

Editorial

Emerging Opportunities for Veterinary Metabolomics

There has been a notable increase in the application and publication of global, non-targeted metabolomics research that is relevant to veterinary science and medicine across the fields of infectious and chronic diseases, pharmacology, nutrition and diagnostics over the past decade. These studies have enhanced our understanding of the metabolic pathway diversity in livestock, companion animals, and wildlife species in ways that differ from traditional laboratory animal studies. For example, findings from metabolomic based studies have been used to increase production efficiency, detect and predict mechanisms of antibiotic and anthelmintic resistance, improve diagnostic sensitivities of infectious diseases, assess acute metabolic disease with unique biomarkers, and determine the biological values of specific nutrients. While studies from the plant and human metabolomes have been leading the field, we now have the opportunity to integrate this information with robust tools in veterinary science and medicine. The goal of this thematic issue was to provide a single place for readers to become engaged in the various applications of metabolomics to veterinary medicine. Articles addressing current trends and approaches in veterinary medicine and that utilize small molecule profiling in field, clinical and laboratory settings were encouraged.



In this special issue, Alloway reviews the complexity and challenges with the increasing demand for individual or specialized nutrition, and highlights recent advancements made in companion animal nutrition. This review also addresses the metabolomes across the lifespan of cats and dogs whereby extensive variation can exist across genomes, diet, environment, and individual physiology. The de Godoy, *et al.* article describes how the plasma metabolome of dogs changes during rapid, excessive weight gain. In this case, metabolomics was useful to describe disturbances in energy, protein, and lipid metabolism during weight gain and the normalization-stabilization of the response. Finally, Forster, *et al.*, utilized non-targeted GC-MS to examine the phytochemical contributions from whole dog diets that differed in staple food ingredients, and was able to advance our knowledge of phytochemical modifications to the host metabolome that extends beyond the traditional focus on macro and micro-nutritional compositions. There are a number of future research opportunities that could incorporate veterinary metabolomics, and these may resemble approaches being taken to advance human medicine. Metabolomics should be increasingly considered for its utility, as a high throughput and sensitive tool that may help us better understand veterinary disease etiology, progression, prevention and treatment. As the database of metabolites detected across biological matrices (e.g. serum, tissues, urine, feces) and mass spectrometry platforms (LC-MS, GC-MS, NMR etc.) increases with relevance to veterinary species, it is possible that we may achieve not only clinical utility of the findings, but also appreciate metabolome diversity in a One-Health context.

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