Variation of Virulence Factors Associated with Clostridium Perfringens Type A in Cattle

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Introduction

Clostridium perfringens Type A is implicated in several cattle diseases including abomasal ulcers and tympany, gas gangrene and possibly jejunal hemorrhage syndrome. Recently, there has been an increased incidence of enteric disease case reporting due to this organism. Pathogenesis of disease includes colonization and production of large amounts of alpha toxin. In addition, debate continues to surface concerning the alleged role of beta2 toxin in bovine disease. Until there is conclusive evidence that beta2 is not involved in pathogenesis, it cannot be ignored in preventative strategies or vaccine technology. The increased prevalence of this organism and the range of disease severity led to the examination of toxin production and growth variation between strains.

Materials and Methods

Isolates from bovine enteric disease cases were tested by PCR for cpb2, the gene for beta2, and grown in GC broth. Culture samples were taken hourly from 5 to10 hrs and tested for alpha toxin with a commercially available ELISA kit (BioX, Belgium). If positive for cpb2, samples were also collected every 5 hrs from 50 to 65 hrs and tested for beta2 by Western blot analysis. To examine growth characteristics, percent transmission was also evaluated at specified time-points.

Results

PCR testing revealed that not all colonies of a particular isolate were positive for cpb2. Results also indicate toxin level variation between strains as well as growth rates. Alpha toxin levels peaked between 6 and 8 hrs for the majority of strains. Due to assay limitations, beta2 analysis was only semi-quantitative by comparison of band intensity. Larger and more intense bands were seen at approximately 50 to 60 hrs.

Significance

Collectively, these results suggest strain variation, leading to different levels of virulence. Due to this, autogenous vaccines offer system specific protection against *C. perfringens* Type A.