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PRACTICAL MANAGEMENT OF ACUTE DIARRHEA IN DOGS

Harry Cridge, MVB, MS, PG Cert Vet Ed, DACVIM (SAIM), DECVIM-CA, FHEA, MRCVS

Images from Nutramax Laboratories

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My Background

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VET VISITS FOR ACUTE DIARRHEA

"Acute diarrhea is a common condition in dogs managed under primary veterinary care, with **1-in-12 dogs** diagnosed each year."

O'Neill et al. Epidemiology and clinical management of acute diarrhea in dogs under primary veterinary care in the UK.

Plos One. 2025; 20(6):e0324203

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SURVEYS OF PET OWNERS (n = 772)

~ 15% of dogs had diarrhea

Only 10% of those cases presented to a veterinarian

The cases we see are just the tip of the iceberg

Many cases are self-limiting

→ need to be careful that my treatment aimed at hastening recovery doesn't cause harm

All dogs with > 7 days of diarrhea presented to the vet

Hubbard et al. *Risk of Vomiting and Diarrhea in Dogs. Vet Rec. 2007; 161: 755-757.*

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JAVMA AVMA

Clinician prescribing practices for managing canine idiopathic acute diarrhea are not evidence based

Preferred 1st line therapy:

41.3% dietary modification	21.2% antimicrobials
20.1% probiotics	17.3% others (13% anti-diarrheals, 4% time)

Probiotics and nutritional support are gaining momentum in the management of diarrhea in dogs

- 78% of respondents were using more probiotics than previously
- 41% were using more nutritional management than previously (>90% manipulate fiber)

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What influences prescribing practices?

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So … Let's Talk About the Elephant in the Room

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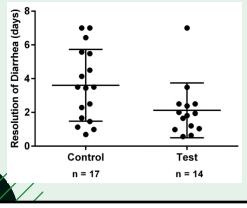
Why do Clinicians Use Metronidazole?

Metronidazole treatment of acute diarrhea in dogs: A randomized double blinded placebo-controlled clinical trial

Daniel K. Langlois[1] | Amy M. Koenigshof[1] | Rinosh Mani[2]



Dogs with acute diarrhea w/o GI parasitism (fecal flotation and Giardia SNAP test). Parvo negative.

Time to resolution of diarrhea:

- Control group: 3.6 ± 2.1 days
- Metro group: 2.1 ± 1.6 days

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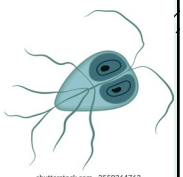
> Vet Ther. 2006 Fall;7(3):199-206.

Prevalence of *Giardia* in Symptomatic Dogs and Cats throughout the United States as Determined by the IDEXX SNAP *Giardia* Test*

E.. P. Carlin, BS[a]
D. D. Bowman, MS, PhD[a]
J.. M. Scarlett, DVM, PhD[b]
J.. Garrett, BS[c]
L.. Lorentzen, DVM[c]



~ 15% prevalence among tested dogs with clinical signs of vomiting &/or diarrhea

Giardia is a common enteric agent in dogs with GI signs

Metronidazole is a tx option for Giardia

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What's the Harm? / Concerns for Metronidazole Use

GI upset / inappetence → common
Development of antimicrobial resistance
Dysbiosis → common and potentially long-term

Rare:

- Neurologic disorders
- Lethargy / weakness
- Neutropenia
- Hepatotoxicity
- Hematuria

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Epidemiol. Infect. (2011), **139**, 1511–1521. © Cambridge University Press 2010
doi:10.1017/S0950268810002785

Risk factors for dogs becoming rectal carriers of multidrug-resistant *Escherichia coli* during hospitalization

J. S. GIBSON*, J. M. MORTON, R. N. COBBOLD, L. J. FILIPPICH AND D. J. TROTT
The University of Queensland, School of Veterinary Science, Gatton, Queensland, Australia

Treatment with metronidazole increases the risk of carriage of MDR *E.coli* during hospitalization

Odds Ratio: 7.17 (95% CI: 1.01-50.79)

Potential risk to patient or owner (esp. if immunocompromised)

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DOI: 10.1111/jvim.15871

STANDARD ARTICLE

Journal of Veterinary Internal Medicine ACVIM Open Access

Effects of metronidazole on the fecal microbiome and metabolome in healthy dogs

Rachel Pilla[1] | Frederic P. Gaschen[2] | James W. Barr[1] | Erin Olson[2] | Julia Honneffer[1] | Blake C. Guard[1] | Amanda B. Blake[1] | Dean Villanueva[1] | Mohammad R. Khattab[1] | Mustafa K. AlShawaqfeh[3] | Jonathan A. Lidbury[1] | Jörg M. Steiner[1] | Jan S. Suchodolski[1]

Conclusion and Clinical Importance: Our results indicate a minimum 4-week effect of metronidazole on fecal microbiome and metabolome, supporting a cautious approach to prescription of metronidazole in dogs.

We don't fully know the long-standing clinical implications of antibiotic associated dysbiosis

Pilla et al. Effects of metronidazole on the fecal microbiome and metabolome in healthy dogs. J Vet Intern Med. 2020; 34(5):1853-66

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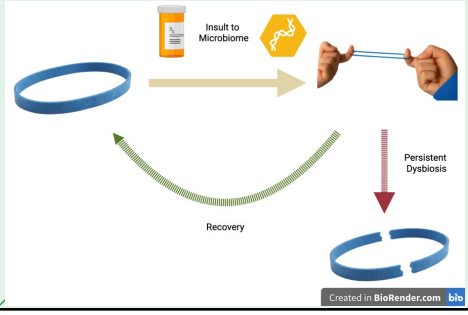
Microbiome & The Elastic Band Analogy



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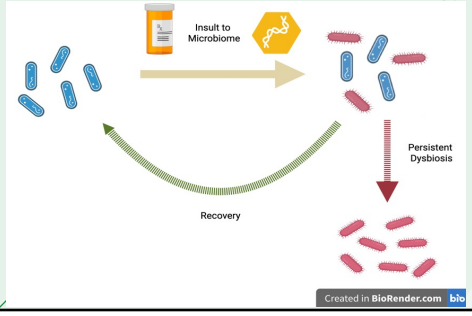
Microbiome & The Elastic Band Analogy



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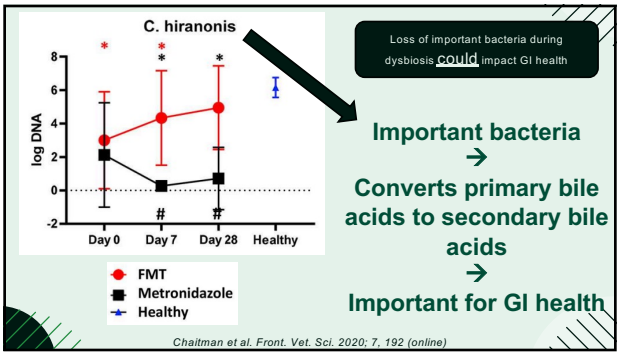

Chaitman et al. Front. Vet. Sci. 2020; 7, 192 (online)

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PLOS ONE

RESEARCH ARTICLE

Long-term effects of canine parvovirus infection in dogs

Elena Kilian[1]*, Jan S. Suchodolski[2], Katrin Hartmann[1], Ralf S. Mueller[1], Gerhard Wess[1], Stefan Unterer[1]

Conclusions

Results of this study suggest that dogs that survive CPV infection have a significantly higher risk (odds ratio = 5.33) for developing a chronic gastrointestinal disease. Further prospective studies to identify the trigger for the development of chronic diarrhoea and possible targeted treatment strategies are needed.

Kilian et al. Long-term effects of canine parvovirus infection in dogs. PLoS ONE. 2018; 13(3): e0192198

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DOI: 10.1111/jvim.16312

STANDARD ARTICLE

Journal of Veterinary Internal Medicine ACVIM Open Access

Frequency of signs of chronic gastrointestinal disease in dogs after an episode of acute hemorrhagic diarrhea

Elisabeth Skotnitzki[1] | Jan S. Suchodolski[2] | Kathrin Busch[1] | Melanie Werner[1] | Yury Zablotski[1] | Bianca D. Ballhausen[3] | Felix Neuerer[4] | Stefan Unterer[1]

Results: There was a higher prevalence of signs of chronic GI disease in the dogs with a previous episode of AHD compared to control dogs (AHD 28%; controls 13%; $P = .03$; odds ratio = 2.57; confidence interval [CI] 95% 1.12-6.31) over a similar observation time (median 4 years; range, 1-12 years).

Conclusions and Clinical Importance: Severe intestinal mucosal damage and associated barrier dysfunction might trigger chronic GI disease later in life.

Skotnitzki et al. Frequency of signs of chronic gastrointestinal disease in dogs after an episode of acute hemorrhagic diarrhea. J Vet Intern Med. 2022; 36:59-65

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STANDARD ARTICLE OPEN ACCESS

Small Animal Internal Medicine Gastroenterology

Long-Term Follow-Up After Acute Gastroenteritis Caused by *Giardia* Infection in Juvenile Dogs

Karla C. Walz[1] | Jan S. Suchodolski[2] | Melanie Werner[1] | Felix Grimm[3] | Manuela Schnyder[3] | Yury Zablotski[4] | Stefan Unterer[1]

Conclusion and Clinical Importance: Juvenile dogs with acute gastroenteritis and confirmed *Giardia* infection had a higher prevalence of pruritus and chronic gastrointestinal signs. Severe enteritis and metronidazole administration may increase the risk of developing chronic gastrointestinal signs.

Need more data but concerning

Causation vs shared risk factors / association

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Summary Arguments on Metronidazole

Long-standing clinical use

Personal experience

Giardia

Diarrhea when discontinued / long-standing dysbiosis

Antimicrobial resistance

Future risks?

Alternatives Exist

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Metronidazole Alternatives for Non-Infectious Diarrhea

→ Nutrition, Probiotics, & Fiber

Nutramax is a true leader and innovator in this field

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What are Prebiotics, Probiotics, & Postbiotics?

Prebiotics → are non-digestible fibers that act as food for beneficial bacteria

Probiotics → are live beneficial bacteria that help maintain or restore a healthy microbiome

Commercial veterinary products

Postbiotics → are the beneficial byproducts of fermentation when probiotics break down prebiotics

Image from Shutterstock

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Do they work?

A Randomized Double Blinded Placebo-Controlled Clinical Trial of a Probiotic or Metronidazole for Acute Canine Diarrhea

frontiers in Veterinary Science

Justin Shmalberg[1], Christina Montalbano[1], Giada Morelli[2] and Gareth J. Buckley[3]*

UF UNIVERSITY of FLORIDA

60 dogs with acute diarrhea

Measured timeline to 1st normal stool

P = .017

Not-significant

Probiotic: 3.5 ± 2.2 days

Metronidazole: 4.6 ± 2.4 days

Placebo: 4.8 ± 2.9 days

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COLORADO STATE UNIVERSITY

Topics in Compan An Med 32 (2017) 100–103

Regular articles

Evaluation of Metronidazole With and Without *Enterococcus Faecium* SF68 in Shelter Dogs With Diarrhea

Audra Fenimore, DVM, MS[1], Laura Martin, DVM, Michael R. Lappin, DVM, PhD, DACVIM*

48 dogs with diarrhea in a shelter-environment

Treatment groups:

Group 1: GI diet (Purina ProPlan Chicken & Rice) + Metronidazole + Placebo
- normal stool in 37.5% of dogs by day 7

Group 2: GI diet (Purina ProPlan Chicken & Rice) + Metronidazole + Probiotic
- normal stool in 65.6% of dogs by day 7

% of days with normal stool was significantly greater in those that received metro + probiotic vs metro alone

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JAVMA

AVMA

Randomized controlled trial demonstrates nutritional management is superior to metronidazole for treatment of acute colitis in dogs

Adam J. Rudinsky, DVM, MS, DACVIM[1,2]*; Valerie J. Parker, DVM, DACVIM[1,2]; Jenessa Winston, DVM, PhD, DACVIM[1,2]; Edward Cooper, DVM, MS, DACVECC[1]; Tamra Mathie, RVT[1]; James P. Howard, DVM, MS, DACVS[1,2];

59 dogs with non-infectious acute colitis/diarrhea

Treatment groups:

Group 1: GI diet (non-commercial) + Placebo
Group 2: GI diet (non-commercial) + Metronidazole
Group 3: Psyillium-enriched GI diet (non-commercial) + Placebo

Days to "Remission":

Group 1: 5 days (range: 4-10)
Group 2: 8.5 days (range: 7-12)
Group 3: 5 days (range: 3-6)

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Table 1
Summary of studies reviewed for their assessment of the use of metronidazole for treatment of acute diarrhea.

Study, year published	Population	Study design	Sample size (n)	Control	Treatment	Outcomes assessed	Results
Fenimore et al. 2017[77]	Shelter dogs with AD	Prospective, randomized, placebo-controlled, blinded treatment trial	32 dogs without systemic illness, fever	Yes	MTZ +/- FortiFlora®, +/- additional deworming	Number of normal stools	Dogs given FortiFlora® and MTZ had more normal stool than dogs on MTZ alone
Ortiz et al. 2018[78]	Dogs with AHDS requiring hospitalization	Prospective, randomized, placebo-controlled, blinded treatment trial	34 dogs, diarrhea of <3 days, receiving A/C	Yes	A/C, IV fluids, buprenorphine, omeprazole, and either MTZ or saline	Hospitalization time, scoring of disease severity	No significant difference in either outcome among groups
Pignataro et al. 2021[14]	Dogs with AD	Prospective, randomized, single-blinded treatment trial	30 dogs without comorbidities	No	MTZ-spiramycin combo vs. synbiotic	Time to resolution of diarrhea	Synbiotic group recovered one day faster
Shmalberg et al. 2019[17]	Dogs with AD	Double-blinded, placebo controlled, randomized clinical trial	60 dogs without comorbidities or severe AHDS	Yes	MTZ vs. placebo vs. probiotic	Number of days until first formed stool	No significant difference among any groups
Langlois et al. 2020[7]	Dogs with AD without evidence of infection by parasites, Giardia, or parvovirus	Double-blinded, placebo controlled, randomized clinical trial	31 dogs, 14 treated with MTZ, 17 as control	Yes	MTZ vs. placebo	Time to resolution of diarrhea	Dogs treated with MTZ had diarrhea resolve about 36 hours earlier than dogs treated with placebo
Chaitman et al. 2020[15]	Dogs with AD	Prospective clinical trial	18 dogs, 11 FMT, 7 MTZ	Yes	FMT vs. MTZ	qPCR canine dysbiosis index, fecal consistency at day 7 and day 28	Dysbiosis index increased in MTZ dogs and decreased in FMT dogs. Persistent dysbiosis was noted at day 28 in MTZ dogs.
Rudinsky et al., 2022[16]	Dogs with AD	Prospective, randomized, blinded clinical trial	59 dogs, 19 diet, 20 diet and MTZ, 20 diet and fiber	Yes	Diet with MTZ vs. diet with supplemental fiber	Time to resolution of diarrhea, fecal score, relapse, qPCR canine dysbiosis index	MTZ group had longer time to resolution of diarrhea and a worse dysbiosis index at days 7 to 10

Ellis et al. Topics in Companion An Med. 2023; 56-57: 100824

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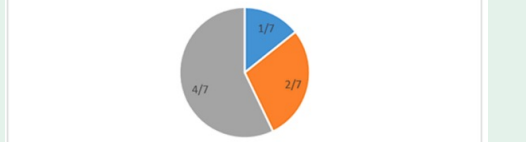

Fig. 1. Summary of the outcome of treatment of acute diarrhea with metronidazole in 7 veterinary studies.

Ellis et al. Topics in Companion An Med. 2023; 56-57: 100824

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Metronidazole Alternatives for Infectious Diarrhea

	Metronidazole	Fenbendazole
Giardia	+	++
Hookworms	-	+
Whipworms	-	+
Roundworms	-	+
Other agents	-	-

Based on CAPC Treatment Recommendations

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My Recommendations for Acute Diarrhea - Mild

Photo by Karah Burns

Generally treated with supportive/symptomatic care

Minimal diagnostics are indicated unless the dog:
- is moderate to severely affected
- fails to respond to initial treatment
- is a repeat offender

Fecal diagnostics &/or empiric deworming

- Highly digestible diet (often labelled 'gastrointestinal')
- Multi-strain pre-and pro-biotic ("symbiotic")
  - Kaolin and pectin to firm up the stool NOW
- Consider fiber supplementation (especially if large bowel)

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Considerations When Picking a Probiotic

"There are a lot of products that don't specify what organisms they contain or what the expected colony-forming units are, so that can be a **huge tip-off that you're not dealing with a product that is going to meet minimum standards**. You can avoid this by using reputable companies."

"A multi-strain probiotic is preferable to a single-strain probiotic"

Sara Jablonski, DVM, PhD, DACVIM (SAIM)

In: Probiotics & beyond: clinical decision-making in balancing the microbiome. Clinicians' forum.

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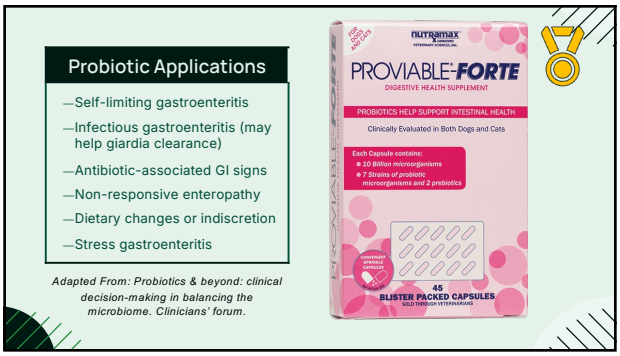

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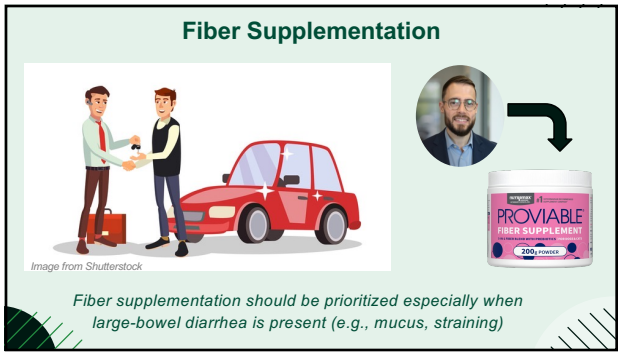

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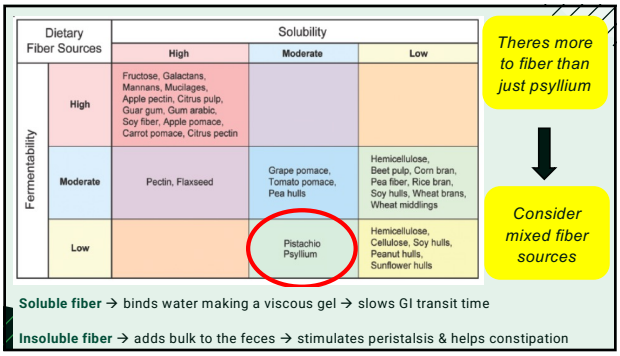

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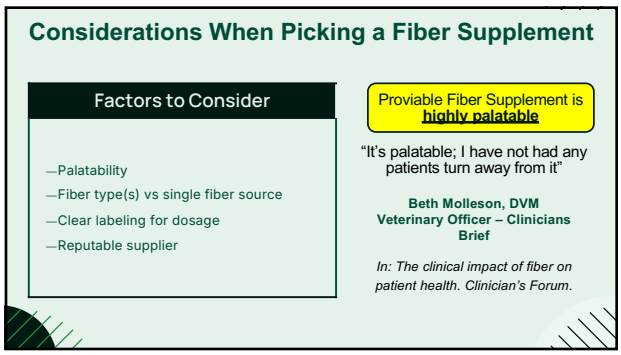

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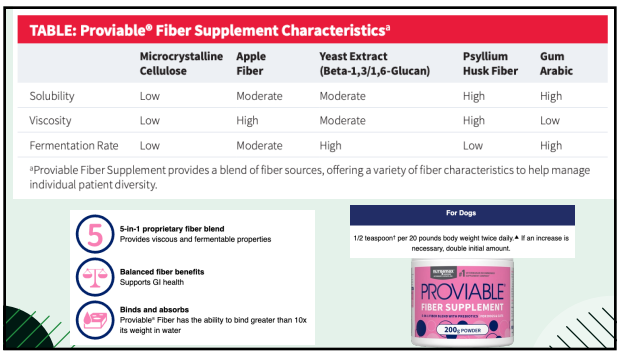

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Ok So What Happens if the Dog has Moderate to Severe Acute Diarrhea

→ Additional diagnostics are indicated to rule in or out DDx that may be treated differently

→ Evaluation of minimum database & imaging may be considered a 'red flag' hunt before instituting more aggressive supportive and symptomatic care (chem, fecal, cortisol > CBC)

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Treatment Moderate to Severe Acute Diarrhea

- IV Fluid therapy ± additives (electrolytes, B vitamins)
- ± Anti-emetics / anti-nausea → esp. in the face of vomiting or hyporexia
- Highly digestible diet → may need placement of a feeding tube
- Probiotics / Fiber (esp. if large bowel)
- Time
- Etiology specific treatments (if underlying cause is identified)

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Are There Ways to Mitigate AEs from Antibiotics (if used)?

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DOI: 10.1111/jvim.15553

STANDARD ARTICLE

Journal of Veterinary Internal Medicine ACVIM

Randomized, contro… antibiotic-induced g… mixture in healthy re…

frontiers in Veterinary Science

ORIGINAL RESEARCH

Jacqueline C. Whittemore[1]

Effects of Synbiotics on the Fecal Microbiome and Metabolomic Profiles of Healthy Research Dogs Administered Antibiotics: A Randomized, Controlled Trial

Jacqueline C. Whittemore[1*], Joshua M. Price[2], Tamberlyn Moyers[1] and Jan S. Suchodolski[2*]

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Are There Ways to Mitigate AEs from Antibiotics?

Sprinkle Capsule

Mycequin (*Saccharomyces boulardii*)

- Mycequin chewable tables contain *Saccharomyces boulardii* and beta-glucan (immune-modulating compound)
- Yeast are larger than bacteria and interact with different host receptors causing a different antigenic response
- Yeast are resistant to low pH, bile salts, and GI enzymes, allowing them to get to the site of action in the large intestine
- Yeast are naturally resistant to antibiotics → can be given concurrent to antibiotics (no need to separate out timing of meds) + they don't risk promotion of antimicrobial resistant populations

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"Results indicate that *S. boulardii* is a promising probiotic agent that can be used for protection against and **management of AAD** [antibiotic associated diarrhea] and **in addition to** standard therapy in dogs with **IBD**."

Ziese and Suchodolski. Saccharomyces boulardii: a new probiotic approach in veterinary medicine. In: Clinical Notes. December 2018

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Key Points / Conclusions

- Acute diarrhea is a common cause of veterinary visits & the no. of cases is likely under-estimated.
- Talking with clients about GI signs at annual appointments may identify cases that would benefit from probiotics or fiber to be used on an as-needed basis.
- Antibiotics should not be used indiscriminately in cases of acute diarrhea but may be needed in specific cases.
- Dietary manipulation, probiotics, pre-biotics, and fiber supplementation offer promising ways to control clinical signs without the risk of promoting antimicrobial resistance, dysbiosis, or potentially long-standing clinical impacts that are yet to be fully understood.
- Multi-strain probiotics from reputable manufacturers are preferred.
- Mixed fiber supplements offer huge promise in the management of large bowel diarrhea and can also be used for other GI signs. Psyllium offers a single source of fiber.
- Probiotics (esp. S. boulardii) can help manage antibiotic associated diarrhea and could be useful as an adjunctive agent in some chronic enteropathy cases.

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