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Rumen fluid, a new diagnostic matrix in dairy cattle farms?

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Abstract

Production diseases of dairy cows are considered man-made problems caused by the inability of cows to achieve a sufficient feed energy intake (Mulligan, 2008).

A correct management of production diseases demands early diagnostic and prognostic parameters, in order to improve the management system and reduce the prevalence of clinical cases (Ingvartsen, 2003).

A previous study of our group indicated that forestomachs walls express immune receptors and cytokines, and the rumen liquor contains leukocytes able to produce IFN-γ (Trevisi, 2014).

Our working hypothesis implied that ruminal fluids could be a source of diagnostic information for the identification of herds at risk for production diseases.

We first demonstrated that the diet can influence the immune response in forestomachs. Diverse leukocyte populations at low concentrations and IFN-γ were revealed in some samples of rumen fluids, with a clear inhibition of the response observed in the animals fed the maize-supplemented diet, compared to a normal and a soy-supplemented diet.

We better characterized the leukocytes subpopulations in the rumen liquor, isolating B cells, monocytes and γδT cells.

Finally we performed a field survey in order to find correlation among the immune profile of the rumen liquor. Clinically healthy animals showed a farm specific immunologic pattern of the rumen liquor: low CD45 mRNA expression, low IFN-γ, few/absent B-cells.

We can conclude that the epithelial cells of ruminant forestomachs can react to different stresses (metabolic, infectious, inflammatory) and the inflammatory response can be sustained by infiltrating leukocytes.

Our data points into the idea that dairy farms could be ranked according to a risk score using the inflammatory markers in rumen fluids, in addition to the traditional analysis.

References

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