EXPRESSION OF RBP4-MRNA IN ADIPOSE TISSUE AND RBP4 IN SERUM OF HEALTHY DAIRY COWS

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Introduction: In human diabetologia recently retinol binding protein 4 (RBP4) is discussed to be directly involved into insulin resistance and to reflect visceral fat mass. RBP4 is the transport protein for retinols in blood. It is synthesized mainly in liver and is catabolized in kidney after glomerular filtration. In wild type mice insulin resistance could be induced by an injection of RBP4 or by transgenic overexpression, whilst lower serum levels of RBP4 were associated with improved insulin sensitivity. This study aimed to investigate whether mRNA expression of RBP4 of healthy cows differs between fat depots and whether serum RBP4 concentrations in dairy cows change during the periparturient period or correlate with NEFA-concentrations.

Materials and methods: Fat was taken at slaughter from 12 dairy cows from omentum, renal capsule, inguinal region (retroperitoneal), hip (subcutaneous) and heart base, quick-frozen and stored at -70 °C. mRNA expression for RBP4 was measured using quantitative RT-PCR. Blood samples from 44 HF/SB-cows without any clinical disease until 4 months pp were collected 10 d ap, 3 d pp and 4 wks pp and analyzed for RBP4 using quantitative Western Blotting. Clinical chemical analysis included BHB, NEFA, urea, creatinine and electrolytes.

Results: RBP4 mRNA expression was significantly upregulated in pericardial in comparison to omental fat. RBP4 concentrations 3 d pp were 8 (4.05;13.44) mg/l (median and quartiles) and did not change significantly between the three sampling points. Cows with exceeding fat mobilisation 3 d pp showed a tendency of higher RBP4 concentrations 10 d ap. There was a significant correlation (r = 0.5) between RBP4 concentrations 10 d ap and NEFA concentrations 3 d pp. No relationship between BFT and RBP4 could be shown in this study.

Conclusions: Significant upregulation in pericardial fat could be due to high metabolic activity and glucose turnover in heart muscle. The constant serum levels of RBP4 show, that in normal conditioned cows with balanced energy metabolism, RBP4 levels are not altered during the periparturient period and do not correlate with BFT. The relationship between RBP4 ante partum and NEFA post partum and the differences between cows with and without exceeding FM suggest RBP4 as a possible predictive marker for fat mobilisation in cattle as well.