Hamburger weight losses during cooking did not depend upon the nature of the fatty acids, but increased with hamburger fat content. However, sensory evaluation indicate that texture was softer and more tender when unsaturation increased.

Dry sausages prepared with the 4 types of fats presented a normal fermentation pattern (either homo or hetero) during processing. But drying of the sausages was mainly affected by the proportion of unsaturated fatty acids as can be seen from water activity curves. Sausages prepared with the most unsaturated fats could not reach a normal state of dryness and were not palatable.

It can be concluded that when the proportion of C18:2 is above 12—15% in the backfat, good quality dry products cannot be prepared.

Adipocyte and preadipocyte activity during genetic preobesity in the chicken. D. Hermier [1], B. Leclercq [1], A. Quignard-Boulange [2], M. Lafontan [3] *([1] INRA, Nouzilly, 37380 Monnaie, [2] INSERM U177, 20, rue de l'Ecole-de-Médecine, 75006 Paris and [3] INSERM U317, Institut de Physiologie, rue F.-Magendie, 31400 Toulouse, France)*

The storage capacity for plasma triglyceride-derived fatty acids in abdominal adipose tissue has been investigated in 2 lines of chickens selected for either high or low fat content (fat line and lean line, respectively). Adipose tissue cellularity (cell size and number), and lipoprotein lipase (LPL) activity were estimated in 2 and 5 week old male birds. Cellularity and LPL activity at the onset of obesity (2 weeks), were evaluated in the stromal-vascular fraction (SVF) which contains adipocyte precursors. In addition, SVF cells were separated on a Percoll gradient according to their differentiation state, counted and the activities of the differentiation markers, LPL and glycerophosphate dehydrogenase (GPDH), determined. Susceptibility to lipolytic agents (glucagon, norepinephrine) was investigated in abdominal and subcutaneous adipose tissues.

At 2 and 5 weeks of age, the abdominal adipose tissue of the fat birds was characterized by a considerable hyperplasia with a 2-fold increase in cell number and by a marked hypertrophia (30 and 20% increases in cell volume at 2 and 5 weeks of age, respectively), as compared to the lean line. In 2 week old birds, SVF cells were 2.5-fold more numerous in the fat line, although relative cell distribution was similar in the 2 lines. LPL activity per cell was similar in lean and fat birds, irrespective of their age and nutritional state; however, total LPL activity in the whole abdominal fat pad was higher in fat birds at 5 weeks of age. Conversely, LPL activities were higher in all preadipocyte fractions from lean birds, while GPDH activity was unrelated to genotype.

Glucagon was a potent activator of lipolysis, and was more efficient on subcutaneous adipocytes that on abdominal tissue. α_1- and β_1-noradrenergic receptors were apparently absent in the chicken, whereas β2-receptors were numerous but insensitive to agonists normally used in mammals. However, there was no difference between the two lines.

Finally, the overdevelopment of adipose tissue in the fat line could not be related to an increase of LPL activity in adipocytes or to a decrease in their capacity of mobilizing lipids. The higher LPL activity in adipose tissue from fat birds resulted primarily from cell hyperplasia, which represents a major factor in the determination of adiposity in the chicken.

Biosynthesis and utilization of fatty acids in fat or lean chickens. P. Lemarchal and P. Legrand *(Laboratoire de Biochimie, ENSA, 65, rue de Saint-Brieuc, 35000 Rennes, France)*

These studies concern the two lines of chickens, fat (FL) and lean (LL), selected by Leclercq *et al.* (1980) (*Br. Poultr. Sci.* 21, 107-113). They were carried out in an attempt to clarify the mechanism of lower deposition of abdominal fat in LL chickens during growth.

[^{14}C]acetate was injected into 9 week old male chickens of both lines and its

incorporation into the liver, plasma and abdominal adipose tissue lipids was studied over a 30 min—48 h period. Lipogenic enzyme activities were also measured in liver extracts from 5 to 11 week old chickens of either line. Furthermore, the abdominal fat of LL or FL animals was enriched *in vivo* with dietary elaidic acid (a structurally labeled fatty acid) in order to determine its half-life in each case, following the cessation of label intake.

The studies with [^{14}C]acetate showed a higher rate of triglyceride secretion from the liver of fat animals than that of the lean ones. Moreover, a significant difference was found between the two lines as concerns the liver Δ-9 desaturase activity, which was 45% higher in FL than in LL. In addition, the labeling technique showed very similar half-lives of 29 and 32 days for elaidic acid removal from the abdominal adipose tissue triglycerides of LL and FL chickens, respectively (Lemarchal *et al.*, 1988; *Comp. Biochem. Physiol.* 89B, 227-231).

In conclusion, our results strongly suggest that the difference in adiposity between the two types of animals is unlikely to be due to a higher lipolytic activity in LL chickens. The major metabolic difference seems to be located in the liver, and to involve the VLDL processing and secretory mechanism which, in turn, could be influenced in some way by the Δ-9 desaturating activity.

Characterization of brown adipose tissue during fetal and perinatal life in cattle and sheep. L. Casteilla [1], D. Ricquier [2], G. Ailhaud [3] and J. Robelin [1] *([1] Laboratoire de la Production de la Viande, INRA, Theix, 69122 Ceyrat, [2] Centre de recherches sur la nutrition du CNRS, 9, rue Jules-Hetzel, 92190 Meudon-Bellevue, and [3] Centre de Biochimie, Parc Valrose, 06000 Nice, France)*

The brown adipose tissue (BAT) is involved in non-shivering thermogenesis and in body weight regulation. The function of this tissue is associated with the presence of a mitochondrial protein, specific to BAT, the uncoupling protein or UCP. We studied the development of BAT during fetal and perinatal life of cattle and sheep. The breeds of cattle and sheep were Friesians and IF x RO x Li crossbreeds, respectively.

We biochemically characterized UCP in most of the newborn adipose tissues (bovine or ovine) except the subcutaneous one. According to these results, BAT would represent about 3 or 4% of newborn body weight. To pursue this topic, we developed a molecular approach and isolated genomic probes for cattle and sheep UCP. We also cloned a cDNA for bovine UCP. These probes were used together with other probes coding for mitochondrial proteins (cytochrome III and IV, ADP/ATP translocator) to study the development of BAT during ontogenesis in cattle and sheep by Northern blotting analysis. We obtained evidence for a gradual development of BAT during fetal life and for the sudden appearance of UCP in the last third of gestation. After birth, UCP mRNA disappeared very quickly, while the apparent number of adipocytes did not vary. BAT seemed therefore to turn into white adipose tissue.

Our results emphasize the importance of BAT for cold adaptation of newborn ruminants and indicate that BAT could be involved in the development of white adipose tissue in particular fat pads.

***In vivo* estimation of fatness to improve bull selection in performance testing station.** G. Renand [1] and J. Robelin [2] avec la collaboration technique de C. Barboiron [3], P. Gillard [1] and B. Perreau [3] *([1] Station de Génétique Quantitative et Appliquée, INRA, Jouy-en-Josas, [2] Laboratoire de la Production de Viande, INRA, Theix, 63122 Ceyrat, and [3] Domaine de Gall, INRA, Avord, France)*

In performance testing stations, the main selection goal is muscle growth, which is indirectly selected *via* a synthetic index combining growth rate and feed efficiency. The need for an estimation of body composition led us to develop a simple and inexpensive method and to predict its effectiveness in increasing genetic improvement of muscle growth.