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Volume 3 • Issue 2 • 2019

Scientia Ricerca

Editorial

Clinical Biotechnology and Microbiology

ISSN: 2575-4750

Omadacycline : A Novel Potential Aminomethylcycline Antimicrobial for Treatment of Drug-Resistant Infections

Attapon Cheepsattayakorn[1]* and Ruangrong Cheepsattayakorn[2]

[1]10th Zonal Tuberculosis and Chest Disease Center, Chiang Mai, Thailand

[2]Department of Pathology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

***Corresponding Author:** Attapon Cheepsattayakorn, 10th Zonal Tuberculosis and Chest Disease Center, 143 Sridornchai Road Changklan Muang Chiang Mai 50100 Thailand.

Received: February 09, 2019; **Published:** February 12, 2019

Volume 3 Issue 2 February 2019

Since 1970s, antimicrobial resistance has been an gradually growing-health problem, globally [1]. Resistance to gram-positive and gram-negative bacterial organisms have been developed to older tetracyclines, such as minocycline and doxycycline [2]. In the United States, about 423,000 visits to emergency medicine departments had been diagnosed of pneumonia as the primary discharge diagnosis in 2014 and 51,811 individuals died of pneumonia (16.1 deaths per 100,000 population) in 2015 [3]. In a retrospective study, approximately 80% of pathogen-positive acute bacterial skin and skin structure infections (ABSSSIs) resulted from *Staphylococcus aureus* and around 46% of these positive-culture Staphylococcus aureus infections were methicillin-resistant *Staphylococcus aureus* with frequency of clinically diagnosed ABSSSIs in the study population being 496/10,000 person-years [4]. Nevertheless, there is urgent need for additional antimicrobials that is effective against common community-acquired pathogenic microorganisms [2].

There are two major mechanisms of resistance that are increased number of production of ribosomal protection proteins and efflux pumps, and two minor mechanisms of resistance that include enzymatic inactivation and modification of the ribosomal target [5-7]. Fortunately, omadacycline retains activity for organisms with these resistance genes and does not affected by resistance to other antibiotics [6-9]. In a double-blind clinical trial, its results revealed that omadacycline was noninferior to moxifloxacin in treating community-acquired bacterial pneumonia (CABP) [10]. The United States Food and Drug Administration (US FDA) accepted the New Drug Application (NDA) and granted priority review for amadacycline in treating CABP and ABSSSIs, including both intravenous and oral formulations and finally was granted US FDA approval on October 2, 2018 [2,11].

In conclusion, omadacycline represents a novel aminomethylcycline with a potent broad spectrum against community-acquired bacterial pathogenic microorganisms, including CABP and ABSSSIs. Omadacycline displays flavorably pharmacokinetics, low drug-drug interactions, low plasma protein binding, penetrating into epithelial lining fluid, lack of renal dosing adjustments, and early evidence of tolerability and efficacy, in additional to once daily oral and intravenous dosing.

Citation: Attapon Cheepsattayakorn and Ruangrong Cheepsattayakorn. "Omadacycline : A Novel Potential Aminomethylcycline Antimicrobial for Treatment of Drug-Resistant Infections". *Clinical Biotechnology and Microbiology* 3.2 (2019): 597-598.

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