Persistent mast cell activity in bladder pain syndrome following recurrent urinary tract infection

Byron W Hayes\(^1\), Hae Woong Choi\(^1\), Abhay PS Rathore\(^1\), Chunjin Bao\(^1\), Jianling Shi\(^1\), Yul Huh\(^1\), Andrea Mencarelli\(^1\), Pradeep Bist\(^1\), Lai Guan Ng\(^1\), Changming Shi\(^1\), Joo Hwan Nho\(^1\), Aram Kim\(^1\), Hana Yoon\(^1\), Johanna L Hannan\(^1\), J Todd Purves\(^2\), Francois M Hughes Jr\(^1,10\), Ru-Rong Ji\(^4,11\), Soman N Abraham\(^1,9,12,13\).

\(^1\)Department of Pathology, Duke University Medical Center, Durham, NC, USA; \(^2\)Division of Life Sciences, Korea University, Seoul, 02841, South Korea; \(^3\)Department of Cell Biology, Duke University Medical Center, Durham, NC, USA; \(^4\)Center for Translational Pain Medicine, Department of Anesthesiology, Duke University Medical Center, Durham, NC, USA; \(^5\)Program in Emerging Infectious Diseases, Duke-National University of Singapore, Singapore 169857, Singapore; \(^6\)Singapore Immunology Network, Agency for Science, Technology and Research, Immunos, Biopolis, 138648, Singapore; \(^7\)Department of Urology, Konkuk University Hospital, Konkuk University School of Medicine, Seoul, 05029, South Korea; \(^8\)Department of Urology, Ewha Womans University, College of Medicine, Seoul, 07804, South Korea; \(^9\)Department of Pathology, Brody School of Medicine, East Carolina University, Greenville, NC, USA; \(^10\)Department of Surgery, Division of Urology, Duke University Medical Center, Durham, NC, USA; \(^11\)Department of Neurobiology, Duke University Medical Center, Durham, North Carolina, USA; \(^12\)Department of Immunology, Duke University Medical Center, Durham, NC, USA; \(^13\)Department of Molecular Genetics & Microbiology, Duke University Medical Center, Durham, NC, USA.

Introduction

- Bladder Pain Syndrome (BPS) is a broad-spectrum pelvic pain disorder characterized by pain and one or more underlying lower urinary tract symptoms (i.e., frequency).
- Current animal models are insufficient in presenting disease pathogenesis and progression.
- Clinically, mast cell (MC) mediators such as histamine are found in patient urine.
- Patients often report history of urinary tract infections (UTIs).

Based on these clinical observations, we sought to determine the underlying mechanism linking these clinical observations utilizing our murine model of BPS.

BPS Mouse Model – 3 once-a-week instillations of E.coli in the bladder

Mice with a history of UTIs void more frequently and experience pelvic pain.

Persistent MC and Nociceptor Activation in Bladder Lamina Propria 2 weeks after infection

MCs are Required for UTI induced BPS

Histamine Mediates BPS symptoms after UTI

Conclusion

- Our murine model of BPS recapitulates phenotypes observed in human patients, including prolonged MC activity.
- Pathology was dependent on nerve mediated signaling of MC-derived histamine in the bladder.

As our model was based on bladder UTIs, a common bacterial infection in humans, these findings demonstrate a possible etiology of BPS, and define the underlying basis for the observed BPS symptoms. Furthermore, these findings present a potential lasting impact of UTIs on bladder sensation and relevant cell types that may be involved.

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