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**LIPOMATOUS MUSCULAR MYOPATHY IN PIEDMONTESE CATTLE: DIFFERENT TECHNIQUES TO INVESTIGATE THE AETIOPATHOGENESIS.**

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The diagnosis of neuromuscular diseases is based on different diagnostic techniques: clinical evaluation, muscle biopsy and, in some instances, molecular genetics investigations. Lipomatous muscular myopathy (LM) of Piedmontese cattle represents a degenerative myopathy whose aetiology is probably multifactorial, involving genetic, vascular and nutritional factors. This study reports a multiple approach to investigate the aetiopathogenesis of this disease.

Different muscle samples (diaphragm, superficial and deep pectoral, intercostal, sternocleidomastoid group and vastus lateralis) from 156 affected cattle were collected and submitted to macroscopical, histological and enzymatic investigations. Slide sections (10 µm thick) of muscle tissue, frozen in isopentane cooled using liquid nitrogen, were obtained using a cryostat and submitted to routinely histological, histochemical and enzymatic techniques for muscle biopsy. Chemical and physical characteristics of the affected tissue were also evaluated. Sampling for genetic screening were performed matching cases to randomly selected controls within the same herds according to a case - control design. Pools were constructed after evaluations of DNA integrity, purity and total concentration and genotyped with Illumina BovineHD BeadChip.

Gross pathology revealed a different grade of adipose tissue infiltration across individuals. Histological investigations showed a variable fat infiltration, variations in fiber size, fiber necrosis and mononuclear cells infiltrations. Histochemical stains (Sudan III staining) confirmed this fat deposition. Enzymatic stainings didn't reveal metabolic changes. With regard to proximate composition, the extremely high percentage of fat and the low water and protein content was particularly notable. DNA pool genotyping revealed significant association with LM phenotype of 123 SNPs on the 29 bovine autosomes, and 57 SNPs on the X chromosome.

Several observed findings lead to the classification of this disease as a muscular myopathy. To date, no specific research has been aimed to understand the aetiology of this disease associated with severe changes of chemical and physical characteristics of the affected meat compared with standard parameters of the Piedmontese cattle. Genome-wide analysis identified markers significantly associated with this muscular defect thus paving the way for understanding its origin and, possibly, allowing selective breeding for this trait in Piedmontese cattle.

This work was partially supported by the Fondazione Cassa di Risparmio of Cuneo - CN, Italy (Bando Ricerca Scientifica 2011) and by the Italian Ministry of Health (Progetto di Ricerca Corrente IZS PLV 10/17 RC).