

Vaxxon® SRP® Klebsiella

Siderophore Receptors and Porins



Klebsiella mastitis has nowhere to hide.

A Klebsiella vaccine with SRP® technology keeps cows healthy and productive.

Vaxxon® SRP® Klebsiella is the only USDA licensed vaccine for use in the management of mastitis infections caused by Klebsiella – an increasingly challenging disease in dairy cattle. Based on Siderophore Receptor and Porin (SRP®) technology, Vaxxon SRP Klebsiella is an exciting new tool to fight Klebsiella mastitis.

Key findings from an Iowa State study

- Vaxxon SRP Klebsiella has been shown to reduce the prevalence of mastitis in the herd by 71%¹
- The incidence rate of a cow getting mastitis one or more times was reduced by 76%¹
- Vaccinated cows stay in the herd longer; regardless of mastitis infections¹
- Somatic cell count, an indicator of udder inflammation, was reduced by 42%¹
- 2 lb/day gain in milk production per cow, compared to non-vaccinated cows¹



REDUCED PREVALENCE OF KLEBSIELLA MASTITIS¹



REDUCTION IN SOMATIC CELL COUNT¹



INCREASED MILK PRODUCTION¹

60-80% of cows diagnosed with Klebsiella mastitis leave the herd within that lactation period.²

Klebsiella mastitis is one of the most devastating emerging diseases in the dairy industry. Klebsiella is a Gram-negative bacteria associated with environmental mastitis in cattle, which means it can be found almost anywhere and can cause infection through contact. Fecal shedding into the environment coupled with various types of bedding create an ideal growing condition for the survival and transmission of Klebsiella bacteria. Dairy cattle that are not culled from the herd due to Klebsiella mastitis typically have recurring infections that are costly to the dairy.

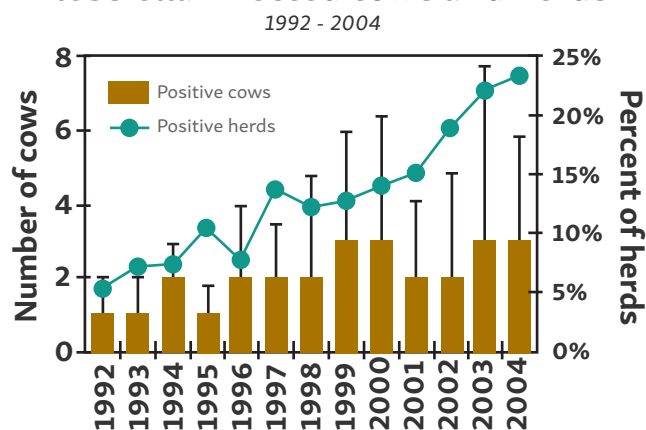
How common is Klebsiella mastitis?

More herds and more cows within those herds are experiencing cases of Klebsiella mastitis. The prevalence of *Klebsiella pneumoniae*-positive fecal samples from surveys done over a **12 year period** in Northeast herds, have shown a **23% increase** in infection detection. The number of reported cases has been **steadily growing over the past 15 years**, which can be attributed to the usage of recycled manure bedding, although Klebsiella can be found in sand bedding as well.

Klebsiella infections can occur at any time during the lactation period and may also occur during the dry period. Cows in early lactation are at an increased risk for new infections due to the increased stress and immune suppression associated with the postpartum period. Additionally, cows are at an increased risk for mastitis immediately after the dry off period.

For more information on Vaxxon SRP Klebsiella, please visit our website at www.vaxxinova.us.com

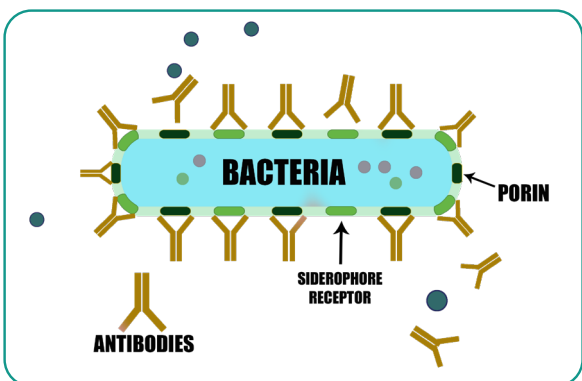
Klebsiella infected cows and herds



Source: Ruth Zadoks and Marcos Munoz, National Mastitis Council Annual Meeting, 2007

SRP Vaccine Technology

Bacteria require iron to survive. Since most iron in a host is tied up, bacteria produce and release siderophore proteins, which scavenge iron from the local environment. These “siderophores” then bring the iron back into the bacteria through protein pores (porins) specialized for iron acquisition. These pores are referred to as siderophore receptors, or SRP proteins. A vaccine made from SRP proteins will generate antibodies that block the uptake of iron into the bacterial cell.³



FEATURES	BENEFITS
SRP proteins “conserved”	Cross reactive antibody for many Gram-negative bacteria
Antibodies attack critical bacterial function	Controls infection, not just endotoxemia
SQ administration	BQA compliant

Mode of action of SRP vaccines is different from that of the whole-cell autogenous or core antigen. SRP vaccine induced antibodies bind and block transfer of iron and nutrients through bacterial cell wall pores, starving bacteria of needed nutrients. Provides greater overall immunity than whole cell bacterins.³ Made from siderophore receptors and porins, specialized proteins on the outer membrane of the bacteria.

¹Evaluation of a Novel Vaccine Based on Siderophore Receptor Proteins and Porins (SRP® Technology) for Controlling *Klebsiella* Mastitis in a Commercial Dairy Herd, AABP Annual Meeting 2016, Patrick Gordon, D.V.M., Michael Kleinhenz, D.V.M., Joshua Ydstie, D.V.M., Larry Slinden, D.V.M., Darren Straub, M.S., Doug Burkhardt, M.S.

²Cornell University, Ruth Zadoks and Marcos Munoz, National Mastitis Council Annual Meeting, 2007

³Antigenic Homology of the Inducible Ferric Citrate Receptor (FecA) of Coliform Bacteria Isolated from Herds with Naturally Occurring Bovine Intramammary Infections, Jun Lin, Joseph S. Hogan, and K. Larry Smith, 2009