

Poster 1: Early dynamics of the gut microbiota in Golden Retriever puppies during the first 12 hours of life: A preliminary study

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INTRODUCTION AND AIM. The early hours of life represent a critical period for the dynamic development of the gut microbiota (GM). At birth, the newborn's intestinal tract contains oxygen, creating an environment that favors the initial colonization by aerobic bacteria. This early colonization is essential, as these bacteria consume the available oxygen, facilitating the establishment of facultative and strict anaerobic bacteria later on (Garrigues et al., 2023). Despite the fundamental importance of this process, its detailed progression remains poorly understood and understudied in dogs and other mammals.

MATERIALS AND METHODS. In this preliminary study, we aimed to assess the evolution of the gut microbiota in Golden Retriever puppies during the first 12 hours of life. The study included 14 healthy puppies born vaginally from 3 dams. Rectal swabs were collected at birth (H0) and at 4 (H4), 8 (H8), and 12 hours (H12). Bacterial DNA was extracted, amplified (V3-V4 regions of 16S rRNA), and sequenced (Illumina MiSeq). Taxonomic affiliation used the 16S SILVA database (version 138.1 PINTAIL 100). Statistical analysis (ANCOM) evaluated changes in taxa at H4, H8, and H12 relative to H0, with p-values adjusted using the Holm method.

RESULTS. Four phyla were identified in the 56 collected fecal samples: Bacteroidetes, Firmicutes, Proteobacteria, and Actinobacteria. Altogether, 33 taxa were present at the family level, and 45 at the genus level. Between H0 and H12, a significant increase was observed in the abundances in 6 of those taxa ($p < 0.05$ for all comparisons; Fig.1). Among them, Pasteurellaceae (0% at H0, $16 \pm 29\%$ at H12), and specifically Haemophilus (1% at H0, $2 \pm 3\%$ at H12) and Frederiksenia (0% at H0, $3.31 \pm 8\%$ at H12) were facultative anaerobes. Whereas, Clostridiaceae (0% at H0; $16 \pm 29\%$ at H12) and mainly Clostridium sensu stricto 1 (0% at H0, $13 \pm 29\%$ at H12), and Peptostreptococcaceae ($1 \pm 2\%$ at H0, $12 \pm 25\%$ at H12) and mainly Terrisporobacter (0% at H0, $3 \pm 7\%$ at H12) and Romboutsia, (0% at H0, $8 \pm 18\%$ at H12) were strict anaerobes (Figure Annexes1).

DISCUSSION. The results confirm the rapid shift in GM during the first hours after birth, from an oxygen-rich to oxygen-poor environment, favoring colonization by strict anaerobes and facultative anaerobes. These findings emphasize the importance of these early dynamics in facilitating the transition to a more mature microbiota. Further studies with larger sample sizes and longer follow-up periods are needed to fully understand the functional implications of these microbial changes in the development of gastrointestinal dysbiosis, being most probably responsible for numerous chronic conditions in adulthood.