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In vivo postprandial lipid partitioning in liver and muscle of diabetic rats is disturbed

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Objective: To study *in vivo* lipid partitioning in insulin-resistant liver and muscle of diabetic rats using magnetic resonance spectroscopy (MRS).

Methods: Four groups of n=6 male Zucker diabetic fatty rats were used for this study: obese, pre-diabetic fa/fa rats and lean, non-diabetic fa/+ littermates at the age of 6 weeks, and obese, diabetic fa/fa rats and lean, non-diabetic fa/+ littermates at the age of 12 weeks. ¹H-[¹³C] MRS measurements were performed in liver and tibialis anterior muscle at baseline and 4, 24 and 48 h after oral administration of 1.5 g [U-¹³C] Algal lipid mixture per kg body weight.

Results: At baseline, total lipid content was higher in fa/fa rats compared with fa/+ rats in both liver and muscle, and at both ages. Both in pre-diabetic and in diabetic fa/fa rats, hepatic lipid uptake was increased compared with non-diabetic fa/+ rats. Likewise, in muscle of diabetic fa/fa rats, lipid uptake was higher than in muscle of fa/+ rats. In contrast, lipid uptake in muscle of younger, pre-diabetic fa/fa rats was lower than in controls.

Conclusion: In the pre-diabetic state, muscle appeared to be protected from massive lipid uptake, whereas lipid uptake in the liver was largely increased. In contrast, after developing full-blown diabetes, lipid uptake was highly elevated in both liver and muscle. *This research was funded by a VIDI grant from the Netherlands Organisation for Scientific Research (NWO).*