JOURNAL OF PURE AND APPLIED MICROBIOLOGY, October 2014. Vol. **8**(5), p. 3421-3428

Pathogenesis of Systemic *Candida glabrata* Infection in an Intravenous Challenge Murine Model

Voon Kin Chin[1], Kuan Jeang Foong[1], Maha Abdullah[2], Rusliza Basir[3], Norhafizah Mohtarrudin[2] and Pei Pei Chong[1,4]*

[1]Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia.
[2]Department of Pathology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.
[3]Department of Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
[4]Translational Infectious Diseases Program, Centre for Translational Medicine, Department of Microbiology, National University of Singapore, Level 15 MD6, 5 Science Drive 2, National University of Singapore, Singapore 117597.

(Received: 04 May 2014; accepted: 26 June 2014)

The incidence of systemic infection caused by *C. glabrata* is increasing in immunocompromised patients and resulted in high mortality rate due to antifungal resistance. The pathogenesis underlying *C. glabrata* infection still remains elusive and requires extensive study on it. Hence, this study was aimed to elucidate the pathogenesis of a clinical *C. glabrata* isolate from a Malaysian patient in an intravenous challenged murine model. Mice were challenged intravenously with *C. glabrata* (1x10^8 organisms/mouse) via lateral tail vein and parameters such as quantitative yeast culture, red blood cells and haemoglobin counts, blood plate assay and histopathology were adopted to evaluate the pathogenesis of systemic *C. glabrata* infection. Transcript level of erythropoietin from blood at day 7 post infection was quantified via RT-qPCR. Kidneys of infected mice have highest fungal recovery rate as compared to other organs and there were yeast infiltration with mild inflammation seen in kidney and brain tissues. Red blood cells and haemoglobin counts were reduced throughout the infection period and this reduction which might be associated with the action of haemolysin enzyme of *C. glabrata* in conjunction with iron scavenging for the fungal growth. Erythropoietin mRNA level was found to be up-regulated in blood which indicated a possible role for erythropoietin in compensating the red blood cells loss throughout the infection period. This study reflected the core events during systemic *C. glabrata* infection and involvement of erythropoietin which could be of clinical relevance during systemic *C. glabrata* infection. However, further comprehensive *in vitro* and *in vivo* studies are warranted.

Key words: *C. glabrata*, Erythropoietin, Haemolysin, Red blood cells and haemoglobin counts, Histopathology, Quantitative yeast counts.

Candida glabrata is a commensal yeast that living in healthy mammalian host. However, it can cause mucosal and severe life threatening invasive infections when there is defect in host immune system. To date, *Candida albicans* is still the most common *Candida* species recovered from human infections. However, there is an increasing prevalence of infections caused by non- *Candida albicans Candida* (NAC) species, especially infection caused by *C. glabrata*[1]. *C. glabrata* is the second most common cause of candidemia in the United States, which accounts for approximately 20% of all *Candida* bloodstream isolates after *C. albicans*[2].

Rick factors to develop invasive *C. glabrata* infection include broad-spectrum antifungal therapy, indwelling vascular catheters,

* To whom all correspondence should be addressed.
Tel: +603-89472302/+6586219691;
Fax: +603-89472357;
E-mail: cpp@medic.upm.edu.my