

TITLE: INITIAL STEPS TO BETTER UNDERSTAND WHY USA1100/ST30 MRSA LINEAGE IS WELL ESTABLISHED IN BRAZIL

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ABSTRACT:

Methicillin-resistant *Staphylococcus aureus* (MRSA) is associated with community and nosocomial infections, leading to high rates of mortality and morbidity worldwide. The USA300/ST8/SCC*mecIV* is well documented as a community lineage that has spread to hospitals around the world. On the other hand, in Brazil, the USA1100/ST30/CC30 lineage is disseminated in the community and has been emerging into hospital settings. Genomic and proteomic studies related to resistance and virulence of USA1100 isolates are limited, and little is known about the bacterial fitness that allows this lineage to be established in Brazil. Therefore, we aimed to compare the microbiologic features of 28 USA1100/ST30/SCC*mecIV* isolates (6 from nasal colonization [NC], 12 from skin and tissue infections [SSTI], 10 from bloodstream infections [BSI]) with 8 isolates related to the USA300/ST8/SCC*mecIV* lineage (1 from NC, 1 from SSTI and six from BSI). Overall, 10/36 (27.8%), seven (19.4%) and four (11.1%) isolates were resistant to erythromycin, ciprofloxacin and clindamycin, respectively, and all ciprofloxacin resistant isolates were USA300 clone. Furthermore, USA1100 and USA300 BSI isolates showed higher rates of resistance than SSTI and nasal ones (p -value < 0.005). The Minimal Inhibitory Concentration (MIC) values for oxacillin ranged from 4 to 32 mg/L, and values of MIC₅₀ and MIC₉₀ for vancomycin were 1mg/L and 2mg/L, respectively, for isolates from both clones. All isolates carried *blt*, *fnbA*, *icaA*, *hla* and *pvl* genes. USA1100 isolates also carried *ebpS* (92.9%), *cna* (89.3%), *sasG* (57.1%) and *lukE* (17.9%) genes. All USA300 isolates also harbored ACME (arginine-catabolic mobile element) operon, *fnbB*, *ebpS*, *sasG*, *sasX* and *lukE* genes, and all BSI and SSTI USA300 isolates were related to the North American lineage, whereas the nasal one was related to the Latin-American variant (LV-USA300/ST8). Biofilm production was observed in 60.7% and 87.5% of USA1100 and USA300 isolates, respectively. Of note, BSI isolates and the presence of *sasG* gene were associated with higher biofilm production (p -value < 0.005). The present study showed that USA300 MRSA isolates, differently to USA1100, present higher resistant rates for ciprofloxacin, are positive for the ACME operon, and for *sasG*, *sasX* and *fnbB*, genes related to higher biofilm production. This study is the first step to better understand aspects associated with the fitness of USA1100 isolates that are well established in our country.

Key-words: *S. aureus*; USA300/ST8/CC8; USA1100/ST30/CC30; resistance; virulence.

Development Agency: CAPES, CNPq, FAPERJ