POLYMORPHISM OF THE MTNR1A GENE IN SEASONAL AND NONSEASONAL ESTROUS SHEEP BREED

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The MTNR1A gene controls the melatonin MT1 receptor and thus participates in the processes which signal changes of the photoperiod. Exone II of the MTNR1A gene is highly polymorphic. Polymorphic variants could influence the organism's different responses to photoperiodism which is particularly interesting in sheep where the short-long daylight rhythm is the main modulating factor of the breeding season.
The aim of this study was to determine polymorphism of the MTNR1A gene in sheep breeds with seasonal and aseasonal reproduction.

The study included 34 Dalmatian pramenka sheep (DP; a predominantly seasonal estrous breed) and 48 Merinolandschaf sheep (ML; predominantly nonseasonal estrous breed). Genotypes were identified after digestion with *AfaI and MnlI* restriction enzymes. Differences in genotype frequency between the breeds were tested using the Hi squared test ($P<0.05$) in *Statistica 64*. The sequencing method revealed the nucleotide sequence and the presence of SNPs.

Digestion of PCR products with *AfaI* revealed three genotypes: CC, CT and TT. The frequencies of the individual genotypes were relatively similar in both breeds, and TT and CT genotypes prevailed. In both breeds, gene T (DP 72%; ML 68%), had higher frequency. The differences in genotype frequency between ML and DP were not statistically significant ($P>0.05$). After digestion with *MnlI,* all three genotypes (GG, GA and AA) were identified in the ML breed, while the AA genotype in DP was absent. The differences in GG and GA genotype frequency between ML and DP were not statistically significant ($P>0.05$). In both breeds, gene G had a notably higher frequency (DP 90%; ML 84%). Nucleotyde sequence analysis, besides mutations at positions C606T and G612A, revealed six additional mutations at G453T, G706A, G783A, G801A, C891T and C893A positions. Only mutations at positions G706A (Val-Ile) and C893A (Ala-Asp) were functional.

These results do not confirm our assumption that sheep with seasonal and nonseasonal reproduction have significantly different MTNR1A genotypes.