

Transcripts of interleukins in mastitis affected and oxytocin administered buffaloes: Clinical significance and prognostic value

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With modern intensive farming, buffaloes are subjected to various stressors and compromising their health and production potential. Mastitis is one of the most costly dairy-based diseases worldwide, impairing the milk yield, processing quality and causing heavy economic losses to farmers and the dairy industry as well. Synthetic oxytocin is commonly used to facilitate milk ejection, expulsion of retained placenta and also as an adjunct to antibiotic therapy for the treatment of mastitis. Interleukins are known best for their involvement in the immune response to inflammatory conditions like mastitis. Therefore, to understand the molecular determinants of mastitis and to see effect of exogenous oxytocin, the expression patterns of interleukins were investigated by real-time PCR of total RNA derived from total somatic cells of mastitis affected; oxytocin administered and control milk samples. All the lactating buffaloes of CIRB animal farm, Hisar were screened for incidence of mastitis with the aid of California Mastitis Test (CMT) using Masti- Check Kit. All the positive samples were reconfirmed by subsequent microbial culture and somatic cell count. For observing effect of oxytocin administration, four lactating buffaloes were administered Oxytocin @ 5.0 IU by IM route aseptically twice daily for 7 days. Milk samples were collected immediately before first administration (as control) and immediately after it. Subsequently, samplings were done 1, 7, and 15 day post- seven day oxytocin treatment. Total RNA was extracted by TRIZOL method from the pelleted and resuspended total somatic cells. A higher expression was found in the clinical form of mastitis for IL-1 β , IL-6 and IL-10 genes. For IL-12A gene, no significant difference was observed in different samples. In sub-clinical cases of mastitis, IL-1 β and IL-6 expression was higher compared to control samples. However, higher expression of IL-1 β and IL-6 was evident in clinical samples compared to sub-clinical samples. A positive relationship was found between higher somatic cell count in milk and IL-1 β , IL-6, IL-10 expression. In response to oxytocin administration, high IL-1 β mRNA expression values in control samples decreased significantly on immediate administration of OT ($P < 0.05$) and increased thereafter on day 1 post- seven day OT administration. On day 7, post OT administration, IL-1 β mRNA expression increased and it was still lower than the control. Transcript levels of IL-6 gene also decreased significantly immediately after OT administration. However, on chronic administration of OT, an increased expression of IL-6 was observed compared to control. There was a decrease in expression of IL-6 on day 7 and 15 post OT administration. A significant and immediate downregulation of proinflammatory cytokines' transcripts upon administration of oxytocin was observed. Interleukin transcripts could possibly be biomarkers for development of diagnostic tests or assays.

Keywords: mastitis, oxytocin, interleukins, transcript, real time PCR.

Biography

Varij Nayan is currently working as scientist in the Buffalo Physiology and Reproduction division of Central Institute for Research on Buffaloes (ICAR), Hisar, Haryana. He has earlier worked as Assistant Professor for three years in the C.V.Sc. & A.H. (Central Agricultural University), Aizawl, Mizoram. He has completed his master's degree in Animal biochemistry from National Dairy Research Institute, Karnal and has been selected two times for CSIR-JRF and for ICMR-JRF. His research interests include identification of bio-markers of early pregnancy, prognosis and therapeutic outcome in relation to mastitis; recombinant protein production and fertility augmentation in buffaloes.

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