

Tissue specific metabolic changes associated with obesity in cats

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Background The number of obese cats is rising as an increasing proportion of the cat population leads a sedentary life style while ingesting a diet high in palatability, resulting in an increased intake of calories which combined with a decreased energy expenditure leads to increased fat deposition. As in humans feline obesity leads to inflammation, decreased insulin sensitivity and insulin resistance which is part of the pathophysiology for the development of type 2 diabetes mellitus (DM2) in humans, and cats therefore seem to develop a type of diabetes mellitus that is clinically and pathologically comparable to human DM2. Human and murine studies have shown a connection between obesity related genes involved in glucose metabolism, insulin action and inflammation and the development of insulin resistance and the predisposition for the development of DM2.

Motivation The growing number of overweight cats has prompted further research into obesity related insulin resistance and diabetes mellitus development in cats, but the exact obesity related metabolic changes in insulin sensitive feline tissues are as yet unknown. Using skeletal muscle and adipose tissue samples from lean and obese cats the level of obesity related genes involved in glucose metabolism, insulin resistance and inflammation has been quantified using quantitative Real-Time Polymerase Chain Reaction (qPCR). This study will characterize changes in metabolism and inflammation associated with obesity and help to establish a connection between obesity, glucose metabolism, insulin resistance and inflammation and the predisposition for the later development of diabetes mellitus in cats. The aim is to improve the understanding of the development of obesity and the predisposition for the development of diabetes mellitus in both cats and humans.

Status of the project. During the autumn and winter we have completed the first two phases of a validation study, aiming to validate a canine MCP-1 ELISA kit for the use in cats and to measure MCP-1 in blood samples obtained from healthy lean and obese cats. During the spring we will finish work on the third and final phase of the validation study. Currently we are measuring lipids in the feline blood samples hoping to characterize a possible dyslipidaemia in obese cats. And finally recently we have finished the qPCR analysis of the muscle and adipose tissue biopsies taken from the patients, this work has been in process during the past two and a half years and the results are pending.