

BASIC SCIENCES II. –Microbiology, Pathology, Pharmacology, Oncology

MICROBIAL COMPOSITION AND DIVERSITY OF MICE COLONIZED WITH A CARBAPENEMASE-PRODUCING KLEBSIELLA PNEUMONIAE STRAIN

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Aims: Emergence and spread of multidrug-resistant bacteria represent a serious problem worldwide. The extended-spectrum β -lactamase (ESBL) and carbapenemase-producing Enterobacteriaceas (CPE) are in the critical category on the WHO antimicrobial resistance priority list. These bacteria are responsible for a large proportion of hospital-acquired infections. Intestinal colonization plays a crucial role in the spread of CPE.

Methods: In this study our goal was to investigate the effect of different per os antibiotic treatments on the microbial composition and diversity of C57BL/6 mice colonized with *K. pneumoniae* (KP5825). This strain expressed a carbapenemase gene, a PMQR gene and an ESBL gene. We also examined the colonization rate and the resistance gene copy number changes in the colonized mice. All experiments were carried out using 6–8 weeks-old C57BL/6 male mice. The animals were colonized with 5×10^6 CFU of KP5825 orally. After the colonization mice were divided into 6 groups. These groups received the following antibiotic treatments for 15 days: 0.5g/L ampicillin (AMP), 0.1g/L ceftazidime (CAZ), 0.5g/L ceftazidime, 0.1g/L ciprofloxacin (CIP) and 0.5g/L ciprofloxacin was administered in the drinking water (6th group: control). Fresh fecal pellets were collected from the animals every 3 days from which microbial DNA was extracted. In the second phase of our experiments we used qPCR technique to determine the KP5825 DNA quantities and assess the resistance gene copy numbers. The V3-V4 region of the 16S rRNA gene was amplified and sequenced to determine the microbiota composition and diversity in the intestines of colonized mice.

Results: Our results show that AMP and CAZ increased the colonization KP5825 and reduced the gut microbiome diversity originally characterized by *Bacteroides* dominance. In contrast, CIP did not increase the colonization rate.

Conclusions: We also observed strong negative correlation between the presence of multiple genera of different bacteria and the colonization rate with KP5825.

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