Volume 3 Issue 2

dvm business essentials

Aurora Pharmaceutical, Inc.
Innovative Products Backed
by Exceptional Service

Business Essentials Inside

aurora PHARMACEUTICAL®

Bob Rehurek,
Director of Sales and Marketing
Aurora Pharmaceutical, Inc.

AURORA TAKES NEXT STEP IN GLOBAL PRODUCTS PLATFORM

The global companion animal health market size was valued at USD $15.91 billion in 2018 and is expected to grow at a staggering 6.1% in 2019-2026.

That is why Aurora has been on a mission to enter this lucrative marketplace since our company's inception. We are pleased to say that our very first companion animal product – **Revolt™ (selamectin) Topical Solution** for Dogs and Cats – is approved by the FDA and will be entering the veterinary clinics by fall 2020. Revolt contains the same active ingredients and dosing regimen as Revolution® (Zoetis).

Aurora understands that in order to grow like we want to, we must actively pursue the development of new generic products and expand our distribution channels (companion animal-specific) to capture a larger market share. We are dedicated to our current business plan which includes finding, manufacturing and selling competitive products for our veterinary partners, delivering economic value to our customers and where possible, fulfilling unmet needs.

Our focus is to develop new relationships

> "In order for us to grow like we want to do, we must actively pursue the development of new generic products and expansion of our distribution channels (companion animal-specific) to capture a larger market share."

Approved by FDA under ANADA # 200-673

FEATURES & BENEFITS COMPARISON

Revolt™ is recommended for use in dogs six weeks of age or older and cats eight weeks of age and older

PRODUCT FEATURES	REVOLT™	REVOLUTION® *Pioneer Product	SENERGY™	SELARID™
Active ingredient: Selamectin	✓	✓	✓	✓
Full line comparison to pioneer product	✓			
Manufactured in USA for secure supply chain	✓			
Twist-N-Apply applicator – no cap to remove/dispose	✓			
Product color coding matches pioneer for ease of CLIENT conversion	✓	✓		
Available for kittens up to 5-lbs.	✓	✓	✓	✓
Available for puppies up to 5-lbs.	✓	✓	✓	✓
Weight-specific packages for exact dosing	✓	✓	✓	✓
Quick-drying, non-greasy topical solution	✓	✓	✓	✓
Monthly control of heartworm, fleas, ear mites in dogs and cats	✓	✓	✓	✓
Monthly control of American dog tick and sarcoptic mange in dogs	✓	✓	✓	✓
Treatment of roundworms and hookworms in cats	✓	✓	✓	✓

with companion animal veterinary distributors and online Pharmacies. Order procurement and tracking become easy, as associated supply chain management eliminates delivery channel intermediaries that drain profits. This reduces overall costs and is anticipated to drive demand for Revolt. In 2018 companion animal veterinary distributors and online pharmacies held the largest market share of the companion animal business. This segment is expected to grow consistently over the next decade. Aurora Pharmaceutical's Revolt will allow us to grow right along with the increasing market.

With the help of new distributor partners and online pharmacies, order procurement and tracking become easy as associated supply chain management eliminates other market intermediaries of the delivery channel. This reduces overall costs and is expected to drive demand for Revolt. We want to be there as it grows.

We are making plans to detail our new line to small animal clinics and show how products sourced and manufactured in the USA not only have better overall clinic value, but also provide clinics with a solid supply chain, uninterrupted by foreign shipping or tariffs.

> **We could not have grown as fast and as successfully without Dr. Specht's education, dedication to detail and her ability to work with our staff and management. We never worry about herd or pig health, and that's a blessing."**
>
> **Kathy Heimerl, Co-Owner, Heimerl Farms, Ltd.**

Dr. Terri Specht, Heimerl Farms Staff Veterinarian

Ohio Pork Powerhouse 40 Veterinarian Stresses Keep Your Career Ideas Open – You Never Know Where They Will Lead You

The truth be told, Terri Specht, DVM, ('09, The Ohio State Univ.), never thought she would ever be taking care of pigs for a living. As a matter of fact, her career goal from high school was set – attend OSU's veterinary school, work for a mixed-animal practice close to the family farm and live happily ever after. Skip ahead 10 years and Dr. Specht is now the staff veterinarian for Pork Powerhouses® Top 40 pork operation Heimerl Farms, Ltd, in Johnstown, OH, (a producer partner in Clemens Foods who owns more than 111,000 sows) and oversees the health and production of more than 21,000 sows producing upwards of 800,000 pigs to market a year.

"The move toward pork started almost immediately after I graduated from veterinary school," she recalls. "In 2011, my parents decided to diversify the family farm by building a pork finishing barn that my brother would oversee. It so happened that it was filled with PIC genetics (overseen by Bill Minton, DVM, ('85, The Ohio State Univ.) at Four-Star Veterinary Service (FSVS) in Chickasaw, OH) that were destined for Mexico. Being a veterinarian, I worked with Dr. Minton on the health and blood test records needed to transfer the pigs to Mexico. One thing led to another, and I started working for FSVS full time."

Dr. Terri Specht

Dr. Specht adds, "I was so blessed to have Dr. Minton mentoring me as I immersed myself in the swine medicine side of the pork business for nearly five years. I was also able to work with Heimerl Farms via our family pork business. As fate would have it, owners Jim and Kathy Heimerl decided they were growing too fast not to have a staff veterinarian helping them develop health plans, pig flows, swine service teams and a record-keeping team their growing international sales were requiring. In 2015 I became Heimerl Farms' in-house veterinarian."

According to Dr. Specht, it was quite a transition to establish what she needed and how to make it all work. "I had to work through what kind of support system I needed, who would be responsible for what and how I was going to physically arrange my day and week. Heimerl's is a large multiplier for PIC, so there is a mountain of health documents, blood testing and accompanying paperwork on the finisher barns to make sure every animal is healthy before it can ship," she stresses. "With Jim Heimerl being the Past President-Elect of the National Pork Producer's Council (NPPC) and international free trade being so important to him and most other pork producers, we go overboard to make sure all our animals have the proper testing and paperwork to keep pigs flowing to domestic and international markets."

Besides selling around 100,000 of their own PIC pigs annually, Heimerl Farms has around 150 contract growers across Ohio.

"I work closely with my eight Service Team Managers to manage health programs and optimize market flow with our contract growers," Dr. Specht notes. "If we have a disease outbreak, I work with my team to quickly figure out a solution to the break as well as which way the pig flow and breeding schedules go to maximize production. I have a great support team and have come to love every segment of the day."

In conclusion Dr. Specht states, "When you first get out of veterinary school you think you're ready, but you really aren't. It takes time and hard work to get into the swing of things and truly understand your role in it all. It helps when you can find that true mentor that is willing to take you under their wing and point you in the right direction. And finally," she adds, "don't close off any opportunities to see all sides of the veterinary industry. You may think you know what type of practice you will gravitate towards, but I suggest that you be open to new opportunities. I also suggest while you're in school to ride with as many veterinarians as you can. They will help you gravitate towards a veterinary career you will love forever."

THROUGH OUR WORK
WOMAN'S INITIATIVE

The nation's largest pig producers added 69,000 sows in 2019, according to the annual exclusive Pork Powerhouses® Top 40 ranking by *Successful Farming* magazine.

The total sow count for these largest producers, at 4.29 million, adds up to about two thirds of the sows in the U.S.

When Carolin von Rosenberg, DVM (NC State '89) started in equine medicine on the large horse farms of Ocala in the 90s, it was, as she puts it, ***definitely a man's world***.

"Ocala was very different back then. Not only were there very few female equine practitioners, the large breeding and racing operations were all run by men and worked by men. I had to overcome the double whammy of being a woman and an inexperienced new graduate.

"I remember clients refusing to use me because I was a woman," she recalls. "However, I was extremely fortunate to have a boss that insisted that they use me," she adds.

"To be honest, it took a few years to get comfortable and to be trusted. But I loved Ocala – the beauty and the lifestyle of the place – and although it has changed tremendously in the last 30 years, I have always felt at home here."

Dr. von Rosenberg now states, "The biggest problem we have as women vets is that we don't have a balanced life. When I first started, the typical male veterinarian was married with kids. His wife was either running the practice and his household or at the very least, could run the kids around and have dinner ready. Nowadays female veterinarians are either single, or if they are married, their spouse is also working full time. That means we have to find the time to take the kids to school, buy groceries, figure out what to eat, work all day, work in those after-hours clients and emergencies and then spend the late evening paying bills and invoicing clients."

The equine specialist adds, "Finding a life balance is especially difficult in equine medicine because it's a job you can't do part time. That's why we see more women heading to small animal practices, so they can balance their time better. We as an industry need to find more ways to cooperate with each other and find ways to do a part time practice. Losing good female equine practitioners permanently, because they are raising their kids, is a big bummer."

Entering her 31st year in practice, Dr. von Rosenberg now operates her own equine practice– Buena Vista Farm Reproduction and Foaling Center, Ocala, FL. While Dr. von Rosenberg points out she doesn't have an advanced degree in reproduction, she says three decades of working with mares has given her a school-of-hard-knocks approach to reproduction and foaling.

"Opening a mostly haul-in reproduction facility grew out of my desire to use my time more efficiently. I am now spending a lot less time on the road, and whatever emergencies I may have, they are mostly right here on the farm and can be dealt with swiftly," she explains.

"I have been able to hire a great crew, so no more midnight foalings unless there are complications," she smiles. "I spend most of my day breeding mares in an efficient and effective manner. I can check 10 mares in the time it would take me to drive to one client. I do not have to worry about my clients having a teaser stallion, about them having help to properly hold the horse, or even to be available at all during working hours. In reproduction you have to come back a lot to check the mares. It can be a daily thing during the heat cycle. When they bring the mares to me, I can check them whenever I need to. Basically this is my solution to tweak that work-life balance thing a little."

Dr. von Rosenberg says she now sees a lot of older sports mares that the owners want to breed.

"Ocala has changed. We still have many thoroughbred operations, but the emphasis now is training, not so much breeding. The slack is being taken up by other breeds,especially warmbloods. These mares usually have careers first, and then the owner wants to breed them. It's not uncommon to see 15-year-old maiden mares with cervical issues because they have never been allowed to breed," she states. "They easily retain fluids and have a lot of infections. We see a lot of problems with ovary issues as well. They are a challenge, however, what equine reproductive vet doesn't like a challenge now and then?"

FINDING THAT LIFE BALANCE IS INCREDIBLY HARD.

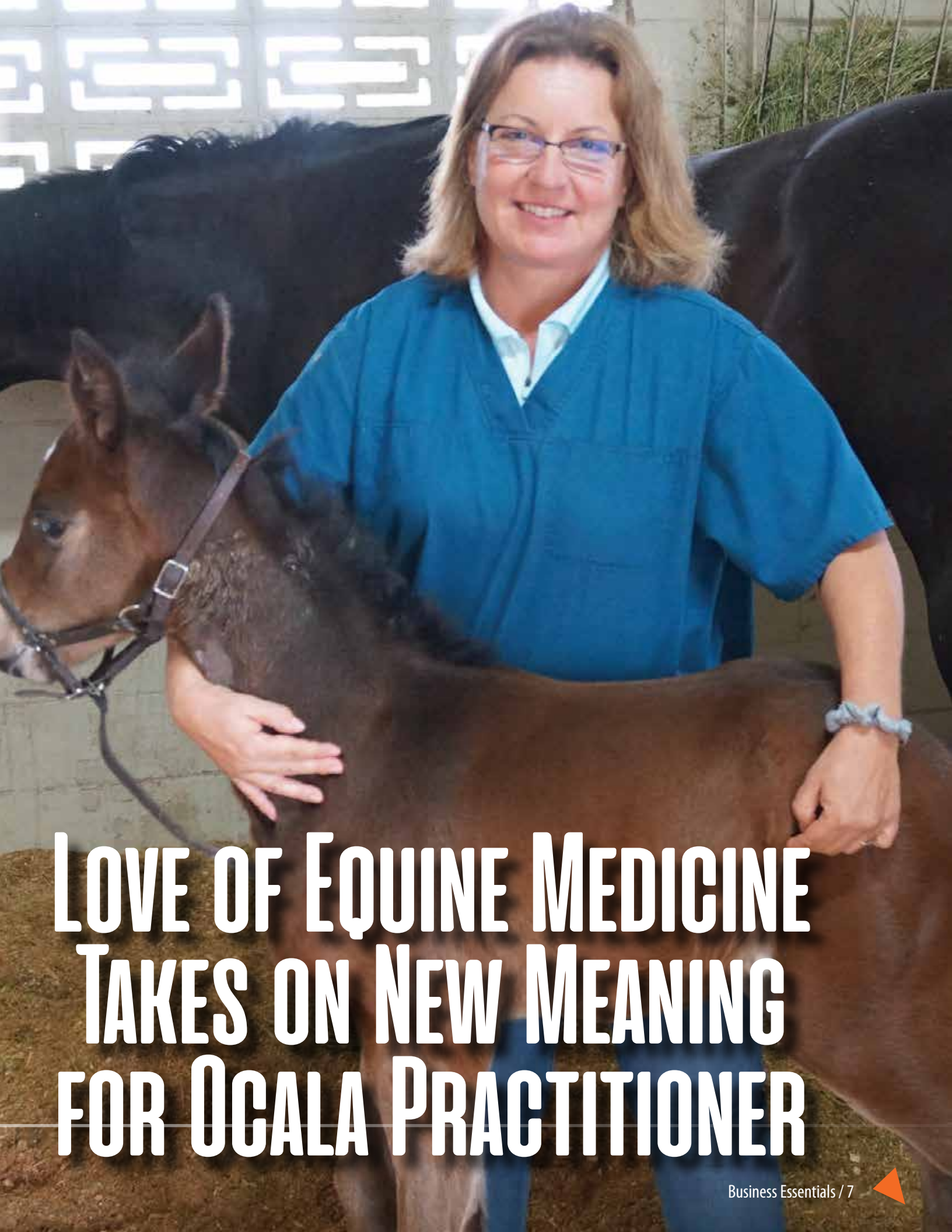
Carolin von Rosenberg, DVM

She notes her mare and foal treatments have become much easier with the use of EQUISUL-SDT® (Sulfadiazine/Trimethoprim).

"All the babies receive Equisul-SDT for the first three to four days after birth along with metronidazole to cover aerobic and anaerobic infections," Dr. von Rosenberg notes. "I also use a lot of Equisul-SDT for placentitis in mares. It is our

continued on page 20

EQUISUL-SDT is a Registered Trademark of Aurora Pharmaceutical, Inc.



Love of Equine Medicine Takes on New Meaning for Ocala Practitioner

AASV President Has Simple Message ... Be Engaged

If you've attended only one American Association of Swine Veterinarians (AASV) annual conventions, you've heard AASV President, Jeff Harker, DVM (Purdue '94), AMVC Swine Health Services, Frankfort, IN, talks about the commitment he feels is essential to the growth and ultimate prosperity of swine veterinarians – *be engaged with the community*.

"We have to do the work of representing our swine clients within the community. We have to attend meetings, fairs, social events, government meetings, etc., and let the community know how much our clients' focus on being environmental stewards and show their never-ending goal of producing a safe, highly sustainable food source that tastes great day in and day out. Talk about how they are reducing their carbon footprint and the commerce they bring to the community."

Dr. Harker adds, "If you aren't already on the farm and in the barns on a regular basis, do the work there as well. It's easy to sit in the office and communicate via email or on the phone, but we must be in the barns. Only a swine veterinarian can determine if the system is indeed dealing with flu vs. PRRS, or greasy pig vs. erysipelas. It's also our responsibility, from a foreign animal disease standpoint, to be in the barns and order the testing on those enlarged, congestive spleens we come across to assure we are dealing with Salmonellosis vs. ASF. ***Do the work***. It's the only way we continue to stay relevant in our clients' eyes."

Another area of concern close to Dr. Harker's mission as President of the AASV, is veterinary student education. "Most veterinary schools do a good job of teaching medicine and general basics of animal health. However, other than just a handful of veterinary schools, most do not have a curriculum dedicated to swine production and medicine. It is our role to bring those students into the AASV, so they can start mentoring with swine vets who are truly interested in helping them understand the complexities and day-to-day focus of a swine veterinarian."

Dr. Harker says they provide proceedings, veterinary journals, intern opportunities and total swine production education via AASV to those students interested in being a swine veterinarian. "We try to attract a large number of veterinary students for our members to choose from as new associates. With the imminent retirement of several of our most experienced swine veterinarians on the horizon, we want to keep as big a pool of candidates to help fill the growing need as possible. It all starts with bringing these students in, welcoming them to the family and becoming true mentors as they navigate school and enter the work force

> **"It is our role to bring vet students into the AASV, so they can start mentoring with swine vets who are truly interested in helping them understand the complexities and day-to-day focus of a swine veterinarian."**
>
> **Jeff Harker, DVM**

In the Community, Do the Work, Reap the Rewards

as a swine veterinarian. I feel very good about where we are and the commitment to keep the educational program moving forward."

And while the ASSV takes some time out of Dr. Harker's week, when all is done, he is one of the best clinicians in the industry with full time swine health and production responsibilities. That time commitment increased four years ago when Dr. Harker and partner, Max Rodibaugh, DVM (Purdue '74) joined AMVC (Audubon Manning Veterinary Clinic).

"After 22 years of business with Max, I'm back to being an Associate Veterinarian and loving it," Dr. Harker smiles. "It was important to both Max and I that our independent pork producers would always have highly-qualified, swine-specific veterinarians to watch over their herds and future. This association with AMVC assures our producers will always have the best care possible. Additionally, it means less management of the clinic and more time to be a veterinarian. It's a great situation, and we couldn't be happier."

Being part of AMVC (*more about AMVC in an upcoming issue*), has also allowed Drs. Harker and Rodibaugh to do the kind of expansion they've only dreamed about in the past. "Working with AMVC management, we found a building on the east side of town and started renovating it to fit our growing needs," says Dr. Harker.

"When completed (Fall 2020), the newly renovated space will allow us to grow from our current 1,200 sq. ft. to over 22,000 sq. ft. It will allow us to have plenty of warehouse space as well as state-of-the-industry facilities, including diagnostic lab, pallet-sized cooler space to bring in enough vaccines for the large herds we are now servicing as a result of the AMVC managed herds in the area and large offices for our growing staff. It will also serve as the home of Midwest Livestock (recently acquired by AMVC) who is a leading provider/contractor of hog barn machinery including feed systems, ventilation systems, etc. And finally, AMVC hired a full-time construction company and that group will have offices here as well. Suddenly, we will be a one-stop-shop for our swine accounts. Everyone wins in this new facility and arrangement."

In conclusion, the AASV president notes, "We are hopeful that we will have our annual March conference in San Francisco and that it will go on as a scheduled. However, we live in a difficult time (Covid-19) and everything may change tomorrow. Regardless," he surmises, "the research goes on and we'll continue to play our role as educators, industry stewards and community mentors to the best protein-producing clients in the world."

Dr. Harker oversees the new facilities (22,000 sq ft) hopefully move-in ready in the fall of 2020.

Dr. Harker and staff are excited to move to more spacious facilities this fall.

Dr. Ronald Genovese has instilled into my way of thinking, to practice progressive medicine while being innovative, treat everyone with respect, and above all care for the horse. Perhaps his most important lesson is the philosophy of being passionate about the profession itself. His love of equine veterinary medicine has always been clear and unquestionable to both clients and peers alike."

Brett Berthold, DVM

Practice Manager Julie Berthold helps clinic veterinarians stay on schedule.

Cleveland Equine Clinic ... Equine Focused and Client Driven Business Philosophy Pays Dividends

Brett Berthold, DVM ('95 The Ohio State Univ.), owner of Cleveland Equine Clinic (CEC) located in Ravenna, OH, believes a horse's optimum performance can only truly be achieved when ***all of you*** is in the game.

"As veterinarians, our clients look to us to be at the top of our game every day. No excuses. That's why we have to stay ahead of the technology curve, educational curve and performance curve to be a viable partner with our owner clients. That requires a commitment that can only be achieved through continuing education, surrounding yourself with like-minded veterinarians and staff and making sure the horse is always the #1 focus in our day," says Dr. Berthold.

"Just as much importance comes from reputable pharmaceutical companies, like Aurora Pharmaceutical, that are truly focused on the health and care of the horse. The commitment, let alone the financial investment, they have put forth for the betterment of the health of our horses, goes to show that they are valued partners of the equine veterinarian. Products like Equisul-SDT® (Sulfadiazine/Trimethoprim) that are used daily in this practice, have improved the outcomes of infectious disease in our client's horses," he stresses.

This ethos on life isn't something Dr. Berthold and business partner and wife, Julie, came up with on their own. According to Dr. Berthold, this outlook on veterinary service and client commitment is something his mentor, Ronald Genovese, VMD (U of PA '64), instilled in him since graduating from veterinary school and beginning his career.

"My father was a thoroughbred trainer and Dr. Genovese was his veterinarian," says Dr. Berthold. "What better mentor than the nationally (and internationally) recognized authority on tendon and ligament scanning and long-time equine sports medicine and surgery specialist? I have been truly blessed to have him teach me his skills and help me build this practice."

In 2002, Dr. Berthold and Julie started the process of building the clinic from the ground up and developing one of the largest and most respected equine hospitals in the region. Dr. Berthold's professional areas of focus include lameness evaluation, respiratory health and magnetic resonance imaging (MRI).

"I wanted to develop a clinic that could provide more equine specific and specialized care," recalls Dr. Berthold. "In 2006, CEC was formed from the merging of multiple practices from Northeast Ohio into a single clinic and ambulatory practice."

Today, CEC provides high quality ambulatory, inpatient, emergency, medical, surgical and diagnostic services to serve the equine industry.

"The CEC team currently consists of nine veterinarians with a diversity of special interests to provide the utmost in quality care and treatment," outlines CEC Practice Manager Julie Berthold. "That care starts with having state-of-the-art diagnostics modalities such as ultrasound, digital radiography, standing magnetic resonance imaging (MRI), endoscopy, gastroscopy, as well as computed gait analysis. CEC also offers innovative treatment options such as platelet rich plasma (PRP), interleukin receptor antagonistic protein (IRAP), stem cell and shockwave therapy. Along with our own in-house laboratory and pharmacy, we have the ability to be an all-inclusive clinic focused entirely on performance horse wellness."

Dr. Berthold adds, "Many practice owners count on their spouses to help with managing the business. I'm extremely fortunate that Julie comes from a family-business background that has been highly beneficial when setting up veterinary scheduling, payroll, billing, pharmacy management, etc.

She cares about the business and it's not just a 9 to 5 job. She not only wants the business to be successful, but also to grow as I do. She sees the finances, and I see the needs from the customer's standpoint. Her expertise in management has allowed me to be a better, more focused veterinarian and our business successes and growth have been a direct result of her dedication and skills."

In conclusion Dr. Berthold states, "My focus is on our clients and their horse's needs, but my business goal is to make sure my fellow associate veterinarians excel and grow into outstanding veterinarians. I want them to be successful and instill into them to practice great medicine, always stay on top of new advancements in medicine and be a success in this industry. We support continuing education (CE) opportunities and help young veterinarians find their niche in the practice. We are fortunate that our veterinarians are proficient in areas including dentistry, reproduction, lameness and ophthalmology. Together, we count on each other to make the most appropriate decision for the treatment and welfare of the horse and owner. At the end of the day, that's what we are in business to do. We feel we do it at a higher level and continue to grow."

Vet fleet trucks ready for the day.

Best Medicine Also Includes Best Laboratory Practices

By: Matt Klotz, DVM
Technical Services Veterinarian
Aurora Pharmaceutical, Inc.

As a practitioner that strived to make the best medication choices for my patients based on sound science, I often submitted swabs and other samples for antibiotic sensitivity testing (AST). While I was educated in the value of culture and sensitivity testing in the practice of medicine, I was poorly educated in best procedures in the lab to obtain the results that I based my clinical decisions on and how the practices of the lab could affect my patients.

There are two ways to do antibiotic sensitivity testing. First is by the Kirby Bauer disc diffusion method that most veterinarians are familiar with and is the most common form of AST. This test is rapid and cheap to run with a few basic pieces of equipment.

The drawback to it is that zones around the discs can leave room for subjective interpretation. The second way to conduct AST is by microdilution methods in broth cultures. This is the most sensitive way to test and allows for measuring an accurate MIC for the cultured organism. However, the equipment is expensive, which limits the availability to a few research and diagnostic laboratories.

According to the Clinical and Laboratory Standards Institute (CLSI), formerly known as National Committee for Laboratory Standards, fastidious organisms of veterinary medicine like b-hemolytic *Stretococci* should be cultured on Mueller-Hinton agar or broth fortified with 2.5% to 5% lysed (laked) **horse** blood. Unfortunately, few of our laboratories follow this standard.

Some don't follow this standard out of ignorance and some refuse to follow this due to added expense of culture media. Most if not all labs we send our culture samples to use Mueller-Hinton agar fortified with *sheep* blood because it is commonly available and cheap.

For most disc diffusion AST, this is ok; however, for sensitivity testing to potentiated sulfonamides, the use of sheep blood containing media lead to false reports of resistance.

Sheep blood agars contain high levels of PABA and thymidine which act as local antedotes to the potentiated sulfa. This leads to the zones of inhibition being indistinct or completely absent and the plate is read as being resistant to sulfa-trimethoprim when in reality, the organism may be highly sensitive.

This problem is not just isolated to *Streptococci* organisms, but also organisms like *Actinobacillus pneumoniae* and *Haemophilus somnus*.

So how can the practitioner assure his or her antibiotic choices are correct?

1. First, educate yourself with the many published reviews of antibiotic sensitivity for the primary organisms you encounter on a daily basis.
2. Second, ask your chosen laboratory if they are aware of the CLSI published standards and protocols for AST.
3. Third, insist that your cultures and AST are conducted in the proper media, not the cheapest.

These actions will bring your laboratory testing up to the same standard of best medicine that you practice.

References

Fiery, Darien J., *Investigation of Reported Resistance of Streptococcus equi ssp. Zooepidemicus to Trimethoprim-Sulfa in Horses,* AAEP Proceedings, Volume 51, 2005

Wilson, W. David, *Rational Selection of Antimicrobials for use in Horses,* AAEP Proceedings, Volume 47, 2001

CLSI. *Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals.* 5th ed. CLSI VET 01. Wayne, PA: Clinical and Laboratory Standards Institute; 2018

CLSI. *Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals.* 4th ed CLSI supplement VET08. Wayne, PA: Clinical and Laboratory Standards Institute; 2018

Novel New Research Suggests PRRSv is Controllable

While porcine reproductive and respiratory syndrome (PRRS) virus first emerged in North America in 1987, the virus remains one of the most persistent and costly disease complexes affecting the U.S. swine industry. University of Connecticut assistant professor of animal science Young Tang and professor of pathobiology and veterinary science Antonio Garmendia have now successfully identified compounds that can effectively block the virus from infecting pig cells, creating a promising pathway to an alternative treatment. (See *Virology Journal* for their recently published findings).

The Connecticut research team hypothesized that a small molecule blocking a cell surface receptor called CD163 — which is expressed in pig monocytes and macrophages that the virus needs to get into the pig target cells — could block infection. (*Note that CD163 has been the target of research aiming to breed pigs genetically resistant to PRRS virus.*)

The Connecticut researchers used a bimolecular fluorescence complementation (BiFC) assay to determine if the compounds could block the viral glycoproteins from interaction with the cell receptor. When proteins interact, they generate fluorescence in the assay, which, in this case, indicates that the viral glycoprotein binds to the receptor. When the researchers did not observe fluorescence, this meant the small molecule successfully blocked the virus.

They found that one of the predicted compounds, named B7, blocked the formation of fluorescence in the BiFC assay.

In follow-up assays, they determined that B7 blocked the virus from infecting pig cells, becoming the very first *in vitro* study to demonstrate successful inhibition of viral receptor recognition by the PRRS virus. The researchers tested the small molecules with both the American and European types of the virus and found that B7 effectively blocks both. These two types are genetically diverse, making this finding's broad applicability significant.

Coupled with existing vaccines, this compound could provide a second line of defense against PRRS, the researchers said, adding that while vaccines prompt the creation of antibodies, the small molecule would block the virus's attachment to cell receptors, reducing further virus shedding and transmission. "This would protect animals better than a vaccine alone," Garmendia states. "It could have a significant impact."

Drinking Water Has The Potential to Alter Swine Microbiome

Commercial swine farms go to extreme lengths to ensure microbial exposure is kept to a minimum. So, where do the microbial communities that populate the pigs come from? The most common answers are from the diet and their interactions with other animals. One possibility that is less understood is drinking water. Drinking water quality is considered important to the health and productivity of pigs, and the classification of "quality" water includes more than just the mineral content.

A study conducted at North Carolina State University considered gestating and lactating sows from two different NCSU research farm locations, the Swine Education Unit and Tidewater Research Facility.

Water samples were taken from each location and analyzed for potable water parameters. DNA from the sow and replicate water samples were extracted via column chromatography, sent to the University of Arkansas for 16S rRNA sequencing (Illumina MiSeq platform), and microbiota data were filtered and aligned using the QIIME2 2020.2 pipeline. Microbial abundance, diversity, and composition were compared between the locations.

There were no significant differences in alpha diversity indices between TW and SEU water, and the beta diversity differences may have been due to a high level of dispersion between the two sample types. However, there were compositional differences between SEU and TW water's microbial communities as well as differences in potable water quality (though no water samples were outside of published acceptable ranges).

Diarrhea causing Campylobacteria were more abundant in the TW water samples when compared to SEU water samples. That may be reflected in the oral, vaginal and rectal samples, as Campylobacteria were more abundant in these physiologic locations of the TW sows as compared to SEU sows as well.

There is still more investigating to be done in this large data set, but preliminary examination suggests that oral, nasal, rectal and vaginal microbiomes were distinctly different in sows from different locations. Therefore, drinking water and location may influence the sow microbiome. Data have already been collected from a follow-up trial with multiple sites in a large integrated system that will also provide information on how drinking water can affect the sow microbiome and reproductive performance.

Identifying patterns of change in microbial abundance and diversity present in the gut may be correlated to health and production parameters that would help producers, feed suppliers and veterinarians make more strategic decisions about management, feed additives and treatment options.

RODEO

Dr. Wade Shoemaker

"IT'S BOOTS AND CHAPS
IT'S COWBOY HATS
IT'S SPURS AND LATIGO
IT'S THE ROPES AND THE REINS
AND THE JOY AND THE PAIN
AND THEY CALL THE THING RODEO"
GARTH BROOKS

COUNTRYSIDE LARGE ANIMAL VETERINARY CLINIC PRACTICES PERFORMANCE HORSE EXCELLENCE

Like most veterinarians, Wade Shoemaker, DVM ('99 CSU), is an early riser. But unlike most, Dr. Shoemaker gets up at 5 a.m. most mornings at his ranch in Gill, CO, saddles five horses and spends upwards of two hours roping and practicing his rodeo skills before seeing his first equine client. Dr. Shoemaker is also in an elite fraternity of veterinarians who are also members of the Professional Rodeo Cowboy Association (PRCA).

As a matter of fact, Dr. Shoemaker looks more like a cowboy than a veterinarian, and that's no accident. Dr. Shoemaker paid for most of his college and entry fees by shoeing horses. "I spent a lot of time during veterinary school in the vet hospital on therapeutic cases for in-house surgeons," recalls Dr. Shoemaker. "I still enjoy working on challenging foot issues that are such an important part of keeping the performance horses working."

However, when it comes to an equine practice owner, Dr. Shoemaker, is all business. Along with his practice partner, Shawn Bott, DVM (CSU '96), the five-vet practice – Countryside Large Animal Veterinary Clinic, Greeley, CO, – is one of the most successful referral clinics in the region. Complete with a Board-Certified surgeon (Josh Zacharias, DVM, ISU '03) and reproduction specialists (Mary Hoffmann, DVM, ISU '09 and Kelsey Martin, DVM, CSU '17), Shoemaker spends most of his time working on performance horse lameness and correcting issues that cause a decrease in performance. In the spring, he also breeds a number of mares via artificial insemination and works to perfect the art of embryo transfer. "I would say that 85% of our income is from the performance horse. These are horses that routinely go to the National Finals Rodeo (NFR), Cutting Horse Futurity, major dressage events, show animal events, etc. And we maintain an excellent beef and breeding cattle clientele as well."

Loaded vet trucks ready for the day.

A skilled rodeoer, Dr. Shoemaker puts his roping talent to work while treating his patients. "I am there and competing, so those owners of the upper level horses know that I understand what that horse needs to do. There are times that I do as much veterinary work while at rodeos as I do in the clinic. It's simply being where the horses are. Clients will schedule me to see their horses while they are at events. It works great for me and for them. Before the roping starts, I'm looking at horses – some of them are even competing against me. In between rounds, I'll work on horses, too. If we are rodeoing in Billings, there's no use for my clients in that area to travel seven hours to Greeley when I can see them there. It makes for a huge monetary and

time savings for us all. I just make sure before I go to these major events to compete, I have a fully stocked vet box. I oftentimes will take an extra x-ray and ultrasound machine with me as well."

Dr. Shoemaker adds, "The majority of the horses I work on (when rodeoing) are referral horses. I'm there to specifically look at a lameness issue. I don't do the daily work (vaccinations, dewormers, etc.), but work solely on performance issues, usually related to lameness, bone issues, etc." If more advanced therapies are required, they are sent to the clinic in Greeley where they have state-of-the-art diagnostic and performance tools including IRAP, PRP, Shockwave, laser therapy, joint injections and specialty shoeing.

"We offer our clients the gold standard of equine medicine," Dr. Shoemaker notes. "We have the advanced training, experience, facilities and staff to handle high level care to high level equine patients. That sets us apart from many single-practice veterinarians and some larger clinics in our region."

Part of that gold standard service includes Equisul-SDT® (Sulfadiazine /Trimethoprim). "Equisul-SDT is my go-to broad-spectrum antibiotic. I think this is one drug that is way underutilized in our profession. Oral route of administration is superior and client compliance is second to none. I've given up telling clients to grind up a bunch of SMZ tablets and try and shoot it down the horse's throat. The same holds true for administering oral SMZ powders like Uniprim® (trimethoprim + sulfadiazine) or Tucoprim® (trimethoprim + sulfadiazine). You can stand there and watch the horse siphon to the bottom of the feed bin and leave the uneaten drug. Knowing that the Equisul-SDT is actually getting into the horse, tells me I'll have better results vs. force-feeding oral SMZ, foul-tasting, medications."

Dr. Shoemaker adds, "Altren® (altrenogest) is a product Dr. Hoffmann relies on to provide the same active ingredient as Regu-Mate® (altrenogest), but at a much better price point. That's good for my business and my clients appreciate the cost savings I can pass on to them." Dr. Shoemaker adds, "We don't want to be a pharmacy. We don't want our income contingent on the sale of drugs. We make money on our expertise and service, not the drugs we carry. We routinely send the Altren 150 mL home with clients, especially if we have a problem mare that needs to be on altrenogest after breeding to help maintain that pregnancy. That will allow us to get out to the ranch at 15 days for the first preg-check, and then decide if the mare stays on the Altren or not. It's been a great deal for us and for the client."

But when the sun starts to set and the veterinary work is done for the day, you will see Dr. Shoemaker working once again on his rodeoing skills, but this time it's working with young horses and helping his two children with their rodeo and showing interests. But at sunrise the next morning, you can bet Dr. Shoemaker is once again refining his steer roping skills as he holds the piggin' string tight, gives the imaginary judge the cowboy nod, watches the chute gate open and Dr. Shoemaker is once again transformed into the veterinary rodeo cowboy living the dream of the perfect score.

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Uniprim is a registered trademark of Neogen
Tucoprim is a registered trademark of Zoetis Inc.

Combat Heat Stress in Pigs for Improved Production Values

By: Nathan Winkelman, DVM
Swine Services Unlimited, Inc., Rice, MN
Immediate Past President AASV

Heat stress is a well-known phenomenon in animal husbandry and is responsible for $316 million annually economic losses in the US swine industry. These losses include non-productive days for sows and economic losses in growing-finishing pigs. Swine are not capable of dissipating heat in an efficient way. Reducing the effects of heat stress in swine, more specifically in high prolific sows, demands a targeted approach.

What Happens When Animals Have Heat Stress?

We know of the external signs like panting, increase body temperature and increase water intake in the acute phase; however, a net dehydration occurs as the stress continues.

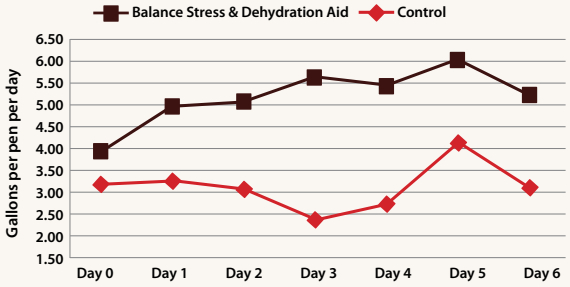
To answer the questions of what happens metabolically and how to correct the metabolic changes, we placed two groups of growers in a heated barn that mimicked a week in southern Indiana during a typical summer. Like the animals in Indiana, pigs in our study were exposed to temperatures of 105°F for five consecutive days with nighttime temperatures at 85°F. Two room vaporizers/humidifiers were used to provide high humidity as well. Clinical evaluation, rectal temperature, feed intake, water intake and blood pH, and base-excess were measured.

The objective of this trial was to evaluate the effects of pigs receiving Balance* Stress & Dehydration Aid (n=10) versus those not receiving treatment (n=5) during very high heat and humidity for five consecutive days. Balance is a nutritional/metabolic supplement formulated to balance the osmotic and the buffering effect needed to maintain hydration and corrected pH when heat stress challenges occur due to environmental heat and handling. Maintaining a stable blood pH during heat stress helps assure steady water and feed intakes.

Balance is formulated using electrolytes and buffering agents and does not use sugar as a filler. Increased carbohydrates are contraindicated due to its effect on blood pH. It contains zinc to aid in the maintenance of cellular integrity and tight junction integrity in the gut. In the face of prolonged heat periods, the buffering effect of Balance helps to reduce a metabolic alkalosis crisis that develops with heat stress, whether it is environment or transportation or processing of any sort.

The following is a list of parameters we evaluated with results:

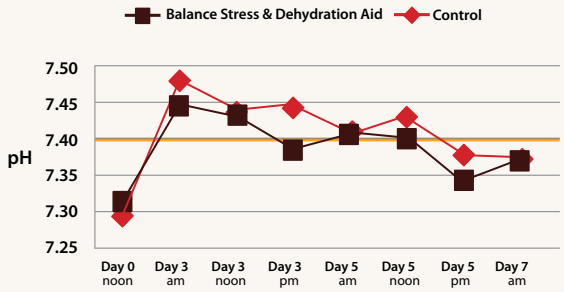
Water Intake by Treatment and Day



Control group: The pigs initially drank water at an increased rate, and then beginning on day 3, the water consumption was reduced leading to dehydrated pigs.

Balance group: Water consumption increased daily till the end of the heat period; there was no evidence of dehydration in treated pigs either by clinical observation or blood gas analysis.

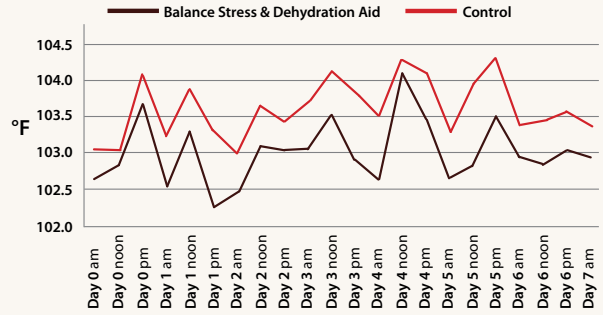
Blood pH by Treatment and Day



Control group: Consistently showed higher blood pH values and high Base-excess.

Balance group: Buffered the blood resulting in a more normal pH and base-excess as compared to the control group.

Rectal Temperature by Treatment and Day



Control group: The rectal temperatures were elevated as the environmental temperature increased.

Balance group: The rectal temperatures were consistently lower as compared to the control group.

Use Balance prior to stressful heat or handling events. The balancing and buffering effect will give your livestock:

- Increased water consumption.
- Reduction of body temperature in a high heat environment.
- Reduced panting of the heat-stressed animals, thus reducing the pH of their blood and maintaining a healthy and more responsive metabolic system. This will help meat quality in slaughter animals.
- A quicker rebound after any stress in production animals, either from excessive heat or handling.
- Less shrinkage in processed animals and a better cut out.
- Greater meat and milk production when environmental conditions are less that optimal.

* Balance (Aurora Pharmaceutical, Inc.)
For the complete study, log onto www.aurorapharmaceutical.com

Optimizing Your Choice of Antimicrobials Based on Cultures and Antibiogram

Part 2

Peter Morresey
BVSc, MVM, MACVSc, DipACT, ACVIM, CVA
Rood & Riddle Equine Hospital
Lexington, KY

How can the laboratory help me make better choices with antimicrobials?

Sensitivity Analysis: What does it mean?

Sensitivity analysis determines how well that organism can grow in the presence of a particular antimicrobial at varying concentrations *in vitro* (on the culture plate). However, it is important to realize that the organism has been removed from the site of infection (e.g. uterus, lung, skin etc.) and conditions have changed. As a result, an organism that is supposedly sensitive to the antimicrobial tested on the culture plate may inside the host be unaffected due to the environment at the site of infection. Therefore, the goal of sensitivity analysis is to assess at what concentration of antimicrobial we would reasonably expect treatment success, and with knowledge of the conditions at the site of infection, whether is it reasonable to assume we can achieve that concentration.

This is a judgment call based on our experience and knowledge of biology. The conditions at the site of infection can render the antimicrobial ineffective, or where a barrier has formed to exposure e.g. a thick-walled abscess, the antimicrobial may not penetrate to the site of infection at a sufficient concentration to be effective even though the organism is deemed sensitive. By considering how antimicrobials work and how they will distribute, veterinarians can make the most appropriate treatment choices.

Sensitivity analysis does not consider the ability of the bacteria to counter the antimicrobial and promote persistence. Some bacteria are able to produce enzymes which break down antimicrobials they are tested against. These enzymes are not produced *in vitro* on a culture plate. Therefore, although an organism is sensitive to a particular drug on the culture plate, the organism is resistant at the site of infection. Identification of the organism will allow suspicion of this ability, and advanced testing for resistance genes will confirm this ability to resist.

What is MIC?

The Minimum Inhibitory Concentration (MIC) is the lowest concentration of antimicrobial that inhibits visible growth of a specific organism *in vitro*. Three results are given: susceptible (S), resistant (R) and intermediate (I) which can be considered a grey zone in response making knowledge of the actual conditions that may exist where the organism resides in the animal very important. It is not possible to compare the MIC of one agent to another for a particular bacteria, that is, an MIC for one antimicrobial of 2ug/ml and another of 1ug/ml for that bacteria does not mean one is twice as effective the other. This just means that the concentration that will inhibit the growth of that particular organism is different. You must achieve that concentration at the site of infection to be effective, which is where knowing both your patient and the intended treatment is so important.

How do you determine the MIC?

Kirby-Bauer

This is a method to assess the susceptibility of an organism based on the inhibition of growth of a pure culture around disks impregnated with the antimicrobial under test placed on to the culture plate. The diameter of the zone of inhibition indicates the degree of sensitivity of the bacteria, with a larger diameter of bacteria-free media surrounding an antibiotic disk suggesting the bacteria is more sensitive to the antimicrobial the disk contains. The relative importance of the diameter of the zone of inhibition is dependent upon the organism and the antimicrobial under test, with standardized values used in this assessment.

MIC by Broth Microdilution

The broth microdilution method can be used to test the susceptibility of bacteria to multiple antimicrobials at once. Broth microdilution is based upon serial dilutions of antimicrobials added to a multi-well liquid culture system to assay at which concentration bacterial growth is inhibited. This is determined by the lowest concentration at which the broth remains clear, with turbidity indicating ongoing bacterial growth, after incubation for a standardized period of time.

Using an Antibiogram

This information is gained from collating antimicrobial sensitivity information of cultured bacteria derived from submitted diagnostic samples over a period of time from a laboratory. Results are regional and/or practice-area specific and should be regularly updated to maintain relevance. This information is useful when making treatment decisions once the organism has been identified, but sensitivity analysis is not yet available. Veterinarians can assess the likelihood of sensitivity of cultured microorganisms to a particular antimicrobial using local knowledge derived from organisms cultured from infected sites in horses within the catchment of the laboratory. Remember this is an *in vitro* system and as such may not reflect the ability of the organism to produce resistance compounds.

Combination Therapy

This may be necessary to clear the organism by taking advantage of the synergistic effect between some antimicrobials (e.g. beta-lactams with aminoglycosides), or in the presence of mixed infections which may require different antimicrobials to overcome. This can be useful where resistance is suspected or proven. With empirical treatment, combination therapy is often used initially until bacterial identification and sensitivity analysis allows transition to more targeted therapies. The use of a single antimicrobial may be more cost effective and reduces the possibility of an untoward medication interaction.

Conclusion

Ultimately, know your enemy. Understand the causative organism, the environment in which the organism is living, which antimicrobials are likely to be effective in the conditions at the site of infection, and use the information available from laboratory testing to refine your treatment plan.

STRAIGHT FROM THE HORSES' MOUTHS

By: Bess Darrow, DVM
Tune Ups Veterinary
Equine Dentistry
Williston, FL

YOU MISS MORE BY NOT LOOKING THAN BY NOT KNOWING

Most veterinarians are regularly faced with examing a horse's mouths and teeth, even if they do not intend to actually float the teeth. This could be during a prepurchase exam, an annual wellness check or an evaluation of a colic. Whether you intend to refer the horse to an equine dentistry specialist, or if you are trying to decide if the horse is in need of your own dental services, I'd like to share some ideas about how to safely go about a performing a dental exam on an unsedated horse.

First of all, I cannot possibly stress the importance of performing a thorough physical exam, both outside and inside. Several mandatory items for the exam include your eyes, your hands, a light, a dose syringe and a side, or preferably full mouth, speculum! In my humble opinion, it's not worth looking if you aren't going to do a proper and thorough evaluation.

Not taking the time to carefully look, palpate and diagnose with proper lighting and equipment is one of the biggest mistakes I see.

OBSERVE

So, how to start an exam? First, look at the overall unsedated horse. What is the body condition score? Is it's coat shiny or dull? Is it muscled evenly? Does it stand with one front leg slightly ahead of the other? Are the temporalis muscles under the forelock even, or is one side bulging? Is there a head tilt or is the muzzle deviated to one side, as with facial nerve paralysis? Is there any unusual discharge from the eyes, ears, nose or mouth? Do you notice any foul odors? Usually the nose knows. You can smell a lot of dental issues before you even open the mouth. Is the odor coming from the nostrils or the mouth? I have also diagnosed many corneal ulcers, or fly larvae embedded in the corner of a horse's eye, by standing in front of its face studying it while floating its teeth. Does it have an asymmetrical facial marking, like a stripe that runs down its face and drifts to one side? Interestingly, I often find that horses with crooked blazes often have crooked incisors!

TOUCH

Palpate the face, cheeks, ventral mandible, poll, TMJ and note any abnormal reaction like pulling back. This can be a sign of sharp, painful buccal points or TMJ pain. Are there any bony enlargements on the skull, especially on the ventral mandible, such as with an old fracture or with eruption bumps on a two-year-old who is teething? Lift up the lip and note the mucous membrane color. Also see if the incisors are level, slanted, overgrown, broken, missing or if there is an overbite or under jet. Check if the age the owner gave is accurate. To do a quick assessment of whether the upper cheek teeth are sharp, **please do NOT just stick your index finger in**

Correct way to examine the mouth

and feel around! This is a recipe for disaster!

Want to talk about a pain that gets your attention? Whew! Instead, place your left hand on the left side of the horse's face, above the lips and behind the nostril. Steady your hand with your four fingers and use your thumb inserted in the corner of the mouth to retract the tissue away from the teeth. This way your thumb is away from the teeth should the horse bite down.

When he is calm, you can feel along the edges of the first one to two cheek teeth. This will give you a rough estimate of how sharp the enamel points are, but it's not a very thorough exam, as you cannot feel along all of the teeth. Then remove your thumb and with one hand on top of the face and the other under the mandible, gently press the maxilla and mandible together and attempt to slide the mandible from side to side with your bottom hand. You should hear a low pitch grinding sound of the molars making contact. If there is no sound, or only a slick sound, this may mean the horse has little to no molar occlusion due to overgrown incisors or missing molars.

Sometimes you might find it slides more easily to one side and "locks up" on the other, which may indicate uneven wear patterns or a protuberant tooth on one side. Please note that some unsedated horses fight this being done to them, which then gives a false impression of lack of molar slide.

LOOK

The last part of the exam is actually looking into the mouth. Your light source can be a headlamp, a magnetic light that attaches to the upper bite plate of the speculum, or a pen light. A dose syringe or garden hose can be used to thoroughly rinse the mouth.

I have never condoned the old-fashioned method of grabbing a horse's tongue and pulling it out and to the side in order to do an exam. First of all, most horses seriously dislike this practice, as it causes them to bite down on their own tongues, and secondly it is easy to injure the hyoid apparatus, or circle of small bones that connect at the base of the tongue, and lastly, it is still very difficult to see with the tongue in your line of vision. Therefore, the gold standard in performing an equine oral exam is using a full mouth speculum.

A majority of unsedated horses, especially those used to wearing bits and bridles, will

Full mouth speculum with magnetic light

tolerate having it on for a few minutes, long enough to do an exam. This piece of equipment allows for excellent visual access to the mouth to look for sharp points, hooks, ramps, waves, periodontal pockets, loose teeth or other foreign bodies, like sticks stuck sideways between the teeth.

However, in certain cases where the horse is painful, uncooperative or scared, mild sedation may be the only way to make the speculum exam safe and more pleasant for you, the horse and the handler. A half speculum, or cheek retractor, is a clever instrument that I believe should be in every veterinarian's kit.

FINAL THOUGHTS

Keeping veterinary practices alive in this age of Covid-19

Why selling products in addition to services matters to the Veterinary Practice.

By: Mike Strobel, DVM, MS,
President/CEO
Aurora Pharmaceutical, Inc.

Veterinarians frequently ask themselves and partners, **"Why do we sell products in our practice?"**

The answer is not always obvious as it takes money, space and time to order and stock those products. Veterinary practices are faced with an increasing number of entities that want to alleviate them of the problem and the revenue it generates without concern to the effect that will have on veterinarian and staff incomes and the ability to have a financially viable practice. This is often a greater concern in large animal and mixed practices which tend to be more reliant on the income product sales represent.

I believe practices are making a mistake in voluntarily giving up the sale of products that our customers want and need to others. The ability to pick up product at the end of an appointment, as opposed to writing a prescription for the client and trying to keep track of the use in the patients' medical record so they can order it online or pick it up at the local human pharmacy, represents a major convenience to most clients. In our practice, about 99% of prescriptions are purchased at our clinic. For the other one percent we happily give the client the prescription. Why do we maintain such a high local purchase rate? I believe it revolves around providing the client convenience and the best overall value possible.

In our small animal practice, prescription and nonprescription product sales typically are 50% of service revenue. They allow me to provide better benefits and pay to our employees and doctors. They also tend to smooth out total monthly practice revenue. And they also bring clients into the practice more frequently, which drives additional service requests. Much like any retail store, the secret to sales is ultimately the frequency of customer contact. Selling products significantly increases the frequency of client visits and interactions with our practice.

So how is Aurora Pharmaceutical helping practices achieve the goal of selling more product?

1. **We have a single, highly competitive price on our products.**
2. **We do not require clinics to purchase large amounts to get the best price.**
3. **We let clinics determine local selling price. We do not dictate the margin position clinics need to sell our products for.**
4. **We try to create value for the clinic and their customers with all our products.**
5. **We will continue to do so as we introduce new generic and branded products now and in the future.**

Our newest product is Revolt™ (selamectin) – a heartworm and flea topical spot-on for dogs and cats. It is a huge opportunity to reduce client costs for this product while maintaining margin at the practice level. In addition to reducing the cost of this product, Aurora has made several improvements in the packaging and delivery system to make the product more clinic and consumer friendly.

Auroras' one-price-for-all concept allows clinics to buy what they need when they need it, so you do not have to tie up money on products you may not sell for months. I have designed our sales approach to the way I want to buy products and how I want to be treated as a customer. I strive to help you grow your businesses as you help me grow ours.

Thank you for your support in this challenging time. Aurora Pharmaceutical is here to make it a little bit easier for you and your customers.

How Do We Provide Client Convenience and Best Value?

1. **We always price product competitively to online and local pharmacies. Purchasing online or at the local pharmacy is often more expensive for the client, and they do not realize it.**
2. **Let the client know you are priced competitively.**
3. **Stock product for immediate delivery. The online pharmacies cannot.**
4. **Provide customer support for product use. Pharmacists do not always know what your pet requires.**
5. **Drop ship product to clients when they cannot come in at no additional charge. Be their online pharmacy.**
6. **Offer a full range of product choices.**
7. **Price product to the consumer based on the price you need to sell at to compete. Have someone in your practice that is surveying the competition periodically, so you stay current on pricing. Do not use standard percent markup to price products as it will cost you money.**
8. **Do not voluntarily share customer information with suppliers. This can be the first step to losing control of the business.**
9. **Offer products which represent the best value to the client. Sell lower priced generics when they are available to give more disposable income for the client to use on your services.**
10. **The use of brand name products represents a huge cost to clients relative to generics, regardless of the source they purchase them from.**
11. **Purchase from suppliers that allow you to run your business efficiently from an inventory perspective. The best ones do not require you to buy huge amounts to get the best price. Reward suppliers that give you the best price regardless of how much you buy.**
12. **Take the time to explain to the client why purchasing locally at a similar price is a benefit to them. If you are like me, you are asked to support the local community all the time.**

Carolin von Rosenberg, DVM and Vet Tech Heather Rutana

Facilities near Dr. von Rosenberg's home make foaling a lot less stressful.

continued from page 6

#1 issue, especially in these older mares. Equisul-SDT has been a great tool for us. Besides being an excellent antibiotic, my clients seem eager to give as prescribed, since it is so easy to dose, and it's not outrageously expensive."

For Dr. von Rosenberg, the road she travelled has not been straight. She was married to her second husband who owned the farm they worked.

"He managed the farm part of the business, and I only concentrated on my veterinary practice. It was a great setup."

Suddenly, and without warning, he died at age 54 and everything changed. And if that wasn't devastating enough, her son (Marcus) was born with neuroblastoma – a cancer that forms in nerve cells – and required chemotherapy and surgery his first year of life.

"Quite honestly during that time I had no idea what I was going to do. I knew I wanted to stay in the profession I loved, but still be there for my son. I worked as a resident vet for a few years, tried being an associate vet once again with the goal of doing my work and then being able to go home, but neither worked out so well because I was so accustomed to working for myself," she explains.

"So, I decided to start the haul-in reproduction and foaling facility. My son is a lot older now, but when he was just a baby he could stay at the house with a nanny and I could walk in anytime since I worked mostly in the barn right next to the house. That worked out wonderfully. I am remarried now and my son is a teenager, so the time stress is not quite as great, but even now it's good to know that I am right there if I'm needed."

Dr. von Rosenberg adds, "Despite all these adjustments I still have moments when I feel burned out. It is a very physically and emotionally demanding job. There are many heartaches and disappointments, and then there are the clients. The ones that don't like to pay, the ones that know no boundaries, the ones that expect everything to go according to plan and have a melt down if it doesn't. But, right when I feel like I'm ready to retire, I have a client who is near tears with gratitude because her old mare has produced a beautiful and healthy foal. I guess it's really the foals that make it all worth it."