The polymorphism of DGAT1 gene in Polish maternal PL, PLW and native Pulawska breeds

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The diacylglycerol O-acyltransferase 1 (DGAT1) gene, which has been identified in mammalian cells, plays a major role in lipid metabolism. The DGAT1 gene is expressed mainly in the small intestine. It is involved in intestinal synthesis of triglycerides and their transport to the lymphatic system. In pig, on chromosome 4, to which the DGAT1 locus was assigned, almost 200 QTLs were identified: QTLs associated with backfat thickness, weight gain, carcass fatness, fatty acid composition, etc. The aim of the study was to determine the DGAT1 gene polymorphism in pigs used as maternal component: Polish Landrace (PL) and Polish Large White (PLW), and also in the Pulawska, which is included in conservative breeds.

Fot. Mirosława Gamoń

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A total of 50 PL, 47 PLW and 51 Pulawska sows were investigated. Single nucleotide polymorphism in the gene was identified by PCR-RFLP. The PCR reaction was performed using primers that amplify specific gene fragment and restriction enzymes to detect point mutations (acc. to Nonneman and Rohrer, 2002). The 257-bp PCR product was digested with AvaII enzyme. This enzyme detects a single A or G substitution (rs45434075 dbSNP) at position 5504 (ensemble ENSSSCG00000005918) of intron 2.

Frequency of genotypes (%) for DGAT1 gene in the analysed group of PL, PLW and Puławska pigs

	DGAT1		
	AA	*AG*	*GG*
PL	*25,7*	*52,1*	*22,2*
PLW	*46,8*	*44,7*	*8,5*
Pulawska	*96,1*	*3,9*	*-*

Three polymorphic forms of the DGAT1 gene were found in both maternal breeds. The PL breed was characterized by a similar number of homozygotes with DGAT1AA (frequency 26%) and DGAT1GG genotypes (22%). Most animals in this breed were heterozygous (52%). In the PLW breed, most sows were of the DGAT1AA (46.8%) and DGAT1AG genotypes (44.7%), and the DGAT1GG was least frequent (8.5%). Practically one polymorphic form of this gene was found in the Pulawska breed. Out of the 51 Pulawska analysed animals, 49 were of DGAT1AA genotype (96.1%) and only 2 had the DGAT1AG genotype