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Poster Session IV

Molecular epidemiology of *Haemophilus*, *Moraxella*, and *Neisseria*

**B-LACTAMS PLASMID-MEDIATED RESISTANCE IN NEISSERIA GONORRHOEAE IN FRANCE**

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**Objectives:** Acquired resistance to  $\beta$ -lactams in *Neisseria gonorrhoeae* is associated to target modification, decrease in permeability and  $\beta$ -lactamase production. Although class A TEM-1  $\beta$ -lactamase was classically described for NG, a recent emergence of TEM-135 (TEM-1 with a M182T substitution) was observed in Asia since 2010. In France, no recent study was conducted on the molecular epidemiology of  $\beta$ -lactamase resistance. The objective of this work was to characterize the genes of  $\beta$ -lactamases and their genetic support and to study their clonality.

**Methods:** 177 penicillinase-producing-*N. gonorrhoeae* (PPNG) strains were isolated from December 2010 to October 2012 from different regions in France. The gene *bla*<sub>TEM</sub> was amplified and sequenced using OT3/OT4 and additional internal primers. Plasmid DNA was extracted using the QIAprep Spin Miniprep kit (Qiagen®) and was sequenced by PCR-mapping. Molecular epidemiology typing was performed by the reference multi-antigen sequence typing (NG-MAST) method.

**Results:** Among the 177 NG isolates, 152 (86%) carried the *bla*<sub>TEM-1</sub> gene, 14 (8%) the *bla*<sub>TEM-135</sub> and 11 (6%) other TEM alleles not yet described. The alleles *bla*<sub>TEM-1</sub> and *bla*<sub>TEM-135</sub> shared only one base difference, which resulted in the amino acid substitution M182T. The novel TEM alleles are TEM-1 variants exhibiting mutations at position 14 in signal peptide sequence (P14S, P14L; 8 strains), at position 228 (G228S, two strains) or at all plasmid carrying position 269 (Q269K, 1 strain). The complete sequences of all plasmids carrying *bla*<sub>TEM-135</sub>, *bla*<sub>TEM-1</sub> variants and 4 plasmids *bla*<sub>TEM-1</sub> were compared. The *bla*<sub>TEM-135</sub> alleles were carried on plasmids homologous to the pJD4 (Asian, 7.4-kb) or pDJ7 (Toronto/Rio, 5.2-kb) plasmids described previously. On the contrary, other TEM alleles were carried on pDJ5 (African, 5.5-kb) plasmids. According to NG-MAST, 18 ST types were found and 10 ST were observed for NG producing TEM-135.

**Conclusion:** This work illustrates the recent evolution of plasmid-encoded *bla*<sub>TEM</sub> found from *N. gonorrhoeae* and highlights their localisation in several genetic backgrounds. As the mutation M182T has been described as a stabilizing mutation, this study suggests a possible emergence of extended spectrum  $\beta$ -lactamase in NG.