaxation in SHRs is impaired, which might be a cause of hypertension-mediated development of bladder dysfunctions, thereby resulting in a compensatory increase of the H₂S level in the SHR bladder.