RESEARCH GRANT WINNER 2026:

THE EFFECT OF ERYTHROMYCIN AS A GASTROINTESTINAL PROKINETIC ON THE FAECAL MICROBIOME AND METABOLOME IN HOSPITALISED DOGS

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Introduction:
Erythromycin is a macrolide antibiotic that also acts as a motilin receptor agonist to stimulate gastrointestinal motility. No studies have investigated the potential adverse effects of using an antibiotic as a prokinetic drug, including the development of dysbiosis in the patient, or by promoting antimicrobial resistance more broadly.

Objectives:
The objective of the proposed study is investigate the effects of prokinetic erythromycin on the faecal microbiome in hospitalised dogs. We hypothesise that while dysbiosis index (DI) and the proportions of primary and secondary bile acids will change over time in hospitalised dogs, there will be no difference between dogs receiving erythromycin and those not receiving erythromycin as a prokinetic.

Methods:
The proposed study is a pragmatic, prospective, observational, cohort study. All dogs hospitalised with a primary veterinarian in the Emergency and Critical Care (ECC) departments of two referral hospitals that are expected to be hospitalised for >24 hours will be eligible for enrolment with informed owner consent. Dogs prescribed macrolides for non-prokinetic (i.e. antimicrobial) indications and dogs prescribed lincosamide antimicrobials (eg. clindamycin) for any indication will be excluded. Treatment with erythromycin will not be directed by the study, but rather at the discretion of the treating veterinarian. Thus, enrolled dogs may be treated with erythromycin during hospitalisation (experimental group) or not (control group), but individual group allocation will not be known until the time of discharge sample collection. Based on a previous study by our group, we expect that approximately 50% of dogs hospitalised by the ECC service are treated with erythromycin during their hospital stay, so we expect relatively even group allocation. Data will be collected on the use of erythromycin as a prokinetic (yes/no) and dose, frequency, and duration of therapy.

Faecal samples will be collected hospital admission, and again at discharge from the ECC service, and frozen at -80C. Batched faecal samples from 25 dogs treated with erythromycin and 25 dogs in the control group will be sent to Texas A&M Gastrointestinal Laboratory on dry ice. Quantitative polymerase chain reaction (qPCR) assays will be used to measure the abundance of 16 core bacterial taxa, from which the DI derived. A gas chromatography-mass spectrometry (GC-MS) quantitative assay will be performed to assess concentrations of 29 targeted faecal metabolites including long-chain fatty acids, zoosterols, phytosterols, and unconjugated bile acids. Results of faecal metabolite quantification will be reported as nanograms per milligram of dry faecal matter, and the percentages of primary and secondary bile acids relative to the total unconjugated bile acids. pPCR results for individual bacterial taxa, the DI index, bile acid concentrations, and bile acid proportions will be compared at admission and discharge within and between erythromycin versus no-erythromycin groups.

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