

**P1722**

**Paper Poster Session**

**Staphylococcal pathogenesis**

**Persistent airway infection with livestock-associated methicillin-resistant *Staphylococcus aureus* in cystic fibrosis patients**

Sarah van Alen<sup>1</sup>, Britta Ballhausen<sup>2</sup>, Angelika Dübbers<sup>3</sup>, Peter Küster<sup>4</sup>, Holger Schültingkemper<sup>4</sup>, Karsten Becker<sup>5</sup>, Barbara C. Kahl<sup>\*2</sup>

<sup>1</sup>University Hospital Münster, Münster, Germany

<sup>2</sup>University Hospital Münster, Medical Microbiology, Münster, Germany

<sup>3</sup>University Hospital Münster, Department of Pediatrics, Münster, Germany

<sup>4</sup>Clemenshospital Münster, Münster, Germany

<sup>5</sup>Institute of Medical Microbiology, University Hospital Münster, Münster, Germany

**Background:** Cystic fibrosis (CF) patients suffer from persistent recurrent bacterial airway infection, which often lead to lung insufficiency and decreased life expectancy. One of the most prevalent pathogens recovered from CF airways is *Staphylococcus aureus*. Recent epidemiological studies described the prevalence of community- and hospital-acquired methicillin-resistant *S. aureus* (MRSA) in CF patients, however there is no information about the prevalence and persistence of livestock-associated (LA) MRSA in CF.

**Material/methods:** We determined the prevalence of MRSA in two certified CF centers in Münster. MRSA strains were molecular typed by *spa*-typing. Sequential LA-MRSA isolates from individual patients were subjected to DNA microarray analysis (IdentIBAC Microarray, Alere Technologies GmbH, Jena, Germany).

**Results:** MRSA was recovered from 29 of 189 (15%) CF patients. LA-MRSA was identified in 9 patients (31%), all belonging to CC398 (in 4 patients t034, in 3 patients t011, in one patient t108 and t2011). LA-MRSA persisted in one patient 9 years, in 2 patients LA-MRSA was detected within the last year with ongoing persistence (as of today, 11/2015, one year), in 2 patients LA-MRSA was detected just recently, while in 4 patients LA-MRSA was identified only once without further persistence. Thirteen LA-MRSA isolates from 3 patients (n=3, t108; n=8, n=2, all t034) were subjected to DNA microarray analysis. All isolates carried the methicillin- and tetracyclin-resistance genes *mecA* and *tetM*, while the erythromycin resistance gene *ermA* was detected in all isolates of patients 1 and 2, *ermC* in both isolates of patient 3, *tetK* in all isolates of patients 1 and 3 and the aminoglycoside resistance gene *aadD* in 4 of 8 isolates of patient 2 and in both isolates of patient 3. Neither enterotoxin genes nor the *hlyB*-converting phage was detected in LA-MRSA isolates resulting in the presence of a functional *hlyB* gene. While the leukotoxins *lukF* and *S* were present in all isolates, *lukX* was present in 10/13 and *lukY* in 9/13 isolates. All isolates belonged to capsule type 5. While the proteases *sspA*, *B* and *P*, the biofilm genes *icaA*, *C* and *D* were detected in all isolates, the protease *aur* was missing in one, the adhesin *fib* was present in the first isolate of patient 1 only and *sdrD* in 10/13 isolates.

**Conclusions:** LA-MRSA can be isolated from the airways of CF patients and can colonize/infect the airways for extended periods. Although LA-MRSA were isolated from one patient for 9 years and in 2

patients so far for one year, the strains did not acquire the *h/b*-converting phage, which carries important genes interfering with host response. The resistance pattern were different and stable for the individual patient LA-MRSA clones, except for *aadD*, while few virulence genes varied during persistence indicating deletion and/or acquisition of mobile genetic elements.