

Currently, 5 point body condition scoring (BCS) is commonly used by veterinarians to assess adiposity in dogs in Japan. Assigning a BCS is subjective in nature, and most clinicians do not score with half points, instead preferring to round off values, thereby rendering less accurate assessments. Body fat percentage (BF%), using simple morphometric measurements, and 5-point BCS can render increased sensitivity for detecting increasing adiposity in overweight small breed dogs. BF% supplementation to 5 point BCS positively correlated with plasma non-esterified fatty acid (NEFA), insulin, total cholesterol and triglyceride (TG) values, and appears to increase the likelihood of validating overweight status in small breed dogs. Malondialdehyde (MDA) as a lipid oxidation marker and lipoprotein profiles were compared in plasma between obese (hyperlipidemia) dogs and lean control dogs. Plasma TG values in mild hyperlipidemia dogs significantly increased, and plasma ALT activity as fatty liver marker in severe hyperlipidemia dogs. Plasma VLDL, LDL TG and MDA values in mild hyperlipidemia dogs were higher than those in severe hyperlipidemia and lean control dogs. Plasma MDA values decreased in severe hyperlipidemia dogs treated anti-hyperlipidemics (statins and fibrates). Plasma lipoprotein profiles and MDA are most likely useful diagnostic tools for identifying early stage of obesity with mild hyperlipidemia in dogs.

Plasma NEFA, total cholesterol, TG and ALT values increased but adiponectin levels decreased in obese Miniature Dachshunds. In obese Miniature Dachshund, peripheral blood lymphocytes (PBL) mRNA expression of insulin receptor substrate (IRS)-1 and 2, PI3-K and adiponectin receptor (ADIPOR) 1 significantly decreased. These mRNA expression profiles may aid in early detection of PBL markers for assessing obesity in dogs. High-fat (HF) diet (obese) cats showed significant reduction in IRS-1 mRNA expression in their abdominal fat and peripheral leukocytes, with a significantly increased IRS-1 mRNA expression in liver as compared to control lean cats. HF diet cat's abdominal adipose demonstrated a significant increase on ADIPOR1 mRNA expression, with reduced ADIPOR1 mRNA expression in liver and PBL being observed as compared to control cats. Although the expression pattern of the aforementioned genes examined was not completely uniform, there was some correlation between PBL and various tissues.

Naturally occurring (long term) obesity is more representative of the true clinical picture than experimental short-term dietary manipulation in cats. Plasma metabolite profiling highlighted the inherent aberrations associated with different types and exposure time of obesity. PBL transcriptome profiles were very consistent regarding the genes used in this study, highlighted the sensitivity of PBL to the effects of obesity regardless of being acute or long term.