

# IMMUNITY

KemTRACE® Chromium is a water soluble, highly bioavailable, organic source of chromium propionate that helps stabilize insulin receptors in cattle. This improves glucose utilization for increased energy and proper cell function, resulting in better immunity.

## Animals experiencing frequent immune challenges may have:

- ▶ Decreased growth
- ▶ Inefficient feed utilization
- ▶ Poor reproduction
- ▶ Increased health costs


## How often does an immune challenge occur?

Dairy cows are constantly at risk of being challenged by *Escherichia coli* mastitis, *Salmonella* infections, mycotoxin insults and more. The impact of even a minor immune challenge could be significant. In fact, 1/10 of the lipopolysaccharide (LPS) could result in 2.78 kg of milk loss per day.<sup>1</sup> At \$15 per hundredweight (cwt), that's \$0.92 lost per cow per day.

## 4 POUNDS OF SUGAR ARE NEEDED OVER A 24-HOUR PERIOD TO TREAT AN IMMUNE CHALLENGE.<sup>1</sup>

In order to combat an immune challenge, an active immune system requires 4 pounds of sugar over a 24-hour period. The sugar meant for milk production will instead be used to support this immune function, reducing total milk production and profitability.

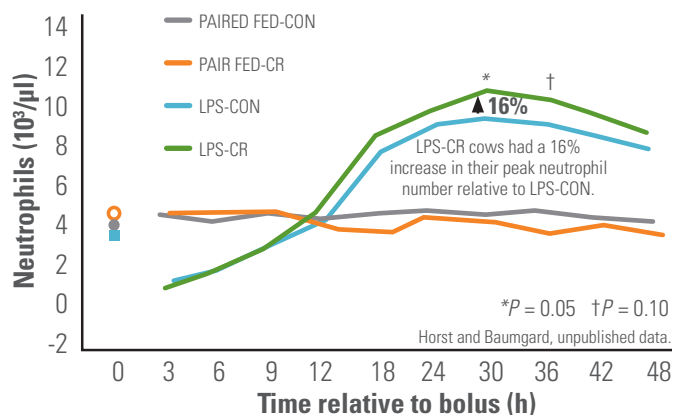
## What is 1 kilogram of glucose worth in terms of milk yield performance?


$$\begin{array}{r} 1,000 \text{ G GLUCOSE} \\ \hline 72 \text{ G GLUCOSE/KG MILK} \\ = \\ \mathbf{13.9 \text{ KG}} \\ \text{POTENTIAL MILK LOSS} \end{array}$$

## Impact of chromium on immunity

Research studies have reported improved immune function of activated leukocytes when animals were supplemented with chromium.<sup>2,3,4</sup>

A recent study conducted with lactating Holstein cows observed: **INCREASED CIRCULATING NEUTROPHIL COUNTS IN LPS** — administered cows supplemented with chromium (Figure 1).<sup>5</sup>



**Figure 1:** Effect of chromium supplementation on circulating neutrophils following a LPS challenge or pair-feeding in lactating dairy cows.<sup>5</sup>

## Fending off infection

Research at Cornell University suggests that **supplemental chromium enhanced immune responses** in early lactation to bacterial challenges in the uterus by increasing neutrophil proliferation (Table 1).<sup>6</sup>

Increased neutrophil proliferation more effectively cleared infections, which resulted in fewer cows with subclinical endometritis — a leading cause of reduced first service insemination conception rates. Ultimately, improving overall herd reproductive health should contribute to lower veterinary/medical costs, lower improved conception rates and more optimal milk production.

**Table 1:** Effect of chromium supplementation on endometrial cytology.<sup>6</sup>

| Item   | TREATMENT      |        |     |         |
|--|----------------|--------|-----|---------|
|  | Control        | Cr-pro | SEM | P-value |
|  | ---- Mean ---- |        |     |         |
| <b>7 d postpartum</b>                                |                |        |     |         |
| <b>% of neutrophils</b>                              | 32.8           | 41.1   | 4.1 | 0.15    |
| <b>40 to 60 d postpartum</b>                         |                |        |     |         |
| <b>Subclinical endometritis<sup>1</sup> (# Head)</b> | 16             | 8      | --  | 0.02    |
| <b>Head (#)</b>                                      | 11             | 20     |     |         |

<sup>1</sup>Neutrophil > 10%

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**KemTRACE<sup>®</sup> CHROMIUM**  
Essential to you and your operation.

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### REFERENCES

1. Kvidera, S. K. (2017). Glucose requirements of an activated immune system in lactating Holstein cows. *Journal of Dairy Science*. 100(3):2360-2374.
2. Moonsie-Shageer, S. and D. N. Mowat. (1993). Effect of level of supplemental chromium on performance, serum constituents, and immune status of stressed feeder calves. *Journal of Animal Science*. 71:232-238.
3. Chang, X., B. A. Mallard and D. N. Mowat. (1996). Effects of chromium on health status, blood neutrophil phagocytosis and in vitro lymphocyte blastogenesis of dairy cows. *Veterinary Immunology and Immunopathology*. 52:37-52.
4. Lee, D. N., C. F. Weng, H. T. Yen, T. F. Shen and B. J. Chen. (2000). Effects of chromium supplementation and lipopolysaccharide injection on physiological responses of weanling pigs. *Asian-Australasian Journal of Animal Science*. 13:528-534.
5. Horst, E. A., et al. (2018). Effect of chromium on bioenergetics and leukocyte dynamics following immunoinactivation in lactating Holstein cows. *Journal of Dairy Science*. 101:1-16.
6. Yasui, T., et al. (2014). Effects of chromium propionate supplementation during the periparturient period and early lactation on metabolism, performance, and cytological endometritis in dairy cows. *Journal of Dairy Science*. 97:6400-6410.