



**MOLECULAR IDENTIFICATION OF ANTIBIOTIC RESISTANCE
AND VIRULENCE GENES OF *STAPHYLOCOCCUS AUREUS* FROM
NASAL ISOLATES AMONG MEDICAL LABORATORY TECHNOLOGY
(MLT) STUDENTS IN UITM PUNCAK ALAM**

By

RUFAIDA BINTI MUHAMMAD

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ABSTRACT

Staphylococcus aureus is gram positive bacterium that known as normal flora in human skin and nasal passages but it can be infectious as the presence of antibiotic resistance gene (*mecA*) and virulence gene (PVL) which contribute to Methicillin Resistance *Staphylococcus aureus* (MRSA). About 4.4% students that exposed to hospital environment during their clinical practice become nasal carrier of MRSA (Baliga *et al.*, 2008). As Medical Laboratory Technology (MLT) students will be exposed to hospital environment, they might become potential nasal carrier of MRSA. Hence, this study was conducted to identify the presence antibiotic resistance (*mecA*) and virulence (PVL) gene of *S.aureus* from nasal isolates among MLT students in UiTM Puncak Alam as well as to evaluate the association of possible risk factor with MRSA carrier. The nasal swab samples were taken from 144 students comprising 70 clinical and 74 pre-clinical students and questionnaire was given before nasal swabs collected. Cultural characteristic and biochemical test were identified *S.aureus* isolates and then proceeding to molecular analysis by using real time PCR as to determine the presence of *mecA* and PVL gene. Association of possible risk factor with MRSA were evaluated by statistical analysis of a questionnaire. Out of 144 nasal swab sample, cultural characteristics and biochemical reaction showed only 18 (12.5%) were *S.aureus* carrier. However, molecular analysis by using real time showed no amplification curve seen for *mecA* and PVL gene in any 18 isolates nasal carriage of *S.aureus*. Therefore, this study revealed that none of them were carrier of for MRSA and the association possible risk factor with MRSA carrier could not be determined.

Keywords: *Staphylococcus aureus*, antibiotic resistance gene, virulence gene, MRSA, real time-PCR

CHAPTER 1: INTRODUCTION

1.1 Introduction

Staphylococcus aureus is a bacterium that known as gram positive bacteria which one of the member of the Micrococcaceae family and also considered as a member of Macroccoccus genus (Lowy F 1998). *S.aureus* is a gram positive bacterium which shows cocci in cluster as grape-like cluster on microscopical examination. *S.aureus* is an aerobic and non-motile organism that grows readily on Sheep Blood Agar (SBA) with white-golden color colonies which surrounded by clear zones of beta hemolysis. White-golden color colonies in SBA are produced by carotinoid pigments and it responsible for the species name aureus which meaning “golden” in Latin. Moreover, the staphylococcal golden pigment also causes to destroy polymorphonuclear granulocyte and then promotes virulence through its antioxidant activity. Besides that, *S.aureus* also shows golden yellow pigmented colonies on Nutrient Agar (NA) with circular and convex shape. However, *S.aureus* can be easily differentiating from other staphylococcal species by positive result of coagulase, catalase, deoxyribonuclease (DNase) test. In addition, mannitol fermentation also the most efficient and clear cut identification test to differentiate *S.aureus* from other staphylococcal species by showing yellow colonies which surrounded by yellow zones or halo on the Mannitol Salt Agar (MSA) as it ferments mannitol by producing acid production (Tang, Y. W., & Stratton, C. W., 2010).

Staphylococcus aureus is a gram positive bacterium which known as one of the most common pathogen that may cause wide range of infection. This bacterium is a normal flora that frequently colonizes in human skin and nasal passage. Moreover, Lowy F (1998) also stated that about 30% of human population carries *S.aureus* in the nostrils. However, *S.aureus* colonization is quietly common in the anterior nares of nostrils because moist squamous epithelium of the nares become its primary habitat (Santhosh DV *et al.*, 2007). It also supported and agreement with Kaplan (2005) that about 40% *S.aureus* colonize in the anterior nares. According to