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Special Section on Therapeutic Approaches to Treat Disorders of the Urinary and Gastrointestinal Tracts—Editorial

This Special Section, published in the *Journal of Pharmacology and Experimental Therapeutics*, collected five manuscripts, including original research articles and minireviews, focused on the latest mechanistic and therapeutic advancements for genitourinary and gastrointestinal disorders with the goal of providing the latest updates on the topic.

The two original research manuscripts tested pharmacological approaches to target cellular receptors and ion channels involved in the contractile function of the upper and lower gastrointestinal tracts in respective animal models. The paper by Kek et al. (2024) identified a novel role for the thromboxane A2 receptor in lower esophageal sphincter (LES) function. The results of the study provided evidence that thromboxane A2 receptors are expressed in the LES clasp and sling fibers, and application of thromboxane A2 receptor agonist, U46619, induced concentration-dependent contractions in porcine LES. Additional experiments suggested that the potential mechanism of action of U46619 on LES function likely involves activation of nifedipine-sensitive voltage-gated calcium channels. The manuscript by Cook et al. (2024) established a role for transient receptor potential vanilloid 1 (TRPV1) signaling on colorectal function and nociception in rats with acute spinal cord injury (aSCI). The results of the study show that intrarectal administration of TRPV1 receptor agonist, capsaicin, triggered rapid but short-in-duration colorectal contractions capable of stimulating defecation in both intact and aSCI rats. In addition, the contractions were blocked by atropine, supporting the involvement of the muscarinic receptor signaling pathway.

Three minireviews included in this Special Section provided an overview of the latest research and therapeutic advances, with a focus on nitric oxide (NO) signaling in priapism resulting from sickle cell disease (SCD), the regulation of colon-urinary bladder cross-sensitization by satellite glial cells (SGCs), and the clinical diagnosis and treatment of urological chronic pelvic pain syndrome (UCPPS). The first minireview by Pereira et al. (2024) outlines the molecular mechanisms linked to the dysfunction of the NO-cGMP-phosphodiesterase type 5 (PDE5) pathway implicated in SCD-associated priapism and describes pharmacological approaches for the treatment of priapism, including PDE5 inhibitors, hormonal modulators, NO donors, soluble guanylate cyclase stimulators, haptoglobin, hemopexin, and antioxidants. The paper by Qiao (2024) provides a comprehensive evaluation of SGC function and discusses their role in neuron-glia interactions and pelvic organ cross-sensitization. Among the reviewed pathways are neurotrophin and purinergic systems, ion channels (TRP, Piezo, NMDAR, etc.), and SGC single-cell RNA-sequencing data from injured and uninjured sensory ganglia. The minireview by Ashraf et al. (2024) compiled recent advancements in the clinical diagnosis and treatments of Urological Chronic Pelvic Pain Syndrome (UCPPS), with a focus on the underlying pathophysiological mechanisms of this multifactorial disease, including signaling pathways and molecular targets contributing to chronic pelvic pain. Urologic chronic pelvic pain syndrome includes nonbacterial prostatitis and bladder pain syndrome, both of which are characterized by persistent pain originating from the pelvis and associated with lower quality of life in the affected patients. This narrative review summarizes the latest recommendations for UCPPS diagnosis, including conventional and advanced bladder therapeutics, interventional approaches targeting growth factors, and the role of autoimmune and cognitive behavioral therapy in UCPPS to support an improved treatment algorithm.

In summary, this Special Section on "Therapeutic Approaches to Treat Disorders of the Genitourinary and Gastrointestinal Tracts" highlights the importance of original basic/translational and clinical research in the pharmacology and therapeutics of the genitourinary and gastrointestinal tracts and summarizes the current state of the research advances in these fields.

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