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Expression of ISG15, UBE1L and MX2 in white blood cells of early pregnant and bred-nonpregnant dairy cows

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Identifying pregnant and nonpregnant cows shortly after insemination can improve reproductive efficiency in dairy cows if resynchronization is practiced on nonpregnant cows. Bovine Interferon Stimulated Gene Product 15 (ISG15), Bovine Ubiquitin-Activating E1-Like (UBE1L) Enzyme and MX2 are produced in response to conceptus-derived interferon- τ . The objective was to determine the level of these mRNA in pregnant and bred-nonpregnant Holstein cows (n=14). We hypothesized that the amount of ISG15, UBE1L and MX2 mRNA would increase between d 14 to 20 in pregnant cows but not increase in bred-nonpregnant cows. Cows were synchronized to estrus and inseminated (d 0). Blood samples were collected on d 14, 16, 18 and 20 following insemination. Pregnancy status was determined at approximately 30 and 60 d after insemination. RNA was isolated, reverse transcribed into cDNA and amplified using quantitative RTPCR. Six cows were nonpregnant (open) and eight cows were pregnant on d 30. On d 60, four of the pregnant cows remained pregnant (pregnant-pregnant) and four were found open (aborted; pregnant-open). mRNA data were expressed as fold increase above control and relative to cyclophilin. A status by day interaction was detected for ISG15 (P<.001) and MX2 (P<.02). The interaction was not significant for UBE1L. Mean ISG15 and mean MX2 remained low for open cows, but increased markedly on d 18 and 20 in pregnant-pregnant cows. Pregnant-open cows either had low levels of ISG15 and MX2 or underwent an increase in ISG15 and MX2 on d 18 and 20. We conclude that ISG15, UBE1L and MX2 are differentially regulated in dairy cows during pregnancy recognition. ISG15 and MX2 mRNA expression could be used as an indicator of early pregnancy. Cows that abort their pregnancy after d 28 (pregnant-open) have abnormal ISG15 and MX2 mRNA expression between d 14 to 20.