Silent Carriage of Multidrug-Resistant *Enterobacterales* in Healthy Companion Dogs

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INTRODUCTION

Antimicrobial resistance is a critical One Health challenge involving humans, animals, and the environment. Healthy companion dogs may contribute to the persistence of multidrug-resistant *Enterobacterales* and associated resistance genes.

MATERIAL AND METHODS

Ethics committee: 24.1.75.60.0

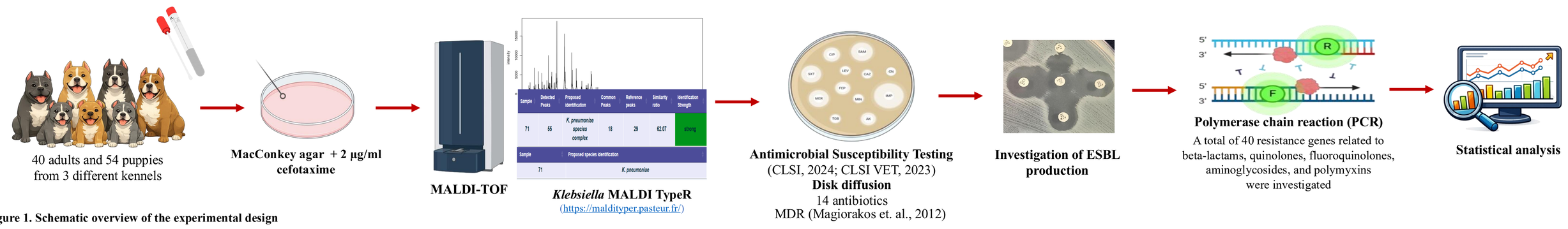

Figure 1. Schematic overview of the experimental design

RESULTS

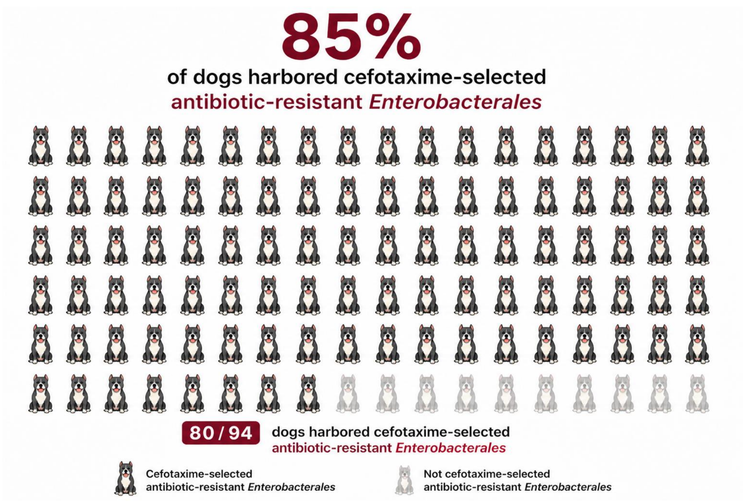

Figure 2. Prevalence of antibiotic-resistant GNB in dogs

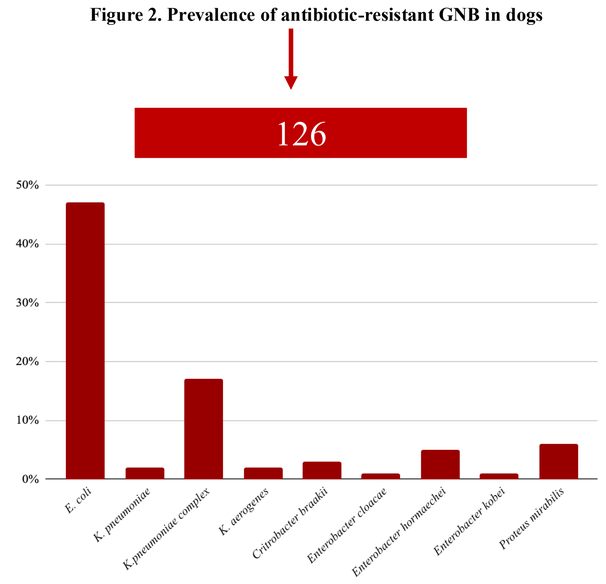

Figure 3. Identification of the 126 *Enterobacterales*

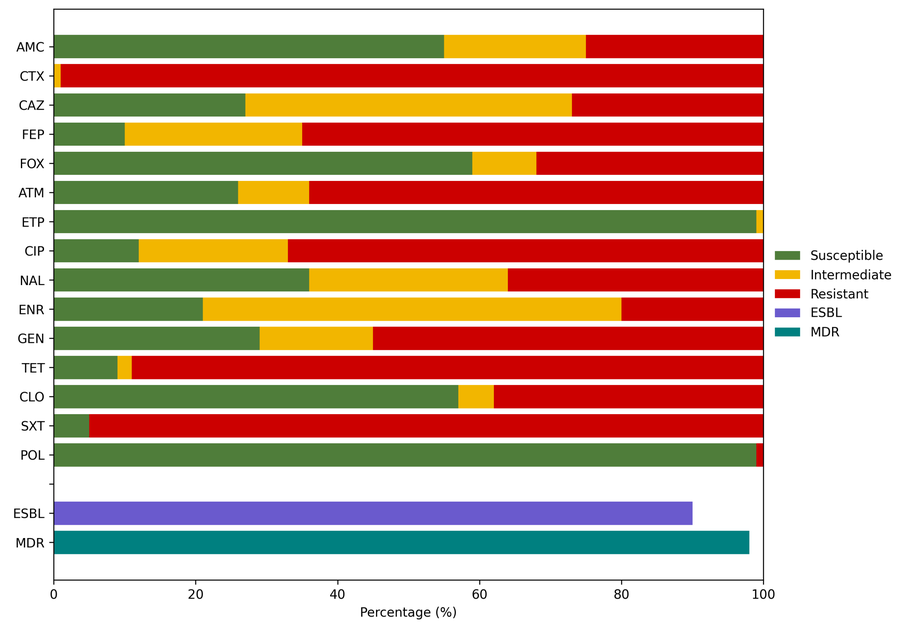

Figure 4. Antimicrobial resistance profile

AMC, amoxicillin/clavulanate; CTX, cefotaxime; CAZ, ceftazidime; FEP, cefepime; FOX, cefoxitin; ATM, aztreonam; ETP, ertapenem; CIP, ciprofloxacin; NAL, nalidixic acid; ENR, enrofloxacin; GEN, gentamicin; TET, tetracycline; CLO, chloramphenicol; SXT, sulfamethoxazole/trimethoprim; POL, polymyxin.

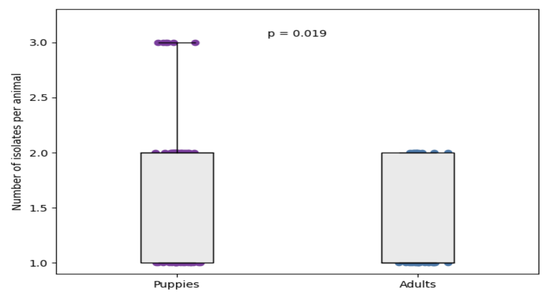

Figure 5. Number of bacterial isolates per animal in puppies and adult dogs

The number of bacterial isolates per animal was compared between puppies and adult dogs using the non-parametric Mann–Whitney U test. Puppies showed a significantly higher number of isolates per animal compared to adults (p = 0.019). However, this difference should be interpreted with caution due to unequal group sizes.

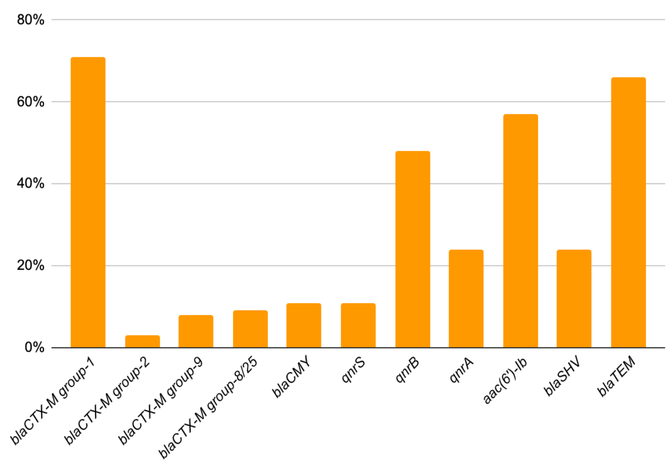

Figure 6. Percentage of antimicrobial resistance genes detected

DISCUSSION AND CONCLUSION

- Prevalence (85%) of cefotaxime-selected antibiotic-resistant *Enterobacterales* in healthy dogs from three different kennels, highlighting their potential role as reservoirs of antimicrobial resistance;
- All isolates carried at least one resistance gene, suggesting widespread dissemination of resistance determinants in the canine microbiota;
- A majority proportion of ESBL producers (90%) and multidrug-resistant isolates (98%), which is particularly concerning given that the dogs were clinically healthy;
- Puppies showed a higher number of isolates per animal than adults (p = 0.019). This may reflect differences in microbiota composition, immune system maturity, or environmental exposure in younger animals, potentially favoring colonization by multiple resistant strains;
- The three kennels showed relatively similar proportional patterns of bacterial isolation, although the second kennel presented a slightly higher number of isolates per animal compared to the others;
- Findings underscore the importance of surveillance within a One Health framework, as close contact between dogs and humans may facilitate the sharing of resistant bacteria and resistance genes, highlighting their epidemiological relevance.

ACKNOWLEDGMENTS

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REFERENCES