

DEVELOPMENTS IN MICROBIOLOGY

ESKAPE PATHOGENS

VIRULENCE, RESISTANCE, AND MANAGEMENT



EDITED BY
KARTHIKEYAN RAMALINGAM



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Host-pathogen interactions in ESKAPE pathogen infections

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8.1 Introduction

Infections caused by multidrug-resistant (MDR) bacteria are among the most pressing health challenges in modern medicine. These infections are not only difficult to treat but are also associated with high rates of morbidity, mortality, and significant healthcare costs. Among these pathogens, a particular group known as the *ESKAPE* organisms has gained significant attention due to their resilience in hospital settings and their ability to escape the effects of multiple classes of antibiotics. The *ESKAPE* acronym represents six key pathogens that are notorious for their antibiotic resistance and ability to cause serious hospital-acquired infections. These pathogens share a common ability to evade the immune response and develop resistance to frontline antibiotics, including those of the last resort, such as carbapenems and vancomycin. Therefore understanding the intricate interactions between these pathogens and human hosts is crucial for developing effective therapeutic strategies (Chang et al., 2022; Luo et al., 2024). This chapter will delve into the molecular, cellular, and immunological dynamics between *ESKAPE* pathogens and their hosts, with a particular focus on the infection models used to study these interactions (Tables 8.1 and 8.2).

8.2 ESKAPE pathogens overview

8.2.1 *Enterococcus faecium*

Enterococcus faecium is a Gram-positive bacterium that primarily inhabits the human gastrointestinal tract. Although it can be harmless in healthy individuals, it is a significant cause