Effect of tigecycline on the production of selected cytokines and counts of murine CD4\(^+\) and CD8\(^+\) T cells - an in vitro study

A. Jasiecka-Mikołajczyk, J.J. Jaroszewski, T. Maślanka

Department of Pharmacology and Toxicology, Faculty of Veterinary Medicine, University of Warmia and Mazury, Oczapowskiego 13, 10-718 Olsztyn, Poland

Abstract

Due to the unrecognized effect of tigecycline (TIG) on CD4\(^+\) and CD8\(^+\) T cells, the present study has been undertaken in order to determine whether the drug can affect these cells in respect of their counts, and the production of IFN-\(\gamma\), IL-17 (pro-inflammatory and immune-protective cytokines), IL-4 (anti-inflammatory and immune-protective cytokine), IL-10 and TGF-\(\beta\) (anti-inflammatory and immune-suppressive cytokines). Murine lymphocytes were treated with TIG for 48 and 96 h at concentrations reflecting its plasma levels obtained in vivo at therapeutic doses, and at 10-fold lower concentrations. It was found that TIG neither affected substantially the percentage and absolute counts of entire CD4\(^+\) and CD8\(^+\) T cell populations nor influenced the Foxp3\(^+\)CD25\(^+\)CD4\(^+\) regulatory/suppressive T cell subset. Furthermore, the percentages of IL-4-, IL-10-, IL-17- and TGF-\(\beta\)-producing CD4\(^+\) T cells were not altered following the exposure to TIG. Similarly, TIG did not influence IFN-\(\gamma\) production by CD8\(^+\) T cells. Thus, with respect to the parameters evaluated, TIG does not seem to exert immune-suppressive and anti-inflammatory effects.

Key words: tigecycline, CD4\(^+\) T cells, CD8\(^+\) T cells, cytokines, mouse

Introduction

Tigecycline (TIG), the first glyclycline antibiotic, is structurally derived from minocycline. TIG has antimicrobial activity against most Gram-positive and Gram-negative aerobic and anaerobic bacteria, and is used for the treatment of complicated skin infections, community-acquired pneumonia and complicated intra-abdominal infections (Traunmüller et al. 2009). Several reports indicate that tetracyclines have additional effects that are separate from their antimicrobial function, such as anti-inflammatory and immune-suppressive activity (Sun et al. 2015). However, the effect of TIG on the immune system is almost unknown. According to the available literature, all the knowledge on this question is limited to the information that TIG did not affect IL-1\(\beta\), IL-6, IL-8 and TNF-\(\alpha\) levels (Traunmüller et al. 2009, Sun et al. 2015, von Seth et al. 2015). Therefore, we decided to investigate whether TIG exhibits anti-inflammatory and/or immune-suppressive properties similar to those represented by other tetracyclines. To achieve this aim, the effects of TIG...