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Urothelium EP_1 receptor facilitates the micturition reflex in mice

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ABSTRACT

We investigated the presence of EP_1 receptor in the urothelium and its role in micturition reflex by examining the effect of intravesical administration of prostaglandin E_2 (PGE_2), an EP_1 agonist (ONO-DI-004), acetic acid, and capsaicin. Age-matched EP_1-KO mice and C57BL/6 wild-type (WT) mice were used. Western blots and standard immunohistochemical procedures were performed. Cystometrygram (CMG) was performed without anesthesia in a restraining cage. ATP release from the cultured urothelium cells was performed using luciferin-luciferase luminometry. The EP_1 receptor was found to be present in the urothelium. In WT mice, PGE_2 infusion shortened the intercontraction interval (ICI) in a dose-dependent fashion; however, it did not alter the ICI in EP_1-KO mice. The EP_1 agonist significantly shortened the ICI in WT mice, but not in EP_1-KO mice. Acetic acid and capsaicin shortened the ICI in both WT mice and EP_1-KO mice. EP_1 agonist, PGE_2 and capsaicin provoked ATP release from cultured urothelial cells. These results suggest that EP_1 receptor was present in bladder urothelium, and could be activated by PGE_2 to release ATP. EP_1 receptor in urothelium might be important for reflex voiding in pathological conditions.

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