ISSN 1466-2523

Animal Health Research Reviews **10**(2); 163–164
doi:10.1017/S1466252309990235

Future of BRD research: an animal health industry perspective

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Received 12 August 2009; Accepted 20 October 2009

Abstract

Industry has made large investments into bovine respiratory disease (BRD) research historically, and will continue to do so, despite the apparent lack of progress, an uncertain regulatory environment, and increased competition for internal resources. Factors such as the growing demand for protein, and the ongoing consolidation and 'technification' of the beef sector globally suggest that the industry will continue to demand interventions that prevent disease, are more efficacious, can be easily administered, and positively affect meat quality. New products must also meet the regulatory requirements of safety and efficacy and anticipate the future needs of the numerous stakeholders in the global food chain. Two obstacles in meeting this challenge are the declining interest in food animal medicine, and BRD specifically, and the reluctance to accept new technology at the consumer level.

Keywords: safety, efficacy, mass administration, marker vaccines, basic research

The bovine respiratory disease (BRD) animal health market

Historically, developing interventions for BRD treatment or control has been a significant focus of animal health companies as evidenced by the number of products on the market today, including biologicals and anti-infectives with BRD associated label claims. On a global basis, the animal health market for cattle products is second only to companion animal, with over US$1 million attributed to vaccines, and a similar amount to anti-infectives. North American cattle are the largest users of animal health products, consuming 37% of the global supply.

However, while product usage continues to grow, BRD still costs the US beef producers up to US$2 billion in losses annually (University of Arkansas, 2003), mostly due to costs associated with labor and lost productivity. Additional research is needed to understand how to better use the tools that are currently available, and to investigate opportunities for new and better products for both the traditional and emerging beef producing markets. The external trends will in part direct the balance of this research.

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Trends impacting BRD research in industry

As labor availability continues to decline in beef operations ranging from feedlots to small cow-calf units with part-time owners, managing the timing and frequency of interventions will be more critical. Products that last longer, do not require a booster, or re-handling, and can be administered through a simple but durable and reliable delivery device will be highly desired. Even more desirable with respect to labor management, and beef quality, will be efficacious and safe vaccines that can be administered through the feed.

Increasing backward integration from retailers to packers and into feedlots, and from there contractually into cow-calf operators has a broad impact on the industry. We will ultimately consider the consumer our customer, in addition to the veterinarian/producer. With respect to BRD, research on new products will consider factors beyond safety and efficacy such as food quality, as determined by the consumer, and animal welfare, including the aspects of delivery and pain management.

The industry demand for animal tracking and information sharing will result in evidence-based recommendations for optimal vaccine timing and other interventions due to broader applications for outcomes research.

A changing regulatory environment is already shifting the research balance from anti-infectives to vaccines. The long development time and the uncertainty of obtaining approval for a new anti-infective will result in a re-allocation of resources toward biopharmaceuticals and other advanced technologies as well as the more traditional vaccines.

Global trade and market access may drive the need for marker vaccines if the local or regional industry does not implement their usage. In parallel, adoption of advanced diagnostics, ideally cowside, would complement an eradication or control program for BRD pathogens.

The sequencing of the bovine genome could finally lead to a definitive diagnosis of stress, and result in targeted therapeutic or prophylactic interventions to one or more of the precursors of BRD. In the meantime, technologies that identify single nucleotide polymorphisms (SNP) in the genome are available today and will identify cows that are more resistant to BRD, allowing for further discovery in understanding the multi-factorial nature of the syndrome.

The future

While there are numerous opportunities to conduct additional research, there are two areas that have the potential to be significant obstacles to future progress in BRD control: lack of basic research and resistance to new technology.

Traditionally, academia has conducted basic research to develop a more complete knowledge or understanding of BRD, and provided industry with concepts or substrate that can be developed into a commercial product. To ensure ideas continue to be generated in this new environment of declining research dollars, alternative research models need to be explored. Consortia focused on areas of complexity where there have been few significant recent advances can be very productive if well managed. The research is multifaceted but oriented to produce a specific knowledge bank, with the expectation that this will form the background to a solution for recognized or future problems.

The cross institutional, multidisciplinary approach to a defined area seen in the consortia is also an objective of central funding bodies in the European Union and Australia. Corporate involvement is encouraged so that opportunities that are identified can be commercialized.

Support of academia in targeted research areas is a win–win situation as it allows corporate internal resources to investigate new formulations and delivery mechanisms. The animal health industry commonly supports post launch activities with academia to optimize usage in the field, but these efforts decline over time.

Genomic research tools can also lead to new discoveries that no longer fit the old paradigms. For example, an agent that acts as a BRD precursor or potentiator may have a large negative impact on cattle health, but may not fulfill Koch's postulates, challenging the current licensing system.

Technology will continue to evolve at a rapid rate and it will be a challenge for both the consumer and the regulatory authorities to stay ahead of the changes. Consumers along the food chain continuum may reject one technology that improves productivity while demanding a second that could lead to improved food safety. If the food chain does not quickly absorb the costs of implementation, the average producer, already working with slim margins and a volatile market place, will continue to be squeezed. Ultimately the cost of production needs to be affordable to the consumer and profitable to the producer.

Conclusions

The animal health industry will continue to identify and provide solutions to BRD control whether they are significant technological advances, or modifications of current products to minimize animal handling requirements and optimize performance. New research models are needed to support BRD basic research and to attract new researchers into the field as the need for healthy and productive animals will become increasingly important as the global population and demand for protein increase.

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https://doi.org/10.1017/S1466252309990235 Published online by Cambridge University Press