

# Vaxxon® SRP® Klebsiella

Siderophore Receptors and Porins



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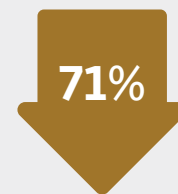


## Klebsiella mastitis has **nowhere to hide.**

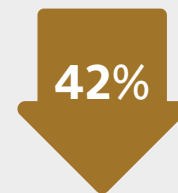
A *Klebsiella* vaccine created with SRP® technology keeps cows healthy and productive. Vaxxon® SRP® Klebsiella is the only USDA licensed vaccine for use in the management of mastitis caused by *Klebsiella* – a challenging disease in dairy cattle. Based on Siderophore Receptor and Porin (SRP®) technology, Vaxxon SRP Klebsiella is an effective tool to help fight *Klebsiella* mastitis.

## Key Features & Benefits

- Reduces the prevalence of mastitis by 71%<sup>1</sup>
- Decreases the incidence rate of a cow getting mastitis one or more times by 76%<sup>1</sup>
- Vaccinated cows stay in the herd longer, regardless of mastitis infections<sup>1</sup>
- Lowers somatic cell count by 42%<sup>1</sup>
- Increases milk production by 2 lb/cow/day<sup>1</sup>



DECREASED  
PREVALENCE OF  
KLEBSIELLA MASTITIS<sup>1</sup>



LOWER SOMATIC  
CELL COUNT<sup>1</sup>



INCREASED MILK  
PRODUCTION<sup>1</sup>

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## Siderophore Receptors and Porins



**60-80% of cows diagnosed with *Klebsiella* mastitis leave the herd within that lactation period.<sup>2</sup>**

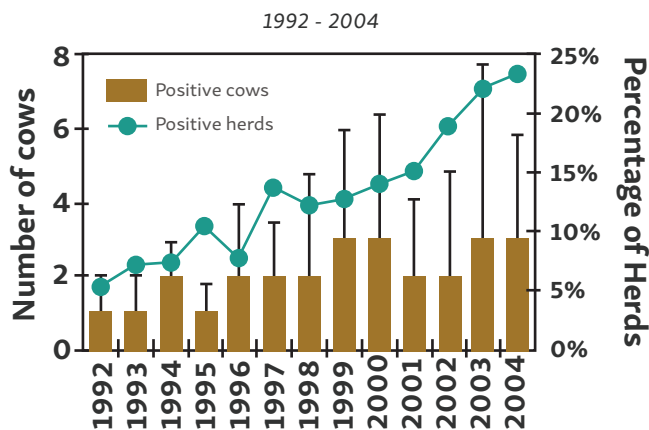
*Klebsiella* mastitis is one of the most devastating diseases in the dairy industry. *Klebsiella* is a gram-negative bacteria and a common cause of clinical mastitis on dairy farms. Mastitis caused by *Klebsiella* can be severe resulting in abnormal milk, a swollen, hard, painful quarter, and a sick cow that sometimes dies. If cows with *Klebsiella* mastitis survive the illness, they are often culled due to low milk production.

### How common is *Klebsiella* mastitis?

More herds and more cows within those herds are experiencing *Klebsiella* mastitis. The prevalence of *Klebsiella pneumoniae*-positive fecal samples from surveys performed over a 12 year period in Northeast herds, have increased 23%.<sup>2</sup> The number of reported cases has been steadily growing over the past 15 years.

*Klebsiella* infections can occur at any time during the lactation cycle. Many *Klebsiella* mastitis cases occur in the summer. This is because the bacteria flourishes in warm, humid weather. Also, cows' immune defenses may be lower at this time due to heat stress which results in a more susceptible animal.

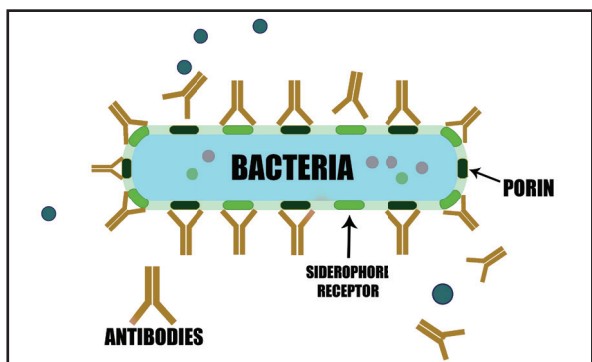
### *Klebsiella* infected cows and herds<sup>2</sup>



### SRP® Vaccine Technology

Bacteria require iron to survive. Since most iron in a host is tied up, bacteria produce and release small proteins called siderophores, which scavenge iron from the local environment. These siderophores bring iron back into the bacteria through protein pores specialized for iron acquisition. These pores are referred to as siderophore receptors. Siderophore receptors belong to a family of proteins called porins. Vaccines made from siderophore receptor and porin (SRP) proteins generate antibodies that block the uptake of iron into the bacterial cell.

Without iron, the bacteria dies.



FEATURES	BENEFITS
SRP proteins are "conserved" <sup>3</sup>	Cross-reactive antibodies for many gram-negative bacteria
Antibodies attack a critical bacterial function	Controls infection and colonization, not just endotoxemia
SQ administration	BQA compliant

<sup>1</sup>Gorden, P. J., M. D. Kleinhenz, J. A. Ydstie, T. A. Brick, L. M. Slinden, M. P. Peterson, D. E. Straub, and D. T. Burkhardt. 2018. Efficacy of vaccination with a *Klebsiella pneumoniae* siderophore receptor protein vaccine for reduction of *Klebsiella* mastitis in lactating cattle. *J Dairy Sci.* 101:10398 – 10408. <sup>2</sup>Zadoks, R. N., and M. A. Munoz. 2007. The emergence of *Klebsiella* as a major mastitis organism. Pages 100 – 111 in National Mastitis Council Annual Meeting Proc. San Antonio, TX. <sup>3</sup>Lin, J., J. S. Hogan, and K. L. Smith. 1999. Antigenic homology of the inducible ferric citrate receptor (FecA) of coliform bacteria isolated from herds with naturally occurring bovine intramammary infections. *Clin Diagn Lab Immunol.* 6:966-969.