How about a BRD Autogenous Vaccine?

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The Australian Lot Feeding industry has a very robust vaccine culture. It has world leading treatment regimes, accreditation schemes and industry leading best practice to service the demand for high quality grain fed beef across the domestic and global markets. The se of autogenous vaccines are not something new to the livestock industry. They're widely known and utilised throughout the pork, poultry and red meat sectors. That said, compared to other global operators such as in North America, there are only a few respiratory vaccines available in the relatively small Australian market

What is an autogenous vaccine? An autogenous vaccine, may also be referred to a customised vaccine. It is developed through the use of microbiology and is an immunobiological product manufactured from one or more microorganisms isolated from an animial or animals that have been identified as harbouring causative agents of a specific infection or disease affecting the herd. The product is then used for the treatment and/or prevention in the animal by activating their immune system to produce an immune response against the infection or disease (APVMA, 12th April 2021). Autogenous vaccines are typically killed vaccines targeted at bacterial pathogens and specifically target to reduce and replace elements.

Notably the biggest name in cattle health is Bovine Respiratory Disease or BRD, and is one of the leading causes of mortality and morbidity in a feedlot operation. This disease also presents a rising opportunity and challenge to the use of antibiotics in conventional feedlot practices combating BRD on the back of imminent antimicrobial resistance. As of now, we have a strong industry presence and focus on reducing our antimicrobial usage with our antimicrobial stewardship in place. This has become a requirement for the globally recognised leading National Feedlot Accreditation Scheme (NFAS) from the beginning of this year. Our antimicrobial stewardship is here as a commitment to industry and consumers by acknowledging our responsibility and demonstrating excellence in providing high quality beef. There are five principles in which the stewardship is formed around and is collectively termed the '5Rs" – responsibility, review, reduce, refine and replace (ALFA, 5th October 2021). Antimicrobial Stewardship is here to reduce antibiotic usage as well as trying to reduce the build up of resistance. Another area to acknowledge particularly with the importance of the antimicrobial stewardship in mind, is the use of in fed antibiotics used for extended periods. We also need to be very careful as an industry with the use of antibiotics that are deemed critical for human health.

There are commercially available vaccines for vaccinating against BRD syndrome pathogens such as MH (mannheimia haemolytica) and the virus IBR (infectious bovine rhinotracheitis). However, it is important to note the involvement and collaboration of other bacterial pathogens in BRD which are pasteurella multocida, histophulus somni and mycoplasma bovis (MLA, 19th May 2022). It is suggested some of these pathogens already demonstrating a form of resistance to frontline macrolide class antibiotics such as Draxxin® (tulathromycin) and oxytetracyclines such as

Engemycin® which are both used in the feedlot industry as proven regimes for BRD. Today there is no readily available vaccine or vaccines targeting these identified bacterial pathogens. Customised autogenous vaccines can fill this gap. As antimicrobial resistance has become more prevalent, these bacterial pathogens will become more present in a cattle herd or feedlot operation.

What is important with our current operational circumstances, is the process of diagnosing animals requiring treatment in a reactive feedlot environment. This process may be unfortunately inadequate to prevent significant production losses associated with BRD as the system is based on subjective visual assessment and depends on the experience and knowledge of operators, and their active participation in the work environment. With this in mind and the overarching challenge the industry is faced regarding staffing shortages combined with the lowest national rate of unemployment, preventative measures, combined with the use of technology such as remote tracking of animals and biometrics is the next step to meeting our commitment. There is a need to establish normal expectations around morbidity and mortality cases in an operation and a feedlot operator needs to work closely with their veterinarian to obtain early diagnostics as soon as possible as part of a wider health management program. Using this information, a decision can be made whether there should be a change in vaccine management or strategy, apply or add an autogenous solution, and/or improve biosecurity, with an appreciation towards an effective introduction of change into an existing operation (Beef Magazine, 1st March 2020).

In summary, the best form of "reduction" is prevention, thus developing an autogenous BRD vaccine incorporated with genome sequencing to determine the strains relevant to, and tailored to, one specific feedlot operation and/or an area of geographic specificity (climate, cattle type etc…). Genome sequencing works essentially by creating a roadmap, utilising information of the strains in microorganisms of animals specific to a herd and then conclusively identifying the bacterial pathogens present in an operation. An extensive trial would need to be conducted to assess the viability of such a vaccine or vaccines ensuring the correct protocol and requirements from the Australian Pesticides and Veterinary Medicines Authority (APVMA) are followed. MLA has announced this year in collaboration with Apiam Animal Health and the University of Adelaide they're conducting a trial and study on the evaluation of autogenous vaccines. Some key objectives around this study will allow for improved health and welfare of animals, reduced antimicrobial treatments and increased profitability (MLA, 19th May 2022). The outcome will also allow feedlot operators to evaluate and quantify the possibility for autogenous vaccination as a control measure in preventing BRD, minimising antimicrobial resistance and, reducing the antimicrobial usage complying with our Industry's stewardship.

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