

glucose (GLU), urea (UR), creatinine (CR) and cholesterol (CHOL) and the activity of alkaline phosphatase (AP), alanine aminotransferase (ALT) and aspartate aminotransferase (AST) were recorded four times during controlled growth and feeding, between the ages of 6 and 8 months. The relationships between particular genotypes of GH, CASK, and BLG and sampled physiological indicators were studied assuming a two-locus epistasis. The genotype substitution of LL to VV, AA to BB and AA to BB effects for GH, CASK and BLG, respectively, as well as the dominance effects of LV, AB and AB were estimated as dependent on the accompanying genotypes at the other two loci. In addition, the model of analysis included the fixed effects of sex, yearseason of birth, number of sampling and age at sampling nested within the sampling number. It was also assumed that the sires were indifferent with regard to their 'random' genotype, and were not included in the model to avoid confusion between sire and genotype effects. Out of the three hormones studied only the IRI level was independent of the chosen loci. The T_3 level was significantly influenced by the interaction between GH and BLG loci, and T_4 by CASK and BLG epistasis. All three loci were involved in moulding the ALT level, GH*BLG in AST and GH*CASK in AP. UR was not affected by the accompanying genotypes, while CHOL and CR levels depended on both CASK and BLG, and their interaction, and GLU depended on BLG owing to the AB dominance effect. All three loci are of economic importance in dairy cattle. At the same time they appear to be marker loci for some active protein and metabolite levels which themselves may be indicative of the animal's producing potential. We should also consider a fixed aggregate marker genotype in predicting productivity of animals, rather than just a single locus.

Communication no. 29

Diagnostics and occurrence of the D128G (BLAD) mutation responsible for immune disorders in cattle and its significance in Polish dairy cattle breeding.

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The purpose of this investigation was: 1) to determine the frequency of the BLAD mutation in the Polish black-and-white cattle population, 2) to compare the effectiveness of genotype identification in the CD18 locus using PCR-RFLP analysis and solid phase sequencing of the PCR products, and 3) to determine the effects of the BL allele on cattle productivity.

Tests were carried out on samples of blood, semen and hair roots from bulls from different Polish AI Stations, as well as on samples of milk from cows. The effect of the BL allele on productivity was estimated from the statistical analysis of milk productivity of 140 cow – half sisters (71 wild type and 69 carriers of the BL allele). All were offspring of a bull imported from France – Feodal 3590063415 (license number 70101-4-9).

It was shown that about 5 % of the AI bulls are carriers of the BLAD mutation. The most useful method for large scale diagnostic tests is the PCR-RFLP method modified at the Institute of Genetics and Animal Breeding of the Polish Academy of Science, which includes an internal control of the PCR product digestion. Solid-phase sequencing can be used for monitoring a larger region in the CD18 gene, allowing a quick detection of any new abnormalities in the DNA sequence of this region.

The presence of the allele in a cow's genome is linked to increased productivity of milk and protein. Comparison of lifetime production showed that BL/TL cows produced 734.56 kg of milk and 23.79 kg of

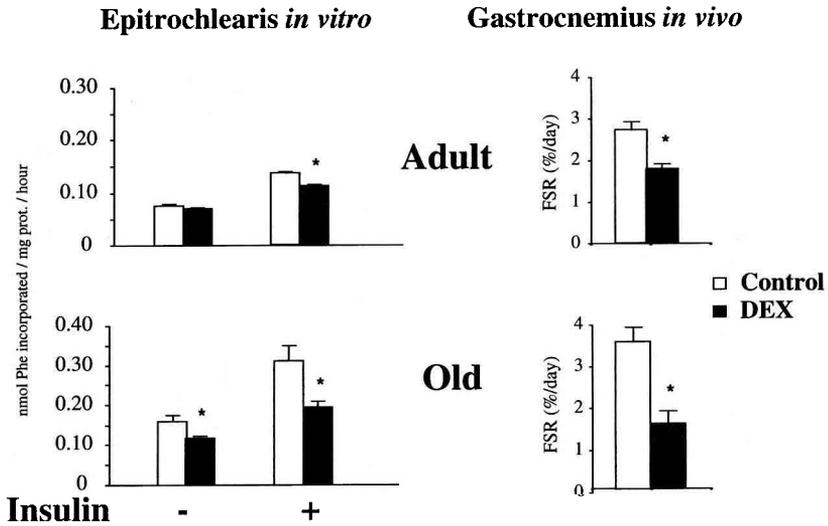


Figure 1. Effect of dexamethasone (DEX) on muscle protein synthesis in adult and old rats; protein synthesis was measured in vivo (*gastrocnemius* muscle) or in vitro (*epitrochlearis* muscle) (* $P < 0.01$ Student's t -test. FSR: fractional synthesis rate).

milk protein more than their TL/TL half sisters. Carriers of the BL gene also produced more fat in their milk.

The frequency of the BL/TL genotypes in the tested population shows that mutation carriers are not eliminated from the population through natural selection; therefore, their immune system functions as well as that of the wild-type animals.

The BL allele appears to be a good tool for marker-assisted selection in genetic improvement of milk production in cattle.

Communication no. 30

Skeletal muscle protein synthesis in adult and old rats. I. Savary, D. Dardevet, E. Debras, C. Sornet, P. Patureau Mirand, J. Grizard (Laboratoire croissance et métabolisme des herbivores et Unité d'étude du métabolisme azoté, Inra, Theix, 63122 Saint-Genès-Champanelle, France)

The aim of this study is to determine whether or not glucocorticoids are involved

in muscle wasting during ageing. Indeed, these hormones are known to induce muscle atrophy by inhibiting protein synthesis and promoting protein breakdown. Adult (6–8 months) and old (18–24 months) rats received dexamethasone (DEX) in their drinking water for 5 days (old rats) and 6 days (adult rats) in order to generate a similar atrophy of *epitrochlearis* and *gastrocnemius* muscles in both groups (old rats are more sensitive to DEX than adult rats). As DEX decreased food intake, all groups were pair fed to DEX-treated old rats. The DEX treatment was associated with a strong increase in insulinaemia and glycaemia at both ages.

Protein synthesis of *gastrocnemius* muscle was assessed in vivo by a flooding dose of ^{13}C valine 50 min before slaughter. DEX induced a decrease in protein synthesis in vivo in adult and old rats but this decrease was greater in old rats (–56.3 % for old rats, –34.5 % for adult rats $P < 0.01$; figure 1).