Hydrogen sulfide (H$_2$S) is the third endogenous gasotransmitter besides carbon monoxide and nitric oxide [1], and has a wide range of biological functions including neuromodulation, vasorelaxation and cytotoxicity [2]. In the lower urinary tract, H$_2$S donors induce contraction of the detrusor [3] and relaxation of the pig bladder neck [4], suggesting a possibility that H$_2$S may have site-specific effects on the bladder. However, the detailed functions of H$_2$S in each part of the bladder are still unclear. In addition, there are no reports showing physiological roles of H$_2$S in the prostate.

Endogenous H$_2$S is produced from L-cysteine (L-Cys) by enzymes: cystathionine β-synthase (CBS), cystathionine γ-lyase (CSE), 3-mercaptopropionylglycine sulfoxide transferase (MPST) and cysteine amino transferase (CATH) (Fig. 1). CBS and CSE produce H$_2$S from L-Cys directly, and MPST produce H$_2$S from 3-mercaptopropionate (3MP), which is produced by CAT from L-Cys (Fig. 1). Recently, a novel pathway for endogenous H$_2$S production from L-Cys (D-Cys) is also reported [6], namely, D-Cys is metabolized by D-amino acid oxidase (DAO) to 3MP, which is a substrate for MPST to produce H$_2$S (Fig. 1).

In the present study, therefore, we investigated (1) pharmacological profile of exogenous H$_2$S-induced relaxation of the rat bladder dome and trigone (BL-D and BL-T) and dorsolateral and ventral prostate (PR-D and V), and (2) expression levels of CBS, CSE, MPST, CAT and DAO in each site of these tissues.