



ReBalance[®]
(sulfadiazine and pyrimethamine)

Antiprotozoal Oral Suspension

The Frustrating Challenge of EPM

THE CHALLENGES



Knows no geographical limitations

- » EPM is widespread throughout North and South America
- » ~50% of horses are seropositive for *S. neurona* where they coexist with opossums¹

A Master of Disguise

- » Signs mimic other neurological diseases
- » Progression varies widely in horses
- » Diagnostic tests are costly and have limitations

Almost impossible to prevent

- » No vaccine available
- » No foolproof method of prevention

Devastating to the horse

- » Most cases are progressive
- » Poor prognosis, including death, if left untreated or if treatment is delayed

The main veterinary solution is to accurately diagnose the disease and treat it early when possible.²

One Tough Disease

ReBalance[®]

(*sulfadiazine and pyrimethamine*)

Antiprotozoal Oral Suspension

Proven efficacy against EPM

- » 61.5% of treated horses were considered treatment successes⁴
- » All approved therapies are of similar efficacy³

Economical treatment option

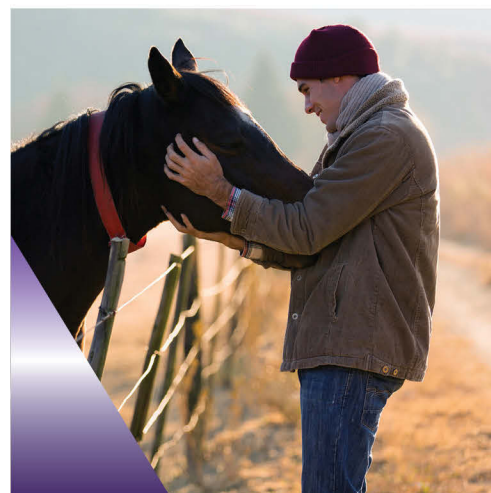
- » As little as 1/3 the cost of other treatment options
- » Ideal for the value-conscious horse owner

The only FDA-approved sulfadiazine-pyrimethamine combination

- » Provides assurance of product consistency and quality manufacturing standards versus the unknowns of compounded medications.
- » "These drugs [compounded medications] are not evaluated by FDA and may not meet FDA's strict standards for safety and effectiveness. Unapproved animal drugs also may not be labeled or advertised appropriately. Horse owners or caretakers should consult with their veterinarians about other therapies."⁶

Established safety profile

- » When administered under labeled conditions, Rebalance is safe and effective for the treatment of horses with equine protozoal myeloencephalitis (EPM) caused by *Sarcocystis neurona*.



Tough on EPM. **Gentle** on the Wallet.

ReBalance®

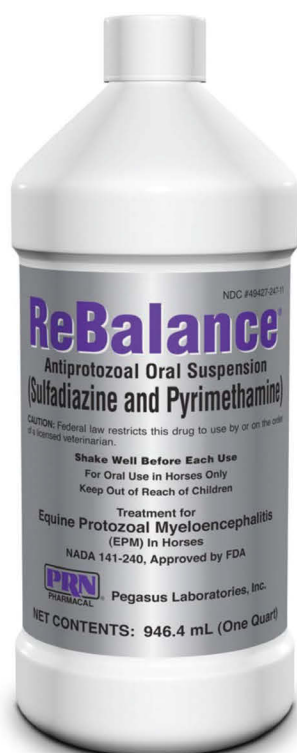
(sulfadiazine and pyrimethamine)

Antiprotozoal Oral Suspension

Known, trusted, FDA-approved antiprotozoal with sulfadiazine and pyrimethamine

All Approved Therapies Are of Similar Efficacy

"Results of efficacy studies were surprisingly similar for each of the four approved therapies when similar methodologies and means of assessing improvement were used. Regardless of drug, ~60% of treated horses improved by at least one neurologic grade or became negative on CSF WB."³



ReBalance Clinical Trials Efficacy

61.5%

of Horses Considered Treatment Successes⁴

Only the 1X dose was evaluated for effectiveness due to the toxicity (bone marrow suppression) seen at the 2X dose. Of the forty-eight horses assigned to the 1X group, 26 horses completed the study. Based on the improvement in the OND scores and/or a negative CSF immunoblot, 16 out of 26 horses (61.5%) were considered successes. Five of the 26 horses (19.2%), had a negative CSF immunoblot by day 150 of the study. Three of these five horses were also clinical successes based on the improvement in OND scores. Fourteen of the 26 horses (53.8%) were corroborated as successes by masked expert evaluation of videotapes.⁴

Important Safety Information

For use in horses only. Do not use in horses intended for human consumption. Not for human use. Keep out of the reach of children.

Prior to treatment with ReBalance, Antiprotozoal Oral Suspension, EPM should be distinguished from other diseases that may cause ataxia in horses. Injuries or lameness may also complicate the evaluation of an animal with EPM. In most instances, ataxia due to EPM is asymmetrical and affects the front and/or the hind limbs.

Treatment may cause generalized bone marrow suppression, anemia, leukopenia, neutropenia, and thrombocytopenia. A complete blood count (CBC) should be performed monthly to monitor horses for development of these conditions. The administration of the drug may need to be discontinued and/or treatments for bone marrow suppression initiated.

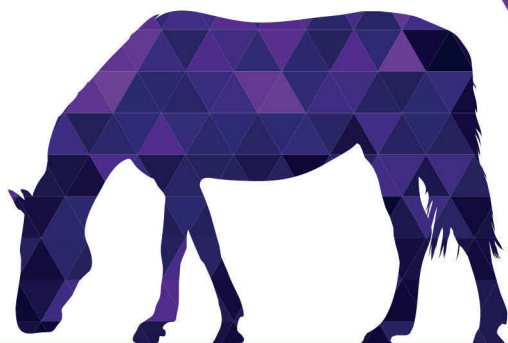
Other, less frequent side effects included decreased appetite, loose stools, and mild colic. In most cases, the gastrointestinal signs were self-limiting and did not require discontinuation of treatment.

Worsened neurologic deficits (treatment crisis) may be observed during a period beginning with the first few days of treatment with ReBalance and ranging out to 5 weeks. This neurologic deficit exacerbation may be the result of an inflammatory reaction to the dying parasites in the CNS tissue.

The safe use of ReBalance Antiprotozoal Oral Suspension in horses used for breeding purposes, during pregnancy, or in lactating mares has not been evaluated. The safety of ReBalance with concomitant therapies in horses has not been evaluated.

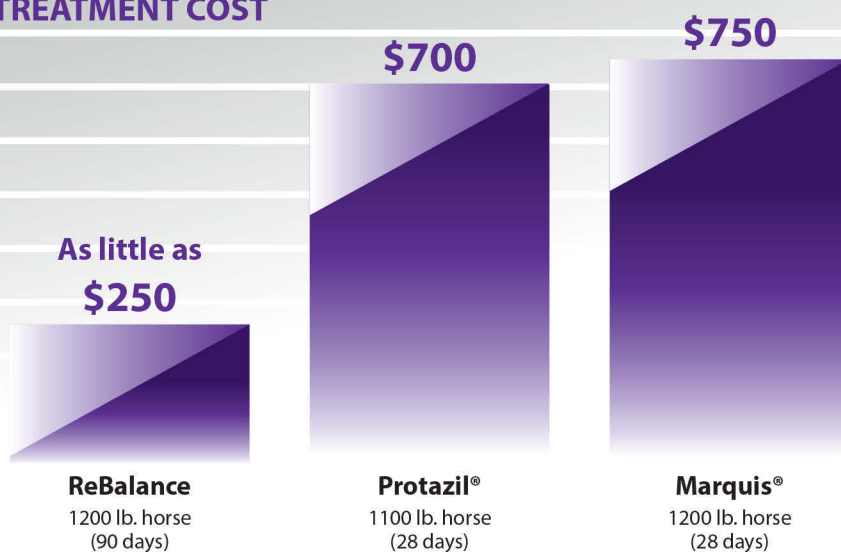
ReBalance is not for use in horses with known hypersensitivity to sulfonamide drugs or pyrimethamine. Refer to the prescribing information for complete details or visit prnpharmaceutical.com/rebalance.

ReBalance® is an
**effective and
economical EPM
treatment choice**



Approximate Veterinary Treatment Cost at Label
Recommendations Based on Current Distributor List Pricing⁵

TREATMENT COST



Ideal for the value-conscious horse owner

ReBalance safety data has been collected and evaluated for over a decade of use by veterinarians

- » When administered under labeled conditions is safe and effective for the treatment of horses with equine protozoal myeloencephalitis (EPM) caused by *Sarcocystis neurona*.⁴

ReBalance is the only FDA-approved combination of sulfadiazine and pyrimethamine

- » FDA approval indicates consistent manufacturing quality standards and ongoing monitoring and reporting of field safety and efficacy versus the unknown risks of compounded ingredients and products.
- » "In general, FDA has serious concerns about unapproved animal drugs, including certain compounded animal drugs. These drugs are not evaluated by FDA and may not meet FDA's strict standards for safety and effectiveness."⁶
- » "Unapproved animal drugs also may not be labeled or advertised appropriately. Horse owners or caretakers should consult with their veterinarians about other therapies."⁶

ReBalance®

(Sulfadiazine and Pyrimethamine)

Antiprotozoal Oral Suspension

Shake Well Before Each Use

For Oral Use in Horses Only
Keep Out of Reach of Children

Treatment for Equine Protozoal Myeloencephalitis (EPM) In Horses

NADA 141-240, Approved by FDA

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: ReBalance Antiprotozoal Oral Suspension is supplied in 946.4 mL (1 quart) bottles. Each mL of ReBalance Antiprotozoal Oral Suspension contains 250 mg sulfadiazine (as the sodium salt) and 12.5 mg pyrimethamine.

INDICATIONS: ReBalance Antiprotozoal Oral Suspension is indicated for the treatment of horses with equine protozoal myeloencephalitis (EPM) caused by *Sarcocystis neurona*.

DOSAGE AND ADMINISTRATION: ReBalance Antiprotozoal Oral Suspension is to be administered at a dose of 20 mg/kg sulfa diazine and 1 mg/kg pyrimethamine daily or 4 mL of ReBalance Antiprotozoal Oral Suspension per 110 lb. (50 kg) of body weight once per day. The duration of treatment is dependent upon clinical response, but the usual treatment regimen ranges from 90 to 270 days.

Administer orally by suitable dosing syringe at least one hour prior to feeding with hay or grain. Insert nozzle of syringe through the interdental space and deposit the dose on the back of the tongue by depressing the plunger. **Shake well before each use.**

CONTRAINDICATIONS: The use of ReBalance Anti protozoal Oral Suspension is contraindicated in horses with known hypersensitivity to sulfonamide drugs or pyrimethamine.

WARNINGS: For use in horses only. Do not use in horses intended for human consumption. Not for human use. Keep out of the reach of children.

PRECAUTIONS: Prior to treatment with ReBalance Antiprotozoal Oral Suspension, EPM should be distinguished from other diseases that may cause ataxia in horses. Injuries or lameness may also complicate the evaluation of an animal with EPM. In most instances, ataxia due to EPM is asymmetrical and affects the front and/or the hind limbs.

Treatment may cause generalized bone marrow suppression, anemia, leukopenia, neutropenia and thrombocytopenia. A complete blood count (CBC) should be performed monthly to monitor horses for development of these conditions. The administration of the drug may need to be discontinued and/or treatments for bone marrow suppression initiated.

Worsened neurologic deficits (treatment crisis) may be observed during a period beginning with the first few days of treatment with ReBalance Antiprotozoal Oral Suspension and ranging out to 5 weeks. This neurologic deficit exacerbation may be the result of an inflammatory reaction to the dying parasites in the CNS tissue.

The safe use of ReBalance Antiprotozoal Oral Suspension in horses used for breeding purposes, during pregnancy, or in lactating mares has not been evaluated. The safety of ReBalance Antiprotozoal Oral Suspension with concomitant therapies in horses has not been evaluated.

ADVERSE REACTIONS: Seventy-five horses (37 horses in the 1X group; 38 horses in the 2X group) that were treated with test article for at least 90 days were evaluated for adverse reactions.

Bone marrow suppression:

Anemia: ReBalance Antiprotozoal Oral Suspension administration caused overall anemia (classification of anemia based on RBC, Hgb, and PCV/HCT values) in 12% of the observations in the 1X group and 21% of the observations in the 2X group. In the 1X group, anemia was noted in 22%, leukopenia in 19%, neutropenia in 5%, and thrombocytopenia in 3% of the cases. In the 2X group, anemia was noted in 58%, leukopenia in 55%, neutropenia in 29% and thrombocytopenia in 5% of the cases. The incidence of bone marrow suppression in the 2X treatment group was two or more times that of the 1X group and the degree of suppression was more serious (mild to severe vs. mild to moderate). Because of these blood dyscrasias, test article was interrupted over four times more often in horses treated at the 2X dosage than those treated at 1X, although both groups were off treatment for about the same amount of time (approximately 20% of the treatment period). In some instances of bone marrow suppression, diet was supplemented with folic acid.

GI: Anorexia was observed in two horses in the 1X group and one horse in the 2X group. One horse in the 1X group and one horse in the 2X group were observed to be off feed. Observations of anorexia and decreased appetite occurred predominantly during the first 90 days of the treatment period. Observations of anorexia/decreased appetite in two of the above-referenced cases were due to unrelated illnesses. Loose stools were observed in three horses in the 1X group and five in the 2X group. The majority of these observations occurred in the first thirty days of treatment.

Diarrhea was observed in one horse in the 2X group on Day 4 of the study. The appearance of loose stool/diarrhea observations was self-limiting and resolved without treatment or discontinuation of test article. Brief, mild colic was observed in three cases (one in the 1X group and two in the 2X group). Colic was treated conservatively or not at all and resolved without sequelae.

Integument: Urticaria was observed in one horse in the 1X group and two horses in the 2X group. One horse was treated topically, two were untreated. All cases resolved without sequelae.

Treatment crisis (marked worsening of the neurological condition) was reported in one horse in the 1X treatment group.

Depression/lethargy was observed infrequently, occurred during the early part of the study in both groups and was primarily associated with the EPM syndrome. In one case, depression was associated with acute onset of a liver disorder.

Seizure: One horse in the 1X treatment group suffered from seizures. Seizure activity may be associated with CNS damage from EPM.

CLINICAL PHARMACOLOGY: Sulfonamides (a specific group of antimicrobial agents) and pyrimethamine are two different antimicrobial agents which inhibit folic acid synthesis at two different sites, in the same synthetic pathway. The combination of a sulfonamide and pyrimethamine is synergistic, with the drug combination having an antiprotozoal effect.

EFFECTIVENESS SUMMARY: A field effectiveness study was conducted at eight sites with eight investigators across the United States. The study was conducted using historical controls. In this study, each animal's response to treatment was compared to its pre-treatment values. The following standardized overall neurological dysfunction (OND) scale was used to grade the horses:

- 0 = Clinically normal. No detectable dysfunction.
- 1 = Slight deficit. Dysfunction barely perceptible.
- 2 = Moderate deficit. Dysfunction easily detectable.
- 3 = Marked deficit. Dysfunction strikingly conspicuous.
- 4 = Severe deficit. Profound dysfunction.
- 5 = Recumbent.

Ninety-seven horses were randomly assigned to one of two treatment groups and administered a daily oral dose of ReBalance Antiprotozoal Oral Suspension for a minimum of 90 days. The two treatment groups were as follows:

- (1) 1X labeled dose, 20 mg/kg sulfadiazine and 1 mg/kg pyrimethamine (48 horses); or
- (2) 2X dose, twice the labeled dose, 40 mg/kg sulfadiazine and 2 mg/kg pyrimethamine (49 horses).

A physical examination and neurological evaluation and complete blood profile were conducted at the end of each 30-day treatment period for the first 90 days of treatment.

At the end of the 90-day treatment period, a videotape recording of the neurological condition and CSF and serum sample immunoblot and protein electrophoresis analyses were made. Based on the degree of clinical improvement and results of the CSF immunoblot analysis on test day 90, treatment in 30-day increments up to a period of 180 days was continued. In fourteen cases, the treatment was extended beyond 180 days (up to 270 days). A 30-day follow-up evaluation was made following cessation of treatment.

Treatment success was defined as: (1) a horse that became CSF Western Blot Test negative with or without clinical improvement; and (2) a horse that remained CSF Western Blot Test positive but demonstrated marked clinical improvement (two or more grade improvement from baseline OND score).

Only the 1X dose was evaluated for effectiveness due to the toxicity (bone marrow suppression) seen at the 2X dose. Of the forty-eight horses assigned to the 1X group, 26 horses completed the study. Based on the improvement in the OND scores and/or a negative CSF immunoblot, 16 out of 26 horses (61.5%) were considered successes. Five of the 26 horses (19.2%), had a negative CSF immunoblot by day 150 of the study. Three of these five horses were also clinical successes based on the improvement in OND scores. Fourteen of the 26 horses (53.8%) were corroborated as successes by masked expert evaluation of videotapes.

ANIMAL SAFETY: ReBalance Antiprotozoal Oral Suspension was administered to ten horses (5 males and 5 females) at a dosage of 8 mL/50 kg (110 lbs) a day (2X the labeled dose) for 92 days. Four horses (2 males and 2 females) were untreated controls.

Complete physical examinations, CBCs and serum chemistry values were determined on test day (TD) minus 14, TD minus 7, TD 0, biweekly throughout the 92 day treatment period and 14 and 29 days following the end of treatment.

Declines in RBC, HCT, Hgb and PCV were greater in the treated group and reached statistical significance. Twenty-nine days after cessation of treatment, blood parameter values returned to baseline levels. No clinical signs of anemia were observed in either group.

Most serum chemistry values remained within normal limits throughout the study in both groups. Alkaline phosphatase (ALP) values were evaluated (slightly above the upper end of the normal range) in three treated horses on study days 84 and 105.

Loose stools, along with infrequent diarrhea, were noted in the treatment group. The conditions were transient and required no medical intervention.

A depressed appetite of 1 to 2 days duration occurred infrequently in all but one of the treated horses. One horse became anorexic and required a change in diet.

ReBalance Antiprotozoal Oral Suspension administered at 2X the recommended label dose for 92 days resulted in clinical signs of toxicity including transient anemia and loose stools; however, medical intervention was not necessary.

STORAGE: Store at 20°C-25°C (68°F-77°F), excursions permitted between 15°C-30°C (59°F-86°F).

Protect from freezing.

HOW SUPPLIED: Each mL of ReBalance Anti protozoal Oral Suspension contains 250 mg sulfadiazine (as the sodium salt) and 12.5 mg pyrimethamine and is available in 946.4 mL (1 quart), multiple dose, child-resistant, screw-capped bottles.

For a Material Safety Data Sheet (MSDS) or to report Adverse Reactions, call Pegasus Laboratories, Inc. at 1-800-874-9764. U.S. Patent No. 5,747,476; 6,255,308 and 6,448,252

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1-2012

1 Equine Protozoal Myeloencephalitis (EPM). http://www.vetmed.ucdavis.edu/vmth/large_animal/equine/equine_medicine_dentistry/EPM; Accessed October 4, 2015.

2 Kane E. Equine Protozoal Myeloencephalitis: Etiology, Diagnosis and Treatment. *DVM Newsmagazine*. October 2011; 8E.

3 Johnson AL. Evidence-Based Review of Diagnosis and Treatment of *Sarcocystis neurona* Infection (Equine Protozoal Myeloencephalitis), in *Proceedings*. 55th Annual American Association of Equine Practitioners Convention 2009; 172-176.

4 Animal Health Pharmaceuticals. *Freedom of information summary, NADA 141-240*. REBALANCE Antiprotozoal Oral Suspension (sulfadiazine and pyrimethamine) "for the treatment of horses with equine protozoal myeloencephalitis (EPM) caused by *Sarcocystis neurona*." Animal Health Pharmaceuticals, LLC, St. Joseph, MO; 2004.

5 Approximate veterinary treatment cost at label recommendations based on current distributor list pricing (Henry Schein Animal Health, October 2015).

6 FDA Alerts Horse Owners and Veterinarians About Adverse Events Associated with Certain Unapproved Compounded Drugs in Horses. US Food and Drug Administration website. <http://www.fda.gov/animalveterinary/newsevents/cvmupdates/ucm397345.htm>. Published May 15, 2014. Updated June 5, 2014. Accessed October 4, 2015.