

TRANSFER FACTOR

A Better Way to Prevent Disease

By Heather Smith Thomas

For many decades, the typical way cattle producers have dealt with disease is by vaccination to prevent some of the common diseases, and by treating sick animals with anti-microbial drugs when signs of illness appear. By the time the animal shows symptoms, however, damage has already occurred and it can be more difficult to treat the disease. In some instances, irreversible damage has already been done. The use of pathogen-killing drugs is not always as effective as we'd like, and is also being questioned today, due to the increasing numbers of drug-resistant pathogens. This microbial resistance diminishes the effectiveness and benefit of some of the drugs we've come to rely on.

There is also the issue of drug residues in food animals if some of these drugs are not used appropriately or if withdrawal times are not carefully observed. Many consumers are becoming more concerned about the safety of meat products and some prefer to buy products that had no drugs used in the raising of that animal.

Due to these factors, beef producers and veterinarians are beginning to look at alternatives to antimicrobial use in dealing with disease. A bright spot in this quest is the use of immune system enhancement and the role of transfer factors. If the immune status of our animals could be enhanced, disease would be less likely to occur, and even if the animals do get sick, the severity and duration of disease could be reduced and they would recover quicker, without the need for as much antimicrobial treatment.

Dr. Steve Slagle, a veterinarian in Granite Bay, California, near Sacramento, has been working with a fascinating product that is now available for humans and animals. "The product that I'm using in my practice is a natural immune enhancer and modulator. It derives its efficacy from a protein produced by the immune system's master immune cells called T lymphocytes. The protein is called transfer factor, and it is also found in cow colostrum. If you buy a bag of dried colostrum (a substitute colostrum product for newborn calves) at the feed store or veterinary supply, about 1% of that product is this protein. We extract that 1% from cow colostrum which enables us to deliver very high levels of transfer factor in our products," he explains

"The transfer factors were originally marketed as a human product. I started using them in my veterinary practice in February 1999. So many veterinarians were using the human product that 4Life Research decided to create a veterinary product line for dogs, cats, horses and newborn livestock. Dr. Joe Ramaeker, a colleague of mine, was asked to formulate the product line. Dr. Ramaeker then went on to develop a cancer product for dogs and cats, and a formulation for ruminating livestock," says Slagle.

Ramaeker's patented Livestock Stress Formula is an organic product and can be used in a natural or organic beef program. "Many of the cattle producers who sell to Coleman Beef, Meyers, Painted Hills and other natural beef companies use Ramaeker's Stress Formulas as one more tool to reduce their dependence on antibiotics," he says.

"I have been practicing veterinary medicine since 1968 and I have never seen anything that is as exciting as this," says Slagle.

HOW IT WORKS – The body's immune system produces memory molecules whenever it is exposed to disease or receives a vaccination. These molecules are bioactive peptides called transfer factors and are passed from the cow (with all her immune intelligence) to the calf via colostrum. This transfer is critical in helping educate the immune response cells of the newborn calf.

Transfer factors were discovered in 1949. Earlier, it had been noticed that immunities could be transferred from one person to another by blood transfusions. In 1949, Dr. H. Sherwood Lawrence, a researcher working on the problem of tuberculosis in humans, found that he could transfer immunity to his patients by using dialyzed leukocytes. When this extract was taken from a blood donor who was resistant to the pathogen and injected into a patient that had no immunity, the immunity of the donor was transferred to the naïve patient. A portion of the lymphocyte (white blood cell) contained what Lawrence dubbed "transfer factor".

Research was conducted in more than 60 countries (and more than 3500 studies were done) during the 1950's through 1970's and then nearly halted. At that point in time, the world's blood supply was becoming contaminated by HIV and hepatitis C virus and the only known source of transfer factor was blood. Research on this phenomenon was also put on hold because more exciting discoveries revolved around antimicrobials. These were the promising wave of the future that could halt diseases in their tracks. The use of transfer factor was limited for awhile—especially in veterinary medicine—because it was more expensive to produce than antibiotics. Research did continue, but slowly.

The phenomenon of transfer factor was not actively pursued until the late 1980's when it was discovered that bovine colostrum contains significant amounts of this ingredient that stimulates both aspects of the immune system (humoral and cellular immunity). Veterinary researchers observed a large number of lymphocytic cells in the normal mammary gland secretions of cows, and wondered what role they might play in the health of the newborn calf, realizing that colostrum does more than merely provide passive immune protection. We now know that transfer factor is a lymphokine—one of the protein messengers released by antigen-sensitized lymphocytes (white blood cells).

Chicken eggs also contain transfer factors, and the combination from eggs and colostrum increases the effectiveness by 185%. Transfer factors from cow colostrum and eggs are superior to and more functional than transfer factors from humans because animals are exposed to many more species and types of bacteria, viruses and fungi.

As stated by Dr. Richard H. Bennett (Infectious Disease Microbiologist and Immunologist, and former consultant to the National Research Council), transfer factor is one of the most potent messengers in the body and has 3 effects on the immune system. These effects are called inducer fractions, antigen specific fractions and suppressor fractions.

Inducer fractions - One of the functions of transfer factor molecules is to selectively enhance immune surveillance by helping the body recognize various antigens. This selective immune surveillance is made possible by the inducer fractions. One of the veterinarians who consulted with the company that has the patent for extracting transfer factor from colostrum stated that one capsule (200 mg) of transfer factor has the capability of recognizing more than 3000 different pathogens. Not only can transfer factor be specific for an individual antigen that a lymphocyte might be exposed to, but it can also stimulate a multiple response and provide protection against several strains of that organism.

This enhancement is made possible by the inducer fraction that acts on what are called the Natural Killer Cells, according to Bennett. The NK cell's job is to seek out any cells that have been altered by microbes and destroy them. They have a similar protective role in preventing formation of malignant tumors. The inducer fractions also influence the body's overall response by increasing the function of the T helper lymphocytes which play a critical role in a balanced immune response to resolve most infections, says Bennett.

The researchers found that they could expose a cow to various bacteria and viruses, and the cow would then produce transfer factor that could stimulate immunity not only to those pathogens but also to other related strains, including some that are much more pathogenic to other species. This is of benefit when using transfer factor to aid disease resistance in horses, for instance. Cows can produce large quantities of colostrum that can then be used for extracting transfer factor that can benefit other species—since transfer factor in horses, cats, dogs, humans and cows has similar structure and identical function.

Another exciting aspect of transfer factor is how quickly the protection is mounted. Immunity from vaccination generally takes 10 to 14 days to develop, whereas transfer factor activates immunity in less than 24 hours.

Antigen specific fractions – Transfer factors act in two ways to “educate” the immune system to respond quickly when confronted by disease threat. One is a response to a specific pathogen such as a cryptosporidium protozoan that might be pathogenic to several species, and the other response is to similar pathogens—such as herpes virus infections that differ from one host species to another. Thus transfer factors can “educate” the immune system to recognize and fight a wide array of related but not identical infectious agents, according to Bennett.

Suppressor fractions – In every physiological system in the body there are checks and balances, so transfer factor can also act to suppress immune function when necessary. The process of achieving balance is called homeostasis. Once a disease threat has been confronted, and a sufficient response has occurred to thwart it, the body must down-regulate the battle so the immune system can return to a resting state and conserve its resources for the next challenge.

The suppressor fractions signal the T helper lymphocytes and the cytotoxic T cells to slow down their activity and return to a quieter state. This “quieting down” the immune response is important because some pathogenic microbes can hide in certain body tissues and the immune response becomes directed toward those tissues, leading to autoimmune diseases. The suppressor fractions of transfer factor appear to be the way the body limits overzealous immune responses, according to Bennett, and becomes the body’s means to protect itself from an inappropriate immune response.

PREVENT STRESS-RELATED DISEASES - “We use the transfer factor products in cattle during stress periods,” says Slagle. “If we give it to newborn calves, it’s the equivalent of giving them 6 to 8 gallons of colostrum in terms of the protective factors. It makes those babies super healthy. At weaning they are often 5 to 10% heavier than similar calves that did not receive the product—depending on how stressed the animals are during their early weeks of life,” he says.

If calves receive Livestock Stress Formula at weaning time (another stress period in their lives), they typically gain an extra ½ to one pound per day during their preconditioning period or when they go to a feedlot. Feedlot introduction is probably the most stressful thing calves experience in their lifetime.

“With use of this product, often death loss is reduced to near zero, because the ones that do get sick don’t get that sick. Usually one treatment and they turn around,” says Slagle.

“We gave a slide show presentation to the Minnesota Cattlemen’s Association 2 years ago. This came about after we were at the NCBA meeting and had lunch with the president and mentioned what we were doing. He called us a couple months later when he started calving, and said he had just treated the first 28 calves born that wet spring, for scours. He wondered if our transfer factor product really worked and asked us to send him some. We sent it to him by next-day air. He had about 250 cows and he started giving this to his calves at birth and it literally stopped the scours,” says Slagle.

“His neighbor was a custom calver who had 850 calving cows to deal with and he’d treated the first 40 or so for scours. Then he got some of the Livestock Stress Formula and stopped the outbreak on his ranch, too. So they invited us to talk to the cattlemen’s meeting in Minnesota.”

EARLY STUDIES WITH CATTLE – “We did our first feedlot study with a professor in the veterinary school in Missouri. We took 240 head of 440-450 pound calves that were not very stressed; they were taken off wheat grass and transported about 40 miles to the feedlot. Our study was to compare our product with Micotil. This was when Micotil first came out. We treated 80 calves with our product and 80 with the new antibiotic and 80 calves with nothing. They’d all been vaccinated and dewormed when they came into the feedlot. The group of calves that received our product had no illness, the Micotil group had 12 treats and the control group had 17 treats. Ours gained over 3/4 pound per day more than the Micotil group. It was a huge success,” says Slagle.

“Then we went to Kansas State University and did a study with 750 cattle. These were stressed cattle that came from multiple sources in the South. Some of them were already sick when they arrived. We did the same basic study, except with 250 head in each group. In this study we failed. Our calves did about the same as the other 2 groups rather than doing any better. We were devastated,” he says.

“Then we found out that the key ingredient in the Livestock Stress Formula product was destroyed in the rumen in about 1.5 hours by the rumen bacteria. The calves in the first study, where it worked so well, were not stressed. Unstressed calves have a rumen by-pass mechanism in which a certain percentage (about 20%) of some feeds bypass the rumen and is not affected or destroyed by rumen organisms. In that first study that’s what happened, giving us those great results,” says Slagle.

By contrast, in the second study with the highly stressed calves their bypass mechanism was non-existent. “Our key ingredient got destroyed in the rumen before it could be utilized by the immune system. With more research, Dr. Ramaeker designed a product that was coated—like a time-release aspirin—so it could get through the rumen without being destroyed. That accomplishment was a major step forward,” says Slagle.

“The other thing we found in both baby calves and adults is that you should give it two days in a row. You can give a double dose on day one, with newborn calves, and it won’t do much better than giving a single dose on day one. But if you give a dose on day one and another dose on day two, it’s like a booster, with much better results.”

This was another hurdle crossed. “Having to give a product for 2 days is a pain in the neck because nobody wants to catch baby calves twice or run cattle through a chute 2 days in a row. So a delayed-release formula was developed with half as immediate release and half a delayed release—another major improvement,” says Slagle. This is just as effective as giving a dose on day one and day two, but with less labor, and less stress on the animals.

“Transfer factors are like an instant temporary vaccine when you give it to an animal. There are about 3000 different pathogens that will be recognized within hours. This protein attaches to the T-lymphocytes which are the master immune cells. They are the ones that recognize the pathogens. When they take in this protein, it’s like an identification molecule. It will recognize Salmonella for instance, and tell the immune system there’s a problem that needs to be taken care of. So the immune system targets that particular pathogen and sets in motion an immune response to destroy it,” he explains.

The difficult part is getting people to try it, but after they try it they can see the benefit. It’s hard to get people out of their old habits of simply treating the cattle that get sick, using antibiotics. This immune stimulation as a preventative is a new approach, but after people use it they are convinced that it’s a better way to deal with illness. As time goes on, there will be more and more challenge and controversy over continued use of antibiotics, so this alternative may become more attractive.

“You obviously need antibiotics when you have a sick animal, but we have found that transfer factor can help reduce the incidents when antibiotics would be necessary. The first study that opened

our eyes was when we worked with two dairies near Oakdale, California. They both used the same calf raiser in Tulare, California. It's about a 7 hour drive after their calves were picked up, before they got down to Tulare. It was a nice operation, with little individual houses for the calves, and very clean," he says.

"The previous 3 months, before we started our study, the two dairies each lost about 11% of their young calves. This was their typical average loss for this time of year," he says.

"Dr. Ramaeker and I approached both dairies about using the product. The first dairy didn't use it. We sold some to the neighboring dairy, who did use it, putting it in milk replacer for the first two days before the calves were hauled to the calf raiser. "During the next 3 months, the one dairy sent down 180 calves and lost 30 of them. The other dairy sent down 181 and lost 3 calves. It was like night and day on the health of these calves," he says.

About two years later, the dairy that used the product called Dr. Ramaeker and Slagle. "The dairyman said, 'those heifers that I gave the product two years ago freshened at 22 months of age. Normally, my heifers freshen at 24 months.' The treated heifers grew that much faster, and he was able to breed them 2 months earlier."

Those heifers had only received the product as baby calves, but it had a beneficial affect on their health and growth. "That dairyman, John Knudson, called us a year later, when those females were 3 year olds. He told us that they were producing an average of 2000 pounds more milk per year than similar heifers that had not received the product as babies. This was fascinating, to see the long-term advantage, that you might not recognize in a beef herd that doesn't have the records like they do in a dairy," he says.

"At that point in time John's dairy was a 1500 head commercial operation. He now has an 1800-head organic dairy because he is able to operate without being so dependent on antibiotics. His was a wonderful success story and he now sells organic milk to Safeway stores," says Slagle.

CORTISOL AND INSULIN STUDIES – "We did our first stress study at a veterinarian-owned feedlot in Ohio. Dr. Bob McClung did the study for us, to measure stress levels in the cattle. Dr. J.D. Norris repeated the exact same study at Texas A&M with almost identical results. We'd been getting reports from feedlot managers that when they got bawling calves and gave them our product, instead of bawling for 3 or 4 days they'd only bawl for about 30 hours and then have their heads in the bunk, eating. Feedlot people kept telling us this, so we wanted to find out why this was happening. We wondered if it might be a reduction in cortisol levels," he says. With lower stress, we see lower cortisol levels. With lower cortisol levels we see better immune response and less sick animals.

"We decided to find out. We bought 12 calves from a sale barn, selecting the most stressed calves we could find. We gave half of them the Livestock Stress Formula and the other half received a placebo. Blood samples were taken twice a day and sent to a lab in Lexington, Kentucky. The cortisol

levels in the treated calves were 46% lower than in the untreated calves. We also checked their insulin and T-4 levels. The insulin in the calves that got our product skyrocketed on about day 7 because they were on full feed by then. The other calves' insulin didn't elevate until they were out between 14 to 18 days; it took them that long to get on full feed," says Slagle.

"We repeated this study at Texas A&M with Dr. J.D Norris, and got the same results. Reducing cortisol levels helps reduce the stress in these animals. When stress goes up, the cortisol goes up, and the immune system goes down," he says.

SIDEBAR: TITER STUDIES – "We've done studies on titers in dogs, goats, pigs and cattle. By using this stress product at the same time as vaccination, we typically boost vaccine response and also increase titer levels by about 400%. We've repeated these studies several times and have gotten similar results. Dr. Ramaeker has applied for a vaccine-enhancement patent," says Slagle. This is one reason the product works so well in the feedlot. When the cattle come into the feedlot and are vaccinated, there is better immune response.

SIDEBAR: REPRODUCTIVE ENHANCEMENT - "Reproduction is another area we work with, and Dr. Ramaeker just received a fertility patent for the stress formula. In embryo transplant procedures we use it on the donor cow and typically double and sometimes triple the number of embryos that can be recovered. Often 100% of the embryos are number 1. We also give the product to the recipient females. We find it increases the pregnancy success rate about 10 to 20%," says Slagle.

"We did a study with a ranch that's a top producer of bucking bulls. These bucking cows are very high-strung. The embryos from their best cows are sought after, and any increase in number of embryos would be like a home run. We weren't able to produce double the amount of embryos, which we often can do when using the Livestock Stress Formula, but we did increase his embryos by about 50% and they virtually all were number ones," he says.

"I think one reason we only increased the number of embryos by 50% is that those bucking cattle are so high-strung and difficult to work with. They are bred to be wild, and their cortisol level must skyrocket when they are restrained in a chute," he says.

With most cattle, however, the results are more dramatic. "A Wygu breeder (Sutton Creek Cattle Company) called me recently to let me know he got 52 embryos on one flush, and 47 of those were number ones. Their embryologist who did that for them, and has been doing this kind of work for more than 30 years, said he'd only seen one other flush that beat that, in many thousands of flushes. This is by far the most embryos this ranch had ever gotten, and they had never gotten 100% number ones until they started using Livestock Stress. Now 100% number ones is not that uncommon for them," says Slagle.

When the stress formula is used for bulls, research has shown improvements in sperm quality, with increased sperm count, morphology and motility.

SIDEBAR: PRODUCTS AND PRICES – The product is available in powder and capsule form. These formulas provide the newborn and the adult ruminant with the ability to absorb the equivalent immune information and cell “education” found in 6 gallons of colostrum. It also contains probiotics, electrolytes and stress vitamins.

Cost of the product varies, depending on what it is used for. The delayed-release product for newborn baby calves (2 doses) is \$9. When the animals go into the feedlot or are being weaned at home, they are given 2 adult boluses which are \$7 apiece (a total of \$14).

“If you are bringing calves into a feedlot, unless they have been preconditioned and bunk trained, many people can get away with giving them 2 doses in the beginning. If they are stressed, or bawling calves, we give an additional dose around day 10 or 12. That’s a total of \$21 for those calves,” says Slagle.

When compared with the cost of treating sick animals (labor and drugs) and losses due to poorer weight gains when animals are sick, and death losses, these transfer factor products more than pay for themselves.