

## DYNAMICS OF TRANSMISSION OF POLYMYXIN AND BROAD- SPECTRUM CEPHALOSPORIN RESISTANCE GENES IN *ENTEROBACTERALES*; FROM THE ENVIRONMENT TO THE BEDSIDE

The emergence and the dissemination of carbapenemase-producing and polymyxin-resistant *Enterobacterales* are considered as a major risk for public health, because it may ultimately lead to impossible-to-treat infections.

In the first part of our work, epidemiological surveys were carried out on the dissemination of polymyxin and cephalosporin resistance genes in Gram-negative bacilli among three reservoirs: the environment, the animals, and the human community.

In the second part of this thesis, novel diagnostic tools were implemented for improving the detection of colistin- and carbapenem-resistant. In addition, a selective culture medium, namely SuperCarba *Pseudomonas*, has been developed to facilitate the detection of carbapenem-resistant *P. aeruginosa*.

This work contributed to a further understanding of gene exchange of *mcr-1*, chromosomally-encoded polymyxin resistance and  $\beta$ -lactamases in a One Health concept (environment, animal, humans). It described the factors such as selective pressure, successful clones and spread of plasmids enhancing this problem as well as the impact of other molecules or genetic content on the spread of respective antibiotic resistance. Finally, screening tools were developed for the detection of colistin- and carbapenem-resistant non-fermenting Gram-negatives.

Jury :

Dr. Laurent Poirol (thesis director)

Prof. Dr. Patrice Nordmann (internal co-examinator)

Prof. Dr. Vincent Perreten (external co-examinator)

Dr. Jean-Yves Madec (external co-examinator)

Dr. Marta Aires-de-Sousa (external co-examinator)

Prof. Curzio Rüegg (president of the jury)