

Characterization of immune and redox system crosstalk in the intestinal tract of suckling lambs

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Suckling lamb meat is a traditionally consumed food in Mediterranean regions. During the suckling period, progressive intestinal maturation is modulated by environmental challenges. However, the pathways preserving gut homeostasis during the oesophageal groove to forestomach function are poorly understood. The aim of this study was to assess the relationship between enzymes involved in the antioxidant defence system and proinflammatory and regulatory immune genes in intestinal tissues of suckling lambs. Twelve lambs were raised on maternal milk and slaughtered at 30.2 ± 3.5 days old and 11.3 ± 0.8 kg of body weight. Immediately after slaughter, jejunum (je) and ileum (il) tissue samples were incubated in RNA later. Messenger RNA expression of proinflammatory (TNF α , IFN γ , NF- κ B) and regulatory (TFG β , IL10) immune genes and antioxidant enzymes (CAT, SOD1, SOD2, GPX1, GPX2, GPX4) was analysed by qPCR. Spearman's rho (r) test was used to identify possible relationships between gene expression levels of immune and antioxidant markers using the computer package JMP Pro 15. Positive correlations were observed between je-TNF α and je-NF- κ B with je-TFG β ($r=+0.9$ and $+0.6$) and il-IL10 ($r=+0.5$ and $+0.7$; $P<0.05$), and between il-NF- κ B with il-TNF α and il-TFG β ($r=+0.7$ and $r=+0.6$, $P<0.05$). Positive correlations were also observed between GPX1 and GPX4 with TNF α , NF- κ B, IFN γ , and IL10 in jejunum and ileum ($r=+0.58$ to $+0.83$, $P<0.05$). However, il-CAT was negatively correlated with TNF α , NF- κ B, TFG β , GPX1, and GPX4 in je, and IL10 in il ($r=-0.6$ to -0.7 , $P<0.05$). TNF α may exert apoptotic and anti-apoptotic actions. Cell survival pathways involve NF- κ B activation that is stimulated in presence of H₂O₂. Accordingly, our results suggest that activation of NF- κ B-dependent survival pathways in je and il downregulates H₂O₂ degrading capacity of catalase in il tissues. To sum up, homeostasis and homeorhetic mechanisms of the intestinal tract in suckling lambs promote cell survival pathways that likely involve NF- κ B activation by TNF α , GPX1, and GPX4 transcription and catalase downregulation.