WIDESPREAD METABOLIC CHANGES ARE ASSOCIATED WITH LOW PRE- AND POST-ACTH STIMULATION CORTISOL IN DOGS

Claudia Ottka^{1,2,3}, Jenni Puurunen¹, Elisabeth Müller⁴, Corinna Weber⁴, Ruth Klein⁴, Hannes Lohi^{1,2,3}

¹ PetBIOMICS Ltd, Helsinki, Finland, ² Department of Veterinary Biosciences and Department of Medical and Clinical Genetics, University of Helsinki, Helsinki, Finland, ³ Folkhälsan Research Center, Helsinki, Finland, ⁴ LABOKLIN GmbH & Co KG, Bad Kissingen, Germany
*corresponding author, claudia.ottka@petbiomics.com

INTRODUCTION

Hypoadrenocorticism can be diagnostically challenging. While it greatly affects metabolism, changes in the biochemical profile can be misleading, which can delay diagnostic testing, including ACTH-stimulation.

OBJECTIVES

The aim of this study is to determine, what metabolic changes can be identified in serum samples of dogs with low pre- and post-ACTH-stimulation cortisol values using quantitative nuclear magnetic resonance (NMR) metabolomics.

METHODS

- Cases n = 36
 - pre- and post-ACTH stimulation cortisol < 20ng/ml
- Controls n = 25
 - normal clinical chemistry

Canine-specific ¹H-NMR metabolomics platform

Z-score scaling

Separate logistic regression models for each measurand

Heatmap creation

RESULTS

Heatmap of measurands associated ($p < 0.0038$) with low pre- and post- ACTH stimulation cortisol in logistic regression. Red boxes on the top bar: controls, green boxes: cases. Red hues in the heatmap indicate higher metabolite levels, blue hues indicate lower levels. HDL: high-density lipoprotein. LDL: low-density lipoprotein. VLDL: very-low-density lipoprotein. S-: small. L-: large. XL-: extra large. -L: lipids. -PL: phospholipids. -CE: esterified cholesterol. -P: particles. -C: cholesterol. -TG: triglycerides.

CLINICAL SIGNIFICANCE

Low cortisol levels associate with metabolic changes identifiable using NMR metabolomics. Lipoprotein subclass analysis may deepen our understanding on changes in cholesterol metabolism. The observed changes in amino acid concentrations may reflect changes in amino acid absorption, synthesis and protein catabolism. The high dispersion of metabolite values suggests, that also other factors than low cortisol concentrations contribute to the variation. Further studies are needed to associate these changes with clinical hypoadrenocorticism.

Reference
Ottka C, Puurunen J, Müller E, Weber C, Lohi H. Metabolic changes associated with four endocrine disturbances. Manuscript prep.
Acknowledgements
We thank Tuomas Poskiparta and Katja Jauni for help in project conceptualization, and customers utilizing the services of LABOKLIN GmbH & Co KG for enabling the scientific use of leftover diagnostic sample material.

PetBIOMICS

LABOKLIN
LABORATORY FOR CLINICAL DIAGNOSTICS