

FEED THE IMMUNE SYSTEM



PHOTO BY SHAUNA HERMEL

There are biological barriers, such as skin and mucus, that help ward off disease, but when there is a breach — like a cut — the innate immune system is called upon.

“When those bacteria pathogens get in, it acts like a garbage disposal and collects all the bad pathogens and kills them,” he said. “If it’s overwhelmed, if there’s too much disease going on, then the active system kicks in.”

It starts early

For a calf to have the best chance at lifetime health, what happens *in utero* sets the stage.

“When a cow drops a calf and produces colostrum, she didn’t make that colostrum that day. It was a process,” he said; one that started at least 30 days prior to calving and requires nutritional taxation on that new mama.

Several decades ago, it was common to reduce calories to cows the month prior to calving to avoid heavy birth weights.

“What that did is compromise colostrum and the survivability of the calf,” he said, noting that shorting cows on nutrition during late gestation is a bad idea. “You’re getting colostrum ready and you’re finalizing the whole immune system and lungs and all that for the unborn calf. That’s a critical time period.

“Colostrum is something that’s vital, and we want to help the cow make the best quality colostrum she can,” Scott said.

Getting good-quality colostrum in the first few hours of life, before gut closure, lays the

foundation for long-term health.

The largest organ

“The gut is critical for the health of people, and it’s critical for the health of animals,” Scott says. “We know it absorbs nutrients, but most people don’t realize that the gut is the largest immune organ in the body. It contains a larger number of immune cells than any other tissue in the body.”

It adds a layer of protection

Keeping cattle healthy is about more than health products.

by Miranda Reiman, senior associate editor

The ideal way to use animal health cures is not to. “We have a problem,” said Ron Scott, director of beef technical innovation, Purina Animal Nutrition. “We continually treat disease. ... We need to figure out how to prevent disease.”

Scott spoke as part of the Cattleman’s College® hosted Feb. 2 during the Cattle Industry Convention in Houston, Texas.

If a calf doesn’t get sick, logic suggests it had a better immune system. How do we create more of those calves, Scott asked, and then answered: “Immunity is a lifelong event that starts at conception

basically. It takes a comprehensive approach.”

Three-tiered protection

The goal is to strengthen all three types of immunity:

- Innate — the immunity an animal is born with.
- Passive — maternal antibodies that come through colostrum.

- Active (Adaptive) — immunity that is gained over time by what the animal is exposed to and develops resistance against. (This includes response to vaccinations.)

The best full-on defense to guard against sickness is to build all types so, as the passive immunity wears off as an animal gets older, the active immunity kicks in, Scott says.

“The innate immune system is the cattle’s first line of defense to prevent disease,” Scott said.





“There’s not one thing that’s going to help all of us in the industry to fight this battle, particularly respiratory disease, but it’s all part of a comprehensive program,” said Ron Scott, Purina nutritionist, on the complexity of the immune system.

against absorbing pathogens in the body, and the gut sends chemical messages to the brain. Conditions like ulcers or gaps in the small intestine’s villi (the small absorbing fingers) can cause “leaky gut,” which can be an entry point for pathogens.

Leaky gut can also lead to chronic inflammation.

“If we have constant inflammation, that means that our energy, protein, vitamins and minerals are used for maintenance requirements, leaving less [left] over for gain,” Scott said. “That’s why we can have reduced performance, and it compromises immunity.”

While some of the science focuses on ways to increase villi growth or repairing gut insult after threats, other projects center on ways to increase the good bacteria found in the microbiome of the bovine intestine.

Bacteria for good

“Your body has three times more bacterial cells than human cells. There’s a thousand different species of bacteria in the gut,” Scott said.

That’s true in cattle, too, and they’re needed to aid in digestion, stimulate gastrointestinal (GI) tract development and help outcompete the bad bacteria.

Plant extracts, made of everything from flowers to fruits and vegetables, along with

prebiotics and probiotics, are feed additives with positive effects.

“What we’re trying to do is to prime the immune system and get it ready,” Scott said. “We’re trying to improve digestion, protect the gut lining and optimize the growth of good bacteria so they can now outcompete the bad bacteria.”

Researchers are also finding ways to stimulate the innate immune system by influencing the production of the disease-fighting white blood cells.

“You have requirements for cattle, pigs, people for protein, energy, vitamins and minerals. There’s no substitute for that,” he said. “But there are no requirements for ingredients and nutrients needed for immune

function. Someday there will be.”
Until then, what should we do?

Immunity to-do list

“There’s no silver bullet,” Scott said, but he did offer some tips:

- ▶ Don’t overlook traditional nutrition.
- ▶ Follow Beef Quality Assurance (BQA) management practices.
- ▶ Help your cattle avoid stress.
- ▶ Talk to your nutritionist about additives.

Producers have an individual and an industry-wide motivation to keep after overall herd health improvements, Scott said. The cost to treat an animal just once averages \$30 per head, and those that require treatment are set back in performance measures. Many

never gain that weight back. There are also negative quality-grade implications.

“That’s a big loss to the industry, but there’s another cost that sometimes we forget about. ... It’s the consumer perspective,” Scott said. In a world where antibiotics are being questioned in animal agriculture, he suggested responsible use is the best way to ensure future access.

He encouraged individual producers to envision being part of the solution. Scott said, “I want all of us to think about, ‘What am I going to do about that? What am I going to change?’”

Editor’s note: Want more of the story? Watch for the *Angus at Work* podcast featuring Ron Scott in April.

Table 1: Nutrient requirements of beef cows^a

To see nutrient requirements of pregnant replacement beef cows, visit: <https://bit.ly/03MarchHfrs>.

Months Since Calving:	1	2	3	4	5	6	7	8	9	10	11	12
NE required (Mcal/day)												
Maintenance	10.25	10.25	10.25	10.25	10.25	10.25	8.54	8.54	8.54	8.54	8.54	8.54
Lactation	4.78	5.74	5.17	4.13	3.10	2.23	0	0	0	0	0	0
Pregnancy	0	0	0.01	0.03	0.07	0.16	0.32	0.64	1.18	2.08	3.44	5.37
Total	15.03	15.99	15.43	14.41	13.42	12.64	8.87	9.18	9.72	10.62	11.98	13.91
MP required (g/day)^b												
Maintenance	422	422	422	422	422	422	422	422	422	422	422	422
Lactation	349	418	376	301	226	163	0	0	0	0	0	0
Pregnancy	0	0	1	2	4	7	14	27	50	88	151	251
Total (g)	771	840	799	725	652	592	436	449	472	510	573	673
Total (lb.)	1.7	1.9	1.8	1.6	1.4	1.3	1.0	1.0	1.0	1.1	1.3	1.5
Calcium required (g/day)^b												
Maintenance	16	16	16	16	16	16	16	16	16	16	16	16
Lactation	16	20	18	14	11	8	0	0	0	0	0	0
Pregnancy	0	0	0	0	0	0	0	0	0	12	12	12
Total	32	36	34	30	27	24	16	16	16	28	28	28
Phosphorus required (g/day)^b												
Maintenance	13	13	13	13	13	13	13	13	13	13	13	13
Lactation	9	11	10	8	6	4	0	0	0	0	0	0
Pregnancy	0	0	0	0	0	0	0	0	0	5	5	5
Total	22	24	23	21	19	17	13	13	13	18	18	18
Gain in weight from pregnancy/day^b												
Pounds	0	0	0.04	0.07	0.11	0.18	0.26	0.42	0.62	0.88	1.25	1.70
Milk production/day												
Pounds	14.7	17.6	15.8	12.8	9.5	6.8	0	0	0	0	0	0
Weight of conceptus												
Pounds	0	0	2	2	7	9	15	26	42	64	97	141

^a Mature weight, 1,172 lb.; calf birth weight, 88 lb.; age at calving, 60 months; peak milk, 17.6 lb.; age of calf at weaning, 30 weeks; breed code, Angus; milk protein, 3.4%; calving interval, 12 months; see Table: Mean Nutrient Content of Feeds Commonly Used in Beef Cattle Diets for abbreviations. Crystalline vitamin A should be added at a level of 2,200 IU/kg (1,000 IU/lb.) dry matter feed.

^b No allowance made for gain because these are mature cows.

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