Breaching host defenses in the urinary tract

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The sterility of the urinary tract is maintained by a variety of host mechanisms that prevent bacterial colonization and survival. The innate immune system encompasses physical barriers to infection as well as more specific soluble and cellular mediators of defense. If the mucosal barrier is breached, a rapid, effective response leading to the eradication of pathogenic microorganisms is elicited before they can cause significant injury. However, uropathogenic bacteria have developed a range of virulence factors that enable them to overcome these innate defense mechanisms and therefore persist within the urinary tract. In particular, recent evidence suggests that bacteria can actually utilize the host's own immune system to aid colonization. By hijacking host proteins, the bacteria are able to gain access to environments that are both rich in nutrients and protected from the bactericidal effects of host immunity. Fortunately, the balance between host defense and infection usually lies in favor of the host, but only minor shifts result in the development of clinical infection. We are moving into an era of greater understanding of the important factors that influence this balance between host and pathogen. In this article, we review the current understanding of the factors that influence the development of urinary tract infection. Understanding these mechanisms may contribute to the development of strategies to combat this common infection. (Hong Kong J Nephrol 2002;4(1):13-21)

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