CHAPTER 2

SKIN IMMUNOLOGY–HOST FACTORS

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INTRODUCTION

Over the last decades, the incidence of fungal infections and related morbidity and mortality is on the rise due to the increase in number of patients with compromised immunity; HIV infection, cancer, hematopoetic stem cell and solid organ transplant recipients, diabetes mellitus and overall improvements in life-expectancy (1). Furthermore, increased use of long-term antibiotics, medical devices like catheters rise the risk of mucocutaneous fungal penetration and sepsis. It is estimated that over one billion people are afflicted globally with a fungal infection and more than 1.5 million people die yearly from infections caused by fungi. Global mortality due to fungal infections exceeds deaths from malaria and breast cancer and is equivalent to that owing to tuberculosis and HIV. Current data indicate *Candida albicans* to be the leading cause of nosocomial bloodstream infections with mortality rate of 40% (2,3). In addition to invasive infections, non-lethal mucocutaneous infections which cause significant morbidity have a very high prevalence worldwide. A common infection, vulvovaginal candidiasis for instance, affects about 75% of women during their fertile years (4). Likewise, superficial mycotic infections of the skin is estimated to affect more than 20–25% of the world's population (5, 6).

The skin is the largest organ of the human body, covering an area of 1.5 to 2.0 m^2 in adult. Being exposed to the environment, it is under assault by microorganisms, allergens, chemical and physical factors constantly (7). Therefore it has evolved to prevent the attachment of pathogenic organisms and mobilize a well-controlled response to eliminate them through coordination of innate and adaptive immune mechanisms if they penetrate through the skin. Meanwhile, self-tissues and commensals are protected from excessive damage. Main components

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22 synthesis. These cytokines eliminate fungal elements through increasing AMP synthesis and neutrophil recruitment. Meanwhile B-cell activation and antibody dependent cellular toxicity further eliminate fungi. As all layers of response are very important, genetic mutations of abovementioned systems cause impaired antifungal response. Moreover the use of monoclonal antibodies targeting IL-17 antagonists like secukinumab, ixekizumab and brodalumab have been related to increased risk of fungal infections.

Due to the increases in both overall life-expectancy, the number of immunocompromised patients and global climate changes, the prevalance of opportunistic and superficial fungal infections are likely to rise. Better understanding of host–pathogen relations may provide opportunity for development of more successful antifungal strategies.

Competing Interests

I have no competing interests.

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Figure 2.1.

Non-immune defence mechanisms of skin