

Differentially expressed proteins in mammary gland during lactation in sheep

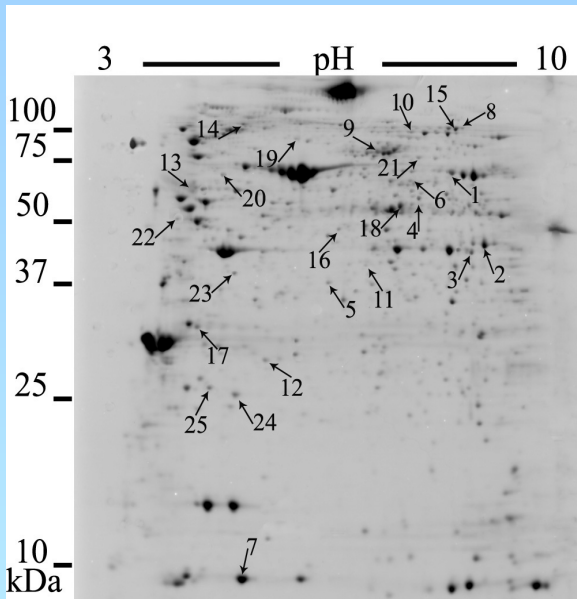


F. Signorelli, G.F. Cifuni, F. Napolitano, M. Miarelli
Animal Production Research
Via Salaria, 31 - 00015 Monterotondo (Roma)



Material and Methods

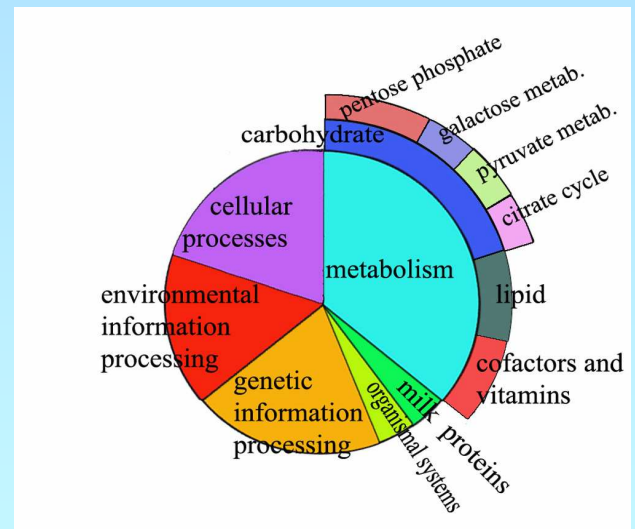
The trial was carried out on Sarda lactating ewes. Animals were reared in the same farm and fed with the same diet; they were slaughtered, respectively, at early lactation (one week after lambing), mid lactation (weaning of the lamb, i.e. about 40 days after lambing) and late lactation (one week before the dry-off). We performed 2D-PAGE analysis (pH 3-10 NL, 12%T) in triplicate for each sample. The gels were analyzed by PDQuest software. The protein spots showing differential expression (≥ 2 -fold change of photodensity) at least between two different lactation stages were analysed by LC-MS/MS.



Metabolisms	Carbohydrate :Pentose	spot 1-2
	Citrate cycle	spot 3
	Galactose	spot 5
	Pyruvate	spot 4
	Lipid	spots 6-7
	Vitamin	spots 8-9
Genetic information processing		spots 10-11-12-13-14
Enviromental information processing		spots 15-16-17-18
Cellular processes		spots 19-20-21-22-23
Organismal system		spot 24
Milk proteins		spot 25

Results and Conclusion

We identified 25 proteins differentially expressed during lactation. According to KEGG classification, 36% of them belong to the metabolism, 20% to the genetic information processing, 16% to the environmental information processing, 20% to the cellular processes and 4% the organismal systems; moreover we identified 4% of milk proteins.



The majority of the identified proteins exhibited the highest photodensity value at peak of lactation in agreement with the higher request of energy and/or metabolites when the cellular processes are accelerated for milk synthesis and secretion.

The negative trend detected for vimentin and lamin B1 during lactation may be linked to the apoptosis mechanisms, that occur in the mammary tissue involution.

Conclusion

The knowledge of the biochemical processes contributing to the functional and metabolic adaptation of mammary gland to perform lactation will contribute to understand the variability of important economic traits, like milk yield and quality, and lactation length.