

## **Fate of *Trans* Vaccenic Acid and CLA *cis-9,trans-11* from rumen to different tissues of pasture- and concentrate-fed beef cattle**

Dirk Dannenberger<sup>a</sup>, Karin Nuernberg<sup>a</sup>, Xiangzhen Shen<sup>b</sup>, Gerd Nuernberg<sup>c</sup>,  
Ruqian Zhao<sup>b</sup>, Nigel Scollan<sup>d</sup> and Klaus Ender<sup>a</sup>

<sup>a</sup>Department of Muscle Biology and Growth, Research Institute for Biology of Farm Animals, Wilhelm-Stahl-Allee 2, 18196 Dummerstorf, Germany

<sup>b</sup>Nanjing Agricultural University, Nanjing 210095, China

<sup>c</sup>Department of Genetics and Biometry, Research Institute for Biology of Farm Animals, Wilhelm-Stahl-Allee 2, 18196 Dummerstorf, Germany

<sup>d</sup>Institute of Grassland and Environmental Research, Aberystwyth, SY23 3EB, UK

The objective of present study was to investigate the fate of C18:1*trans*-11 (TVA) and CLA*cis-9,trans-11* from rumen to different tissues in beef cattle, and to examine the diet and breed effects on the substrate concentration and deposition. Sixty-four German Holstein and German Simmental bulls were randomly assigned to two dietary treatments, based on concentrate or pasture to enhance the contents of conjugated linoleic acids (CLA) in beef. The concentrations of fatty acids with special emphasis on CLA*cis-9,trans-11* and TVA in rumen, duodenal digesta, blood, muscle lipids, subcutaneous fat, liver and heart were determined by gas chromatography.

The results showed that pasture relative to concentrate feeding significantly increased the concentration of TVA in duodenal digesta, plasma and erythrocyte phospholipids. Pasture-based feeding resulted in a significant enrichment of CLA*cis-9,trans-11* in plasma lipids and erythrocyte phospholipids, but not in rumen and duodenal digesta, compared to concentrate-fed diet. Diet did not affect the CLA*cis-9,trans-11* concentrations in *semitendinosus* muscle and subcutaneous fat. There was a breed effect on the deposition of CLA*cis-9,trans-11* in *longissimus* muscle. However, pasture feeding significantly increased both, the TVA and CLA*cis-9,trans-11* concentrations in liver and heart tissues compared to concentrate-fed diet. Both diet and breed effects on  $\Delta^9$ -desaturase index was observed in muscle and subcutaneous fat tissues. There was a linear relationship between the concentration of TVA and CLA*cis-9,trans-11* and the coefficients of determination ( $R^2$ ) varied between 0.29 and 0.87 from rumen to the different tissues.