

# *The Science of Effective*

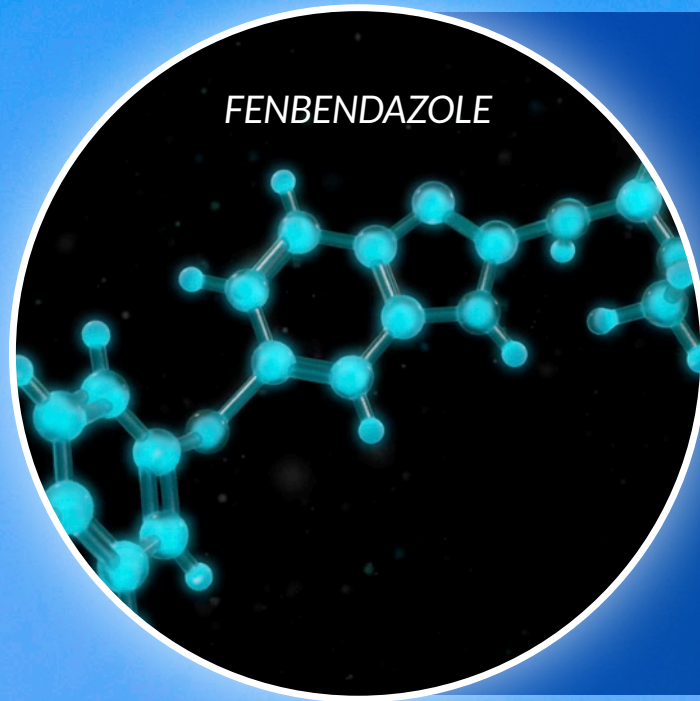
**panacur<sup>®</sup> POWERPAC**  
(fenbendazole)



# DIFFERENT FOR A REASON

## *Fenbendazole – You Know the Name but do You Know the Science?*

Fenbendazole, the active ingredient in Panacur® POWERPAC is different. Fenbendazole features a unique mode of action that makes it extremely safe, yet powerfully effective against the most significant parasite threats in horses.



*The most dangerous parasite threats may require a different deworming solution. Panacur (fenbendazole) POWERPAC is the only dewormer:*

- *With proven efficacy against ivermectin-resistant ascarids<sup>1</sup>*
- *Labeled for the treatment of all stages of encysted small strongyles<sup>2</sup> – which can account for up to 90% of the small strongyle burden.<sup>3</sup>*



<sup>1</sup> Cribb, NC, Cote, NM, Bouré, LP, Peregrine, AS. Acute small intestinal obstruction associated with *Parascaris equorum* infection in young horses: 25 cases (1985-2004). *N Z Vet J.* 2006 Dec;54(6):338-43.

<sup>2</sup> PANACUR (fenbendazole) Paste 10% equine dewormer product label.

<sup>3</sup> *Parasites & Vectors* 2009, 2(Suppl 2): S1 doi: 10.1186/1756-3305-2-S2-S1

# THE FENBENDAZOLE MODE OF ACTION

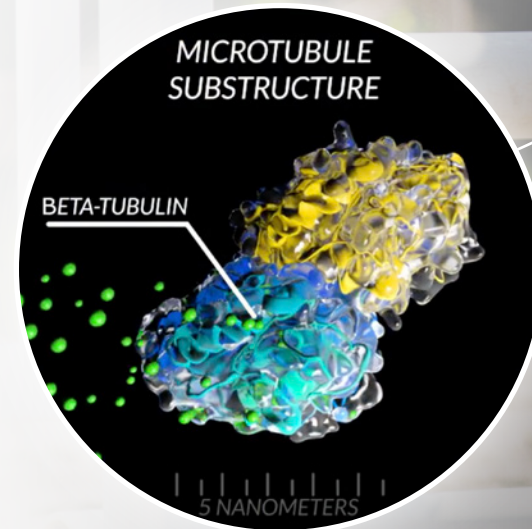
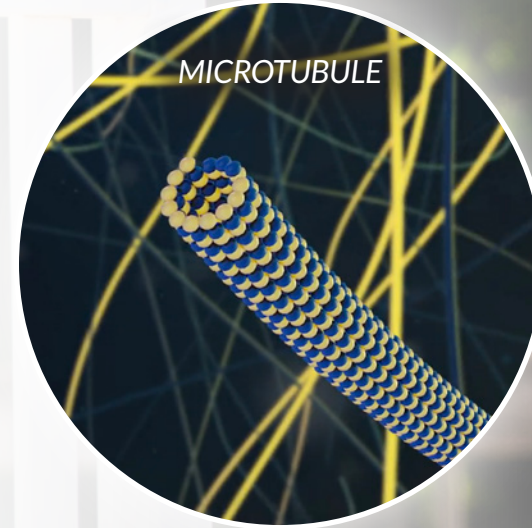
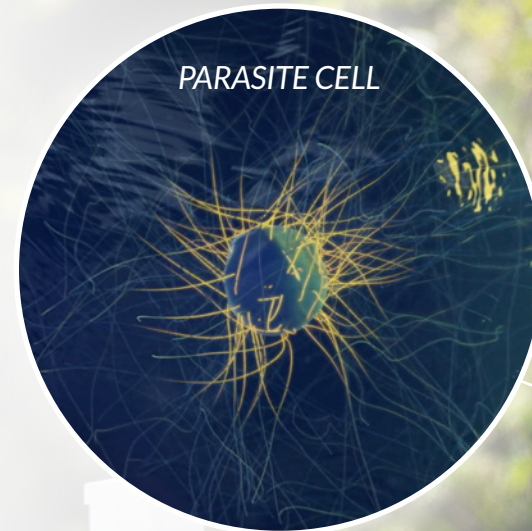
Fenbendazole works differently and that's what makes it special. The unique mode of action of fenbendazole is the reason for its exceptional efficacy and safety profile.

The Panacur POWERPAC five-day treatment regimen creates a gentle, slow saturation of the fenbendazole molecule within the horse that penetrates deep enough to kill the deadliest parasites in the most difficult places.

## Going to battle at the cellular level

Inside the cells of animals and parasites are structures called microtubules, which are important in a number of cellular processes. Fenbendazole preferentially binds to the microtubules of the parasite, disrupting the parasite's intestinal wall and its ability to produce energy. This potent disruption starves the parasite until it dies.

What makes fenbendazole unique is that it is more attracted to parasite tubulin than the animal tubulin. This is the reason the parasite is slowly killed, but no harm is done to the horse. And why fenbendazole is a safe choice for deworming in so many different situations and for every horse, regardless of age, size or body condition.



***Panacur POWERPAC is the only product approved to act as a larvicidal treatment for all stages of stubborn encysted small strongyles, and the only treatment proven to be effective against ivermectin-resistant ascarids that can pose a significant threat to the health of foals and weanlings.***



# EFFECTIVELY TARGETS THE MOST SIGNIFICANT EQUINE PARASITE THREATS

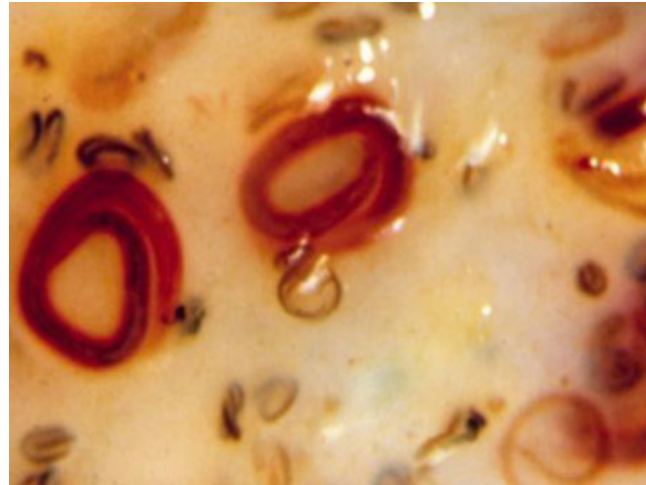
## Fenbendazole seeks out and destroys the encysted small strongyle threat

Cyathostomins (small strongyles) are a worldwide problem for horses. Small strongyles are considered a primary nematode problem in adult horses because of their ability to encyst and burrow in the intestinal lining for extended periods of time.

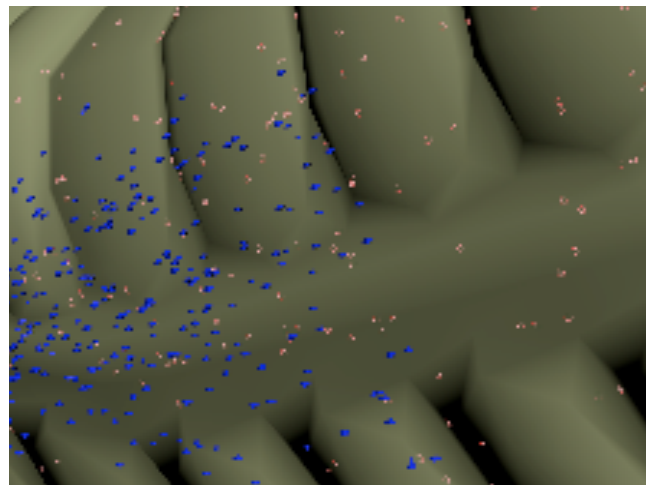
When infective larvae are ingested they migrate and invade the mucosal lining of the large intestine (encysted larvae). At this point they may continue to develop into adults; or, maturation may be arrested for prolonged periods of time. As many as 90% of the larvae may become inhibited in this manner and remain in this encysted stage of development for 4 months or up to 3 years.<sup>2</sup>

Season of the year influences the emergence of larvae. One of the disease threats lies in mass emergence when the larvae wake up (typically in the spring). Fenbendazole has the ability to seek out and kill these encysted larvae in hiding (during dormant period), so there is less threat of mass emergence.

Fenbendazole works by binding to the worm's  $\beta$ -tubulin within the microtubules, affecting not only the early L<sub>3</sub> stages but also the encysted late stage L<sub>3</sub> and L<sub>4</sub> larvae in the mucosa, destroying the encysted small strongyles and disrupting the life cycle.



Small strongyle larvae can become encysted in the horse's intestinal mucosa.



Fenbendazole is the only dewormer FDA approved to treat all stages of encysted small strongyles, including early third stage larvae (EL<sub>3</sub>)<sup>2</sup>, which can account for up to 75 percent of the encysted small strongyle burden.

## Ascarids (Parascaris equorum) are the most significant, potentially lethal, parasites in young foals.

Ascarid larvae migrate through the liver to the lungs where they spend two to three weeks causing inflammation. They are then coughed up, swallowed and continue their migration to the small intestine and become adults. Clinical signs may include depression, rough hair coat, cough, nasal discharge, poor growth, diarrhea, impaction colic, and bowel rupture leading to peritonitis and death.

Ascarid populations are developing worldwide resistance to ivermectin, moxidectin, and pyrantel pamoate.<sup>4,5,6,7</sup> Fenbendazole is the preferred choice for treating ascarids, including ivermectin-resistant ascarids. A larvicidal dose of fenbendazole demonstrated a 99.5% reduction of ascarids eggs in treated foals infected with ivermectin-resistant ascarids.<sup>8</sup>

Although primarily a problem in foals, ascarids can also threaten horses beyond the age of 18 months if these animals were not effectively dewormed as foals and have harbored an ascarid infection into adulthood.<sup>9</sup>

Fenbendazole works by binding the worm  $\beta$ -tubulin within the microtubules of the intestinal cells, disrupting the parasite's ability to produce energy, and starving the adult worms in the small intestine until they die. This unique mode of action results in a slow kill of ascarids, which decreases the likelihood of potential side effects (endotoxic shock, impactions), which may occur after deworming foals with heavy ascarid infections using other classes of dewormers.<sup>1,9</sup>



Ascarids (Parascaris equorum) are the most significant, potentially lethal, parasites in young foals. Heavy infestations can cause deadly intestinal impactions or rupture. The slow kill method of fenbendazole is one of the reasons it's the recommended option for ascarids.



SAFE  
for  
FOALS

<sup>4</sup> Craig TM, Diamond PL, Ferwerda NS, et al. Evidence of ivermectin resistance by Parascaris equorum on a Texas horse farm. J Eq Vet Sci 2007; 27:67-71

<sup>5</sup> Hearn FP, Peregrine AS. Identification of foals infected with Parascaris equorum apparently resistant to ivermectin. J Am Vet Med Assoc. 2003; 223(4):482-485.

<sup>6</sup> Boersema JH, Eysker M, Nas JW. Apparent resistance of Parascaris equorum to macrocyclic-lactones. Vet Rec 2002; 150(9):279-281

<sup>7</sup> Schougaard H, Nielsen MK. Apparent ivermectin resistance of Parascaris equorum in foals in Denmark. Vet Rec 2007;160: 439-440

<sup>8</sup> Reinemeyer CR, Prado JC, Vaala WE. Larvicidal efficacy of fenbendazole against a macrocyclic lactone-resistant isolate of Parascaris equorum in foals. Proceedings of the 55th Annual Meeting of the American Association of Veterinary Parasitologists, 2010, Atlanta, GA, p49.

<sup>9</sup> AAEP Parasite Control Guidelines. Revised February 2016.

# SAFETY IN NUMBERS

*Panacur (fenbendazole) POWERPAC is a larvicidal dose of fenbendazole, which is effective against large and small strongyles (including migrating larvae), pinworms and ascarids. This 5-day regimen is one of the safest, most comprehensive and effective methods to treat a wide variety of parasites in a wide variety of horses.*

Because fenbendazole is less soluble it persists longer in the host. Efficacy can be expanded by extending the duration of exposure to the drug, which is the basis of the larvicidal dose.

There are no known contraindications for the use of fenbendazole. It is extremely safe for every horse, regardless of age, size, or body condition. It is also safe for the environment and non-target species.

Because of its unique safety profile, Panacur POWERPAC is often recommended in these situations:

- Once a year, especially for young horses and moderate-to-high egg shedders
- All incoming horses before co-mingling with resident horses
- Before starting horses on a daily dewormer, and once a year while continuing a daily deworming program
- Foals prior to weaning
- Prior to a performance event for show horses
- The treatment of debilitated or thin horses suffering from internal parasites, horses with chronic diarrhea, recurring colic and chronic weight loss due to suspected parasite infection<sup>10</sup>



<sup>10</sup> Tazmali Y. (2006) Chronic weight loss in the horse: a 60-case retrospective study. Equine Vet Edu. 18, 289-296.

# THE CRITICAL ROLE YOU PLAY IN **COMBATING RESISTANCE**

*Now more than ever it is important to lead the discussion on parasites with horse owners – not only to preserve the efficacy of the dewormers we have, but also to continually position yourself as a resource to owners in all facets of their horse's care.*

Dewormers such as Panacur POWERPAC have the best chance of success when partnered with a comprehensive parasite control program that incorporates fecal egg count (FEC) testing into a farm-wide, herd-based program that combines chemical and non-chemical control strategies.

Offer an annual farm “physical exam” to provide parasite control recommendations:

- Stocking density
- Size and overall condition of pastures and/or paddocks
- Dewormers being used and how often they are being given
- Age range of horses
- Perform fecal egg count to identify high and low shedders



## **Environmental controls:**

- Don't overstock pastures or allow pastures to become overgrazed
- Cross-graze pastures with other ruminant species
- Keep pastures mowed to remove roughs (areas where horses defecate and do not graze)
- Remove manure from stalls daily and from paddocks and pastures twice weekly
- Compost manure
- During hot, dry weather, harrow or rake pastures to disperse manure piles and expose larvae to sun. Rest the pasture a minimum of four weeks after harrowing.
- Feed hay and grain in raised containers and not directly on the ground
- Clean water sources regularly to prevent fecal contamination

***The science of fenbendazole is what makes Panacur  
POWERPAC a great choice for effective and safe  
treatment of the most dangerous horse parasites.***

Talk to your Merck Animal Health sales representative or visit  
**Merck-Animal-Health-Equine.com** to learn more.

**panacur**<sup>®</sup>  
(fenbendazole)  
**POWERPAC**

**Consult your veterinarian for assistance in the diagnosis, treatment,  
and control of parasitism.**

Do not use in horses intended for human consumption. When using  
Panacur<sup>®</sup> (fenbendazole) Paste 10% concomitantly with trichlorfon,  
refer to the manufacturer's labels for use and cautions for trichlorfon.

**The Science of  
Healthier Animals**

2 Giralda Farms • Madison, NJ 07940 • merck-animal-health-usa.com • 800-521-5767  
Copyright © 2018 Intervet Inc., d/b/a/ Merck Animal Health, a subsidiary of Merck & Co., Inc.  
All rights reserved. 16-MERCK-3541-MOA-DETAILER-VETS-US/EQD/0318/0001

