

THE TYPE I IFN OF BOS TAURUS

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ABSTRACT

The Type I interferons (IFN) have major roles in the innate immune response to viruses, a function that is believed to have led to rapid expansion in the number and complexity of their genes. IFNT, which is a unique Type I IFN restricted to pecoran ruminants, also has a specialized role in maternal recognition of pregnancy in cattle. This work has two main aims 1) determine whether male and female blastocysts differ in the kind and number of *IFNT* they express and whether this pattern changes over development and 2) provide the first comprehensive annotation of the Type I IFN locus in *Bos taurus*, thereby providing an insight into the functional evolution of the Type IFN in ruminants. Data collected for the first aim indicate that female blastocysts do not transcribe a different set of *IFNT*s than males ($p=0.54$). However, significant differences ($p < 0.001$) were evident among conceptuses of different age, indicating that additional genes may be transcribed as IFNT production increases during development. The data collected for the second aim revealed the Type I IFN locus has undergone significant rearrangement and expansion in bovine compared to mouse and human. The *IFNW* subfamily is greatly expanded compared to other species, comprising 24 potentially functional genes. Selective pressure analysis found the regulatory regions of the *IFNW* are diverging faster than the coding regions. The identification of a new Type I IFN subfamily that is expressed from virally challenged bovine kidney cells is the most striking finding of the second aim.