

**NUTRITIONAL REGULATION OF LIPOGENIC ENZYME GENE
EXPRESSION BY SREBP-1 TRANSCRIPTION FACTOR IN RAT
ADIPOSE TISSUE**

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Lipogenic enzymes in adipose tissue are highly dependent on nutritional conditions. We previously observed a significant increase in lipogenic enzyme activities and mRNA levels in the epididymal white adipose tissue (WAT) of rats subjected to multiple fasting-refeeding cycles [Kochan et al., *Metabolism* **46** (1997) 10, Karbowska et al., *Metabolism* **50** (2001) 734]. The changes in the expression of all the main lipogenic enzyme genes observed after fasting-refeeding were highly coordinated, suggesting an involvement of a common transcriptional factor in their regulation. Little is known about the factors that could co-ordinate lipogenic enzyme gene expression in adipose tissue. Insulin is the main anabolic hormone influencing carbohydrate and lipid metabolism in adipose tissue. However, the mechanism by which insulin can transmit a signal to its target genes remains largely unclear. Recently, it has been proposed that sterol regulatory element binding protein-1 (SREBP-1) could be a major adipogenic transcription factor capable of mediating the effects of insulin to glycolytic or lipogenic enzyme genes. Therefore, we evaluated the SREBP-1 protein concentration in the WAT of rats subjected to fasting and refeeding treatment. After eight fasting and refeeding cycles, we observed a 24-fold increase in SREBP-1 protein concentration as measured by Western blot analysis in rat WAT. Fatty acid synthase (FAS), a key lipogenic enzyme, is one of known SREBP target genes. In the adipose tissue of rats subjected to 8 cycles of fasting and refeeding, the FAS mRNA level was elevated 20-fold as assessed by Northern blot analysis. Accordingly, the protein level increased 17-fold as measured by Western blot analysis. We also observed an increase in FAS enzyme activity, which increased 23-fold compared to the activity in the control animals.

In conclusion, a close correlation between the rates of transcription of FAS as the main lipogenic enzyme and the SREBP-1 transcription factor protein concentration suggests that SREBP-1 could be involved in the coordinated regulation of lipogenic enzyme gene expression in the adipose tissue of food restricted rats.