International Dairy Topics

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Bovine viral diarrhoea II

Persistent infection

One of the biggest steps forward in understanding BVD was the identification and explanation as to why some cattle are persistently infected with the BVD virus.

Animals persistently infected with BVD virus have virtually no SN antibody against the homologous strain and are identified by infecting foetuses between the 40 and 120th day of gestation. Foetuses that are exposed to NCP-BVD virus between the 45 and 120th day of gestation are immunotolerant to that NCP-BVD virus strain as the viral antigens are deemed to be 'self'. Such persistently infected foetuses can be born weak, small or dead; be born apparently healthy but succumb to disease in their first year; or they are born and grow to adulthood normally.

However, if a persistently infected animal is challenged by homologous CP-BVD virus, severe disease may occur and, in such instances, persistently infected animals usually succumb with the clinical signs of acute, subacute or chronic BVD. It would appear that the immunotolerance of a persistently infected animal to homologous NCP-BVD virus renders it incapable of rendering functional immunological defences against certain CP-BVD viral strains.

Recent research has also shown that animals with naturally occurring persistent BVD infection often harbour antigenically similar CP- and NCP-BVD viruses. It is therefore possible that a persistently infected animal may develop a fulminating CP-BVD viral infection from a genetic reassortment of its own virus with the transfer of genetic material from a heterologous strain to its own virus or from the transfer of genetic material from an entirely novel CP or NCP strain.

Foetuses that are infected before the 125th day of gestation are at risk of persistent infection developing. Foetuses infected between the 90 and 180th day of gestation may also develop congenital abnormalities such as cerebellar hypoplasia and ocular lesions. Foetuses exposed to NCP-BVD virus after 18 days of gestation either produce antibodies against the infecting virus and survive or are aborted. CP-BVD viral strains appear not to cause persistent infection when pregnant seronegative cows are infected before foetal immunocompetence has occurred.

The main concern/issue about persistently infected animals is the constant dissemination of the virus as these animals are an active reservoir of infection within the herd. Exposure of pregnant herdmates to asymptomatic persistently infected animals is a well established means of perpetuating endemic BVD in a herd.

Persistently infected animals may shed so much virus that the finite immunity in herdmates can be overwhelmed and this results in infection of non-persistently infected, immunocompetent and previously exposed and/or immunised herdmates.