

# —EQUUS— KEY

UNDERSTANDING  
ANTIBIOTICS



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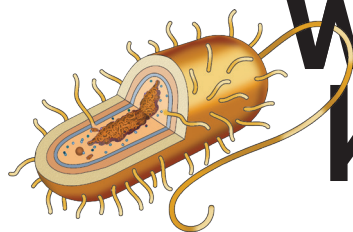
*By Melinda Freckleton, DVM,  
with Christine Barakat*

It's easy to be casual about antibiotics. We've all taken them ourselves, they look like any other medication, and if you've had horses for any length of time, you are probably quite familiar with the "crush and dump" routine. But the nature of antibiotics requires a level of understanding and vigilance that goes beyond those required by many other medications that the average horse owner is likely to administer.

It's not that antibiotics are dangerous or difficult to use. It's more that their job—helping the horse's immune system clear infections by weakening or killing the responsible bacteria—is so specific and targeted that seemingly small details about their administration can have a profound effect on the horse receiving them and the equine community as a whole.

**What your  
veterinarian**

**wants you to  
know about**

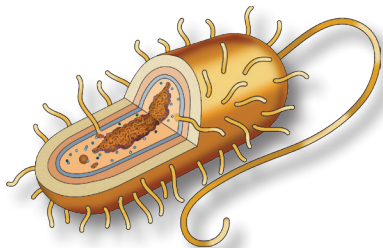


# ANTIBIOTICS

Here are **7** vital facts to keep in mind when handling these powerful medications.

CLIX PHOTOGRAPHY





The issues surrounding antibiotic resistance both in human and veterinary medicine have been well publicized: Excessive and inappropriate use of antibiotics is leading to the development of bacteria that are no longer susceptible to the medications. However, less well understood is how critical the timing and length of dosing is to the efficacy of antibiotics. Or how testing can reveal exactly what antibiotic is best for a particular horse with a specific illness at a specific time. Or just how dangerous it can be to give the wrong antibiotic to a horse.

Last month, “Getting the Most From Antibiotics” (EQUUS 347) provided an overview of the various antimicrobial agents available to treat horses, how they work and how they are properly administered. This month, I’m going to focus on how this information can help you maximize the efficacy of these important, powerful drugs to help your horse regain his health. Here are seven things your veterinarian wants you to know about antibiotics.

## 1. SOMETIMES ANTIBIOTICS AREN’T CALLED FOR AND MAY EVEN CAUSE HARM.

I’m happy to prescribe an anti-inflammatory medication to make a feverish horse more comfortable. But if I don’t have evidence—or at least strongly suspect—that his illness is caused by bacteria, I won’t prescribe an antibiotic. The reason is simple: Antibiotics work only against bacteria. Giving antibiotics to treat any other type of illness will be of no benefit and only encourage potentially harmful side effects and the development of resistance.

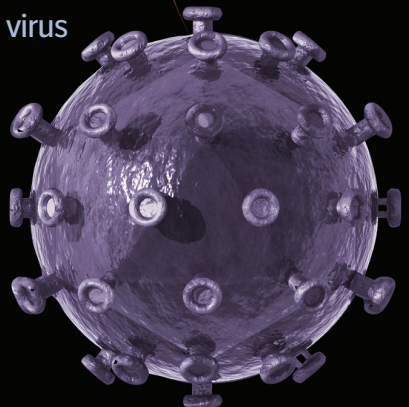
Influenza, for instance, is caused by a

## ANTIBIOTICS WORK ONLY AGAINST BACTERIA, NOT VIRUSES

bacterium



virus



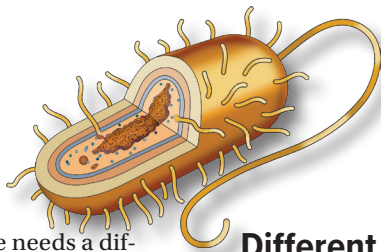
virus. But I have clients that will be disappointed and even upset if I’m not prescribing antibiotics to every horse with a snotty nose. Veterinarians can typically discern, from the clinical signs and history, whether a horse’s illness is bacterial or viral. We see a lot of these things and get pretty good at recognizing the signs. If we are unsure, we can run tests that take about 48 hours to confirm the underlying cause.

Giving a horse antibiotics “just in case” he has a bacterial infection has the potential to harm him. A horse’s body is host to lots of beneficial bacteria, particularly in the gut and on the skin. Giving unnecessary antibiotics can disrupt that delicate ecosystem, leading to problems such as colitis. That said, if I am treating a horse whose immune system is compromised by a severe viral or fungal infection, I might give him an antibiotic because he is at an increased risk of bacterial infection. But I would do this only for an extremely ill horse.

## 2. EXCEPT IN SPECIFIC CIRCUMSTANCES, IT’S NOT WISE TO USE ANTIBIOTICS AS GENERAL PREVENTIVES.

I have a few clients whose horses get rainrot nearly every year in the fall. And nearly every year, before the scabs even appear, they will ask “Why can’t we start him on antibiotics now, to get ahead of it?” There are a few problems with that approach.

First, you don’t want to get in the habit of using drugs to treat a condition instead of making the management adjustments that might prevent it in the



first place. Maybe a horse needs a different type of bedding or turnout space. Maybe his blankets need to be washed.

It's also important to realize that antibiotics can have side effects, ranging from mild gastrointestinal distress to kidney damage. We do the best we can to prevent these with careful selection and use, but there's always the potential that they will occur. There's no sense in putting a horse at risk of side effects by giving him an antibiotic before he actually has an infection.

Finally, if we load a horse up with antibiotics even before a problem appears, we are encouraging resistance of bacteria to that medication, rendering it useless against that type of infection.

### 3. THE ANTIBIOTIC SO WELL FOR YOUR HORSE LAST TIME MAY NOT HELP HIM WITH HIS LATEST PROBLEM.

I've often been asked by clients why I've prescribed a different antibiotic for their horse than one I'd used before. Their thought process is, "It worked for him before, why isn't he getting it again?" And I've heard from more than one client, "Oh, he always gets better with this type of antibiotic. I think that's what he needs," even before I've arrived at the farm.

**Different antibiotics kill different bacteria through different modes and with different potential side effects.**

to have the best results. What worked before, even very well, might not be the best choice in a new situation.

For starters, different bacteria require a different offensive approach. For instance, a "gram negative" bacterium—one that takes up stains in a particular laboratory test—has a complex cell wall that requires a particular type of antibiotic to penetrate it. Different medications work better in different locations: Doxycycline, for instance, is good at getting into joints, whereas minocycline is better at getting into neurological spaces. Finally, the health status of the horse at that moment can rule out some options. Some antibiotics are notoriously hard on the kidneys, so if the horse is dehydrated from an illness, I'm going to stay away from those.

The reality is that different antibiotics kill different bacteria through different modes and with different potential side effects, so I need to choose the correct one for each specific circumstance

## 4. THERE ARE FAR FEWER ANTIBIOTIC OPTIONS FOR HORSES THAN THERE ARE FOR OTHER SPECIES.

Horses can tolerate only a small range of antibiotics compared to people, dogs, cats and livestock. This is primarily because of the delicate balance of bacteria in the horse's hindgut, which is crucial to digestion. Disrupting that balance does more than just cause diarrhea or colic, however: There is a huge range of antibiotic drugs available that would literally kill a horse.

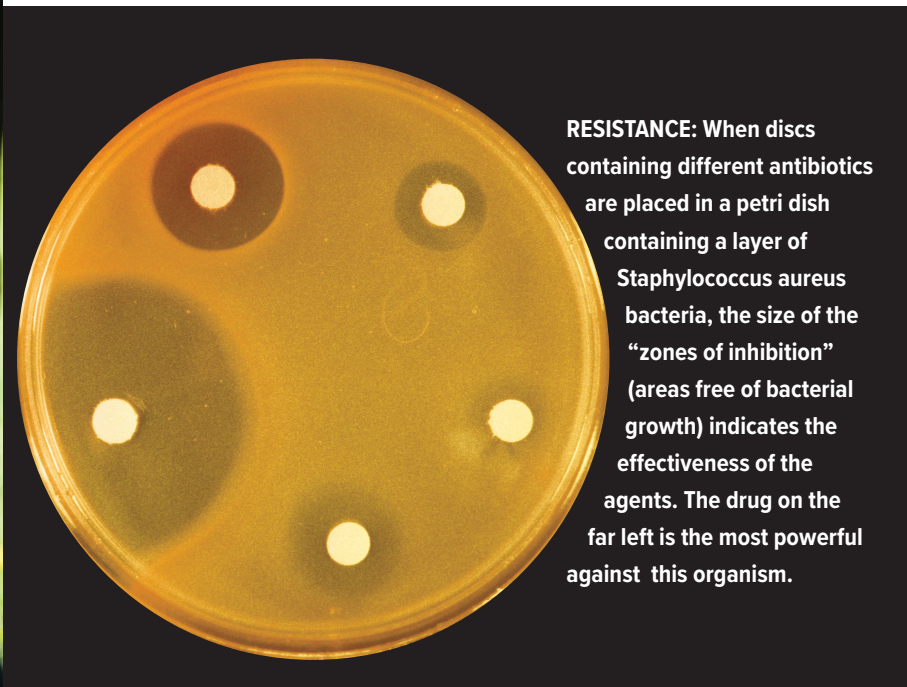
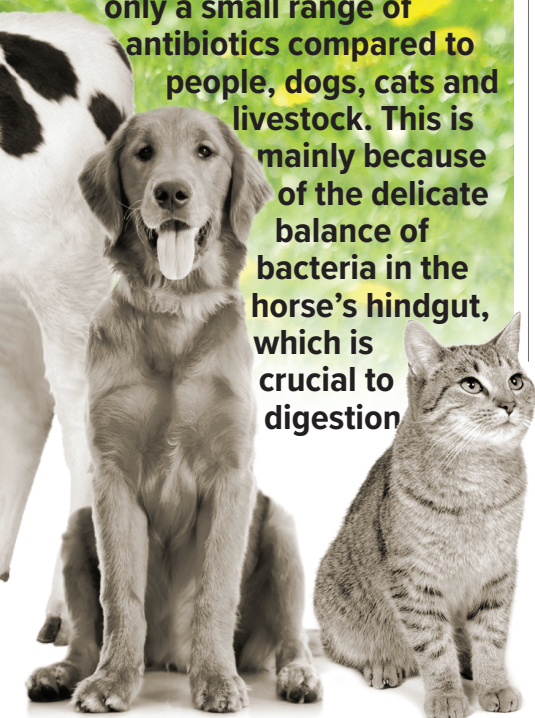
I don't personally know anyone who has done this, and I feel like it should go without saying, but I'll say it just in case: Never, ever give your horse an antibiotic prescribed for yourself—or your cat or your dog or any other animal.







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**RESISTANCE:** When discs containing different antibiotics are placed in a petri dish containing a layer of *Staphylococcus aureus* bacteria, the size of the “zones of inhibition” (areas free of bacterial growth) indicates the effectiveness of the agents. The drug on the far left is the most powerful against this organism.

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## 5. SOMETIMES WE CAN'T START TREATMENT UNTIL WE DETERMINE THE “RIGHT” ANTIBIOTIC FOR THE SITUATION.

Although a veterinarian can make a good educated guess on the nature of a horse's illness—whether or not it's caused by bacteria—and even the type of organism that may be involved, there is no way to know for certain without laboratory testing.

Given what we know about antibiotic resistance, veterinarians are using cultures more often to positively identify bacteria and what antibiotics will be most effective. To do this, we swab the area of the infection and grow the harvested bacteria in a laboratory. Then, we expose the bacteria to a variety of drugs to see which one is most effective against it. This can take about 48 hours, but it's time well spent

if it helps us choose the most effective antibiotic. Not only will your horse recover more quickly, but we won't be contributing to resistance with a half-hearted treatment that leaves stronger organisms behind.

Owners may get frustrated if I recommend waiting for test results to start a medication, but it's in everyone's best interest to pick the correct medication. Because of the risk of side effects, veterinarians want to use the least aggressive antibiotic tool to do the job well. We won't be breaking out the biggest, baddest antibiotic for a case of rain-rot, for instance—the risk of adverse side effects is often proportional to the strength of a medication.

Of course, there are some situations where time is of the essence, and we will make our best guess to get started with an antibiotic right away. But we will still also take a culture to make sure we got it right, so we don't have to guess a second time if the horse does not respond.

ARND BRONKHORST

# A BACTERIAL PRIMER

Bacteria are single-celled organisms with distinct cell walls. They can take many forms—including filaments, squares and stars—but most fall into one of these three categories:

**Cocci** are spherical or nearly spherical cells. They can appear alone, in pairs (*diplococci*), chains (*streptococci*) or clusters (*staphylococci*).

**Bacilli** are rod-shaped cells. They can appear singly, in pairs (*diplobacilli*), chains (*streptobacilli*) and parallel clusters (*palisades*).

**Spiral** bacteria can be comma-shaped (*vibrio*), thick and rigid corkscrews (*spirilla*), or long, thin and flexible (*spirochetes*).

## 6. STICKING TO THE PRESCRIBED HOURLY SCHEDULE EACH DAY IS VITAL TO ANTIBIOTIC EFFECTIVENESS.

When it comes to dosing a horse with antibiotics, timing can be everything. We are typically trying to create a steady stream in the blood, to deliver a constant barrage of pressure to the bacteria, rather than an occasional whack. However, some antibiotics work best in the “lulls” between doses, so their schedules will be designed accordingly.

Read the label on prescribed antibiotics and stick to the schedule as closely as you can. Dosing “twice a day” means 12 hours apart, ideally. If you give doses at 8 a.m. and then 4 p.m., that will be too close together for full efficacy. If the label says “three times a day,” try for every eight hours. That can be difficult with work schedules, but it’s important so enlist the help of friends or barn workers. There are some drugs that we want to give four times a day, which is even more challenging, but it’s recommended for good reason.

## 7. YOU MUST GIVE THE ENTIRE COURSE OF ANTIBIOTICS EVEN IF YOUR HORSE APPEARS BETTER AFTER A DAY OR TWO.

Many antibiotics are prescribed for a two-week course or even longer, reaching well beyond the point that we’d expect a horse’s condition to improve clinically. And while it may seem unnecessary or excessive to give a horse medication after he appears healthy, it is absolutely crucial that you give the entire dose of antibiotics. Not doing so contributes directly to antibiotic resistance that threatens your horse as well as the entire global equine population.

The idea here is simple genetics. The bacteria killed early on in a course of antibiotics are the susceptible ones—the “weak” ones, if you will—while the “stronger” ones and the “clever” ones that were starting to adapt to the antibiotic action survive longer. Stopping antibiotics before these stronger bacteria are killed off by the horse’s immune

system leaves only these behind to multiply and flourish. When you fail to finish a course of antibiotics you are basically starting a master race of disease-causing bacteria. The infection may return, even more aggressively than before.

If you continue with the full dose, however, chances are excellent that your horse’s immune system will have the opportunity to kill enough of all the bacteria to restore his health. Different antibiotics are prescribed for different lengths of time because we know how long that process can take. It’s not a length picked arbitrarily or simply to sell more medication.

**A**s a veterinarian, I am grateful to have antibiotics in my disease-fighting arsenal. But like all powerful weapons, these drugs are a double-edged sword—they can save lives but they can also cause significant harm if used improperly. That’s why it’s so important to understand them and what they can do to a horse’s body.

Armed with that knowledge, we can use antibiotics in the way they are intended—to help horses recover as quickly as possible from infections. 🐾