

Message from the President



2018 is already shaping up to be an interesting year for NovaVive.

We're particularly excited to be having new data presented about our Immunocidin (canine) and Amplimune products at important veterinary conferences later in the year.

A research report (oral) presentation, "Safety Evaluation of Multiple

Intravenous Administrations of Immunocidin® in Cats and Dogs with Malignancies", will be presented by Board certified oncologist Dr. Jeanette Kelly (DACIVM, Oncology) at the 2018 American College of Veterinary Internal Medicine Forum. This conference takes place in Seattle, Washington in mid-June.

At the same conference, we will have a poster presentation, "Efficacy of Mycobacterium Cell Wall Fraction on Influx of Polymorphonuclear Cells in Uterus of Dairy Cows" (Dr. A. Milovanovic *et al.*).

In August, the 30th World Buiatrics Congress 2018 takes place in Sapporo, Japan. The Company will have two oral presentations emphasizing the use of MCWF in the treatment of sub-clinical

and clinical endometritis and the immune stimulating potential of MCWF following intrauterine administration. This event attracts researchers and clinicians in the dairy and livestock industry from around the globe.

The first presentation is "Efficacy of Mycobacterium Cell Wall Fraction on intrauterine influx of polymorphonuclear cells in dairy cows-dose comparison study" (Dr. A. Milovanovic *et al.*) and the second is "Efficacy of Mycobacterium Cell Wall Fraction in the treatment of clinical and subclinical endometritis in dairy cows" (Dr. Gabriel Bó and colleagues).

The Company continues to actively assess new indications where the MCWF technology may prove effective.

Giving Newborn Calves a Fighting Chance

Did you know that a calf is born with a sterile gut and respiratory system? It is immediately exposed to both pathogenic (disease-causing) and non-pathogenic organisms through the nose and mouth. Increasingly, these organisms are becoming resistant to therapeutic antibiotics, presenting a major concern for herd health.

So what is a farmer supposed to do to protect his young calves from exposure to deadly organisms?

Ensuring the calf has colostrum from the cow immediately post-partum is an effective way to offer protection for the baby animal. The passive antibodies derived from colostrum are a calf's major defense against early disease.

Unfortunately, the amount and quality of colostrum a newborn calf ingests is usually unknown and often inadequate. The calf must develop its own active immune protection over time by coming into contact with various pathogens.

Amplimune®, a potent non-specific immunomodulator, can play an important role in turning on the calf's immune system earlier and amplifying its response to diseases.

In a clinical study, precocious immune maturation as a result of Amplimune therapy in calves less than 24 hours old has been demonstrated. In other words, the functionally immature immune system of a newborn calf was proven to be switched on to function as a mature immune system by



using Amplimune. This helps to reduce the risk of infection when the calf is exposed to disease-causing organisms in the first week of its life.

Amplimune is approved for sale in Canada and the U.S.A.



[NovaVive Inc.—Equine](#)

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What is the Importance of an OMRI Listing?



The Company announced in February that it has received an Organic Materials Review Institute (OMRI) Listing in the U.S.A. for Amplimune®. This means that OMRI is allowing Amplimune to be used in compliance with the USDA National Organic Program.

The National Organic Program (NOP) is a regulatory program housed within the USDA Agricultural Marketing Service. The Program is responsible for developing national standards for organically-produced agricultural products. These standards assure consumers that products with the USDA organic seal meet consistent, uniform standards.

Organic cattle producers are not allowed to use antibiotics in their animals, so there is a need for antibiotic alternatives to treat or prevent disease that are permitted for use in these animals.

According to the USDA Certified Organic Survey issued September, 2017, there are 267,523 organic dairy cows in the U.S.A. alone, located on 2,559 farms. Milk is the largest category

of certified organic agricultural product sales, with over 4 billion pounds (1.81 billion kg) of milk produced in 2016 (valued at \$1.385B).

There were 490 certified organic beef farms in the U.S.A. in 2016 with 42,554 animals. Organic beef totaled \$10.5 million in sales that year.

There were 218,268 other organic cows in the U.S.A. as of December 31, 2016, including organic bulls, beef calves,



replacement milk heifers, etc. Their value was \$164.4 million.

Amplimune is a potent immunomodulator that reduces the clinical signs and mortality associated with *E. coli* K99 diarrhea in neonatal calves. The product enhances innate immunity to fight bacterial infections and has received regulatory approval for sale in both the U.S.A. and Canada.

Studies have shown that a single, 1 mL dose of Amplimune can induce an immediate innate immune response in the neonatal calf.

The Company is conducting research with Amplimune in other bacterial diseases in cattle to test the product's efficacy as well as determine the appropriate dosing and route of administration.

Iowa State University Study Recruiting Horses for Study

Dr. Stephanie Caston, Associate Professor of Equine Surgery in the Lloyd Veterinary Medical Center at Iowa State University (ISU)'s College of Veterinary Medicine is busy recruiting horses with cancerous tumors for treatment with Immunocidin® Equine. Specifically, Dr. Caston and her research team are looking for horses with sarcoids or squamous cell carcinoma to analyze how effectively Immunocidin Equine treats these tumors.

Immunocidin Equine has regulatory approval in the U.S. and Canada for the treatment of equine sarcoid tumors. The study at ISU is focused on standardizing treatment protocols and assessing the product's efficacy and safety. Sarcoid and squamous cell carcinoma are two of the three most commonly diagnosed tumors in horses (the third is melanoma).



Sarcoids can occur in horses of any age. They are most common in adult Quarter Horses and other closely related breeds, but rare in Standard-breds. There are four different forms of sarcoids and these tumors are often found around the eyes, head/face, neck, chest, and shoulder, and at the site of old scars. It is estimated that sarcoids affect 1 in 100 horses in North America.

Squamous cell carcinoma is most commonly found in adult to geriatric horses of any breed. It can show up in the form of ulcerative or proliferative masses that look like proud flesh. It is common in un-pigmented (white or pink) areas, such as around the eye or third eyelid and urogenital structures. Sixty horses will be enrolled in the ISU study and horse owners from across the

U.S.A. are welcome to contact Dr. Caston about having their animals with cancer enrolled in this study. She can be reached by email at scaston@iastate.edu or by phone at 515-294-4886.

“Our team at ISU Veterinary College is interested in immunotherapy and we are investigating the success rates of new formulations of immunotherapies and novel immunotherapies as well as combination treatments,” said Dr. Caston.

“We are looking forward to our collaboration with NovaVive and to testing their product, Immunocidin Equine, to potentially establish new treatment protocols for sarcoids and squamous cell carcinoma.”