



RESEARCH PAPER

Canine Chronic Enteropathy in Dogs and Risk Factors Determine the Disease

Sumedh Dongre¹, Prasad Wadajkar², Shalini Gangwar^{2*} Gudaghe Hrishikesh Balasaheb²

¹*Assistant Professor, Mahatma Gandhi Veterinary College, Bharatpur

²Ph.D. Scholar, Indian Veterinary Research Institute, Izatnagar, Bareilly.

*Corresponding Author: Shalinigangwar132@gmail.com

ORCID ID: <https://orcid.org/0009-0000-7795-7570>

Abstract

Canine chronic enteropathy (CE) is a complex gastrointestinal disease that presents with persistent or recurrent signs of diarrhea, vomiting, inappetence and weight loss for greater than three weeks. The etiology is not fully elucidated and involves complex interactions between genetic predisposition, immune system dysregulation, environmental factors, the gut microbiome and compromised epithelial barriers. Genetic polymorphisms of immune-related genes, notably TLR4, TLR5, and NOD2, might be involved in atypical host-microbiota interactions and sustained intestinal inflammation. Infections in early life and previous gastrointestinal problems may also contribute to the susceptibility of disease. Intestinal dysbiosis, alterations in intestinal microbial metabolites, bile acid imbalances, and reduced synthesis of short-chain fatty acids can lead to disruption of intestinal homeostasis and mucosal integrity. Diagnosis is clinical and based on exclusion of other causes of gastrointestinal disease and clinical observations, laboratory findings and response to treatment. CE are classified into food-responsive, antibiotic-responsive, immunosuppressant-responsive and non-responsive enteropathies according to their response to therapy. Hypoalbuminemia, hypocobalaminemia and vitamin D insufficiency may be important prognostic information. The Canine Inflammatory Bowel Disease Activity Index and Canine Chronic Enteropathy Clinical Activity Index are useful for the assessment of disease severity. Effective disease management requires an individualized and comprehensive diagnosis and treatment plan. Further research into genetic predisposition, microbiome changes, and disease markers may improve diagnostic accuracy and long-term health outcomes in dogs with this condition.

KEYWORDS:

Canine chronic enteropathy; Genetic predisposition; Intestinal dysbiosis; Immune dysregulation; Risk factors.

ARTICLE HISTORY

Received: 01 October 2026

Revised: 12 October 2026

Accepted: 15 October 2026

Published: 19 October 2026

CITATION

Gangwar, S., (2026). Canine Chronic Enteropathy in Dogs and Risk Factors Determine the Disease. *International Journal of Agro Frontier Research and Innovation (IJAFRI)*, 1(2), 11-14 <https://doi.org/10.71371/ijafri.1211-14>

Introduction

Canine chronic enteropathy (CE) is a functional gastrointestinal disorder marked by prolonged and recurrent symptoms exceedingly more than 3 weeks that includes

diarrhoea, vomiting, reduced appetite, and weight loss (Dandrieux et al., 2019). The underlying mechanisms of CE remain incompletely understood; however, it is hypothesized



to result from a multifaceted interaction among genetic predisposition, environmental factors, the intestinal microbiota, and immune system dysregulation (Allenspach, 2011). The diagnosis of CE is established through a process of exclusion, ruling out other potential causes of persistent gastrointestinal symptoms. These include parasitic and infectious diseases, as well as endocrine, hepato-pancreatic, renal disorders and mechanical obstructions that may contribute to similar clinical manifestations (Simpsons and Jergens, 2011). Based on treatment response CE classified into food-responsive CE (FRE), antibiotic-responsive CE (ARE), immunosuppressant-responsive CE (IRE), or non-responsive (NRE) (Makielski et al., 2019). When protein loss through the intestinal wall results in hypoalbuminemia, the condition is referred to as protein-losing gastroenteropathy (PLE).

Factors Causes of CE

• Immune Dysregulation

Major contributing factor, similar to inflammatory bowel disease (IBD) in humans. Defects in pattern recognition receptors, specifically Toll-like receptors (TLR-4) and TLR5, have been associated with a breed-specific form of CE in German Shepherd Dogs (GSDs). A risk-associated TLR5 haplotype in GSDs results in hyper-responsiveness to flagellin. Mutations and altered mRNA expression of NOD2 have also been observed in IBD in GSDs (Kathrani et al., 2011). Evidence of immunological dysfunction also includes the expression of mucosal nitrite and increased inducible nitric oxide synthase (iNOS)-expressing cells in dogs with idiopathic IBD and granulomatous colitis (GC). MicroRNAs (miRNAs) are involved, with dysregulated tissue miRNA profiles observed in dogs with large intestinal IBD, similar to human IBD (Cader and Kaser, 2013).

• Genetic Predisposition

Mutations in genes regulating immune responses and intestinal barrier integrity contribute to disease development. Variants in TLR genes, particularly TLR4 and TLR5, as well as NOD2, have been associated with abnormal recognition of intestinal microbes, leading to inappropriate immune activation and chronic inflammation (Masaki et al., 2024). Additionally, genetic defects may impair mucosal immunity and tolerance to dietary or microbial antigens. These inherited abnormalities cause dysregulated interactions between the hosts immune system and gut microbiota, resulting in persistent intestinal inflammation (Jergens et al., 2009). Overall, CE is considered a multifactorial disease, where genetic factors interact with environmental influences such as diet, microbiota composition, infections to determine disease inception, progression and treatment response. Other breed-associated gastrointestinal ailments with a suspected genetic basis include Shar Peis with cobalamin deficiency and Irish Setters with gluten-sensitive enteropathy (Wilke et al., 2012).

• Environmental Factors and Early Life Exposures

The canine CE exposome (life-course of environmental effects or modulators of disease risk) is still being explored. Early life exposures can impact the intestinal microbiome and host response, influencing disease risk later in life. Canine parvovirus infection has been linked to an increased risk of developing CE (Allenspach et al., 2007). Dogs experiencing an episode of acute haemorrhagic diarrhoea were at increased risk for developing chronic GI disease later. These observations support a two-hit model for IBD pathogenesis, involving both genetic and environmental factors (Kaser et al., 2010).

Table 1.2 Types of CE and possible mechanism causes them

Type	Response to Treatment	Possible Mechanism	Prognosis
Food-Responsive Enteropathy (FRE)	Improves with dietary variation (novel or hydrolysed diet)	Adverse reaction to dietetic antigens	Excellent
Antibiotic-Responsive Enteropathy (ARE)	Improves with antibiotics (e.g., tylosin, metronidazole)	Gut microbiota disparity (dysbiosis)	Good
Immunosuppressant-Responsive Enteropathy (IRE)	Requires corticosteroids or other immunosuppressants	Immune-mediated intestinal inflammation	Moderate
Non-Responsive Enteropathy (NRE)	No response to diet, antibiotics, or immunosuppressants	Severe intestinal pathology or neoplasia (e.g., lymphoma)	Poor

• Microbiome and Metabolome Dysregulation

Intestinal dysbiosis, characterized by shifts in microbial composition, reduced species diversity, and changes in the

proportion of certain microbes, is associated with mucosal inflammation and GI dysfunction Increased mucosal *E. coli* and decreased *Helicobacter* spp. and *Akkermansia* spp. in

the colon have been observed in dogs with CE. Bile acid (BA) dysmetabolism can also trigger chronic mucosal inflammation, with decreased *Peptacetobacter* (*Clostridium*) *hiranonis* leading to increased pro-inflammatory primary BAs in the colon. Short-chain fatty acids (SCFAs), crucial for colonocytes and epithelial barrier function, are derived from bacterial fermentation, and their producing bacteria are decreased in dogs with chronic diarrhea (Pilla et al., 2019). Dogs with CE often show reduced relative abundances of *Bacteroidetes*, *Fusobacterium* spp., and *Firmicutes*, and an increased abundance of *Proteobacteria* in fecal samples. Functional changes in the microbiome have also been reported, with differences in the fecal microbiome and serum metabolome in dogs with idiopathic CE (Rivière et al., 2016).

• Impaired Intestinal Epithelial Barrier

A key element in pathogenesis is an impaired intestinal epithelial barrier, which contributes to the loss of immunological tolerance. This impairment has been investigated through sugar permeability testing (Ardicli et al., 2024). Hypovitaminosis B12 (Cobalamin Deficiency). While not a cause, hypo-cobalaminemia is a frequent finding (19-54% of CE cases, 22-75% of PLE cases) and presumed to be result from distal small intestinal cobalamin malabsorption or secondary small intestinal dysbiosis (Borgonovi and Bayton, 2025). However, recent studies suggest cobalamin receptor downregulation is not the primary cause, with overexpression of receptor subunits observed as a compensatory mechanism. To assess disease severity in dogs with CE, two clinical scoring systems are used CIBDAI and the CCECAI have been established. Negative prognostic indicators for CE include hypoalbuminemia, hypo-cobalaminemia, vitamin D

deficiency, severe endoscopic duodenal and rectal lesions have high CIBDAI score.

Conclusion

CE is a multifactorial gastrointestinal condition in which genetic susceptibility, environmental exposures, alterations in the intestinal microbiota, immune system abnormalities, and disruption of the intestinal barrier may collectively contribute to disease development. Although considerable progress has been made in understanding these factors, the underlying pathogenesis of CE remains only partially understood. Categorizing affected dogs according to their response to treatment, including dietary modification, antibiotic therapy, and immunosuppressive treatment, is important for selecting appropriate management strategies and predicting clinical outcomes. In addition, abnormalities such as hypcobalaminemia, hypoalbuminemia, and vitamin D deficiency may provide useful information about disease severity and prognosis. Clinical scoring systems, particularly the Canine Inflammatory Bowel Disease Activity Index (CIBDAI) and the Canine Chronic Enteropathy Clinical Activity Index (CCECAI), assist in assessing disease activity and monitoring responses to therapy. Nevertheless, differences in disease presentation and treatment outcomes emphasize the need for a comprehensive, individualized approach to diagnosis and management. Further research into host—microbiota interactions, genetic factors, intestinal barrier integrity, and disease-associated biomarkers may improve understanding of CE and support the development of more precise therapeutic interventions. Ultimately, integrating clinical findings with advances in molecular and microbiome research could contribute to improved disease management, better long-term outcomes, and enhanced quality of life for affected dogs.

References

Allenspach, K. 2011. Clinical immunology and immunopathology of the canine and feline intestine. *Veterinary Clinics: Small Animal Practice*, 41(2), pp.345-360.

Allenspach, K., Wieland, B., Gröne, A. and Gaschen, F., 2007. Chronic enteropathies in dogs: evaluation of risk factors for negative outcome. *Journal of veterinary internal medicine*, 21(4), pp.700-708.

Ardicli, S., Ardicli, O., Yazici, D., Pat, Y., Babayev, H., Xiong, P., Zeyneloglu, C., Garcia-Sanchez, A., Shi, L. L., Viscardi, O. G., Skolnick, S., Ogulur, I., Dhir, R., Jutel, M., Agache, I., Janda, J., Pali-Schöll, I., Nadeau, K. C., Akdis, M., & Akdis, C. A. (2024). Epithelial barrier dysfunction and associated diseases in companion animals: Differences and similarities between humans and animals and research needs. *Allergy*, 79(12), 3238—3268. <https://doi.org/10.1111/all.16343>.

Borgonovi, S., & Bayton, W. (2025). Prevalence of hypcobalaminemia and hypercobalaminemia in a referral population of cats in the UK and its relevance to clinical

presentation, diagnosis and prognosis. *Journal of feline medicine and surgery*, 27(7), 1098612X251341539. <https://doi.org/10.1177/1098612X251341539>

Cader, M.Z. and Kaser, A., 2013. Recent advances in inflammatory bowel disease: mucosal immune cells in intestinal inflammation. *Gut*, 62(11), pp.1653-1664.

Dandrieux, J. R. S., Martinez Lopez, L. M., Prakash, N., & Mansfield, C. S. (2019). Treatment response and long term follow up in nineteen dogs diagnosed with chronic enteropathy in Australia. *Australian Veterinary Journal*, 97(9), 301-307.

Jergens, A.E., Sonea, I.M., O'Connor, A.M., Kauffman, L.K., Grozdanic, S.D., Ackermann, M.R. and Evans, R.B., 2009. Intestinal cytokine mRNA expression in canine inflammatory bowel disease: a meta-analysis with critical appraisal. *Comparative medicine*, 59(2), pp.153-162.

Kaser, Arthur, Sebastian Zeissig, and Richard S. Blumberg. "Genes and environment: how will our concepts on the pathophysiology of IBD develop in the future?" *Digestive diseases* 28, no. 3 (2010): 395-405.

Kathrani, A., Werling, D. and Allenspach, K., 2011. Canine breeds at high risk of developing inflammatory bowel disease in the south eastern UK. *Veterinary Record*, 169(24), pp.635-635.

Makielski, K., Cullen, J., O'Connor, A. and Jergens, A.E., 2019. Narrative review of therapies for chronic enteropathies

in dogs and cats. *Journal of veterinary internal medicine*, 33(1), pp.11-22

Masaki, S., Masuta, Y., Honjo, H., Kudo, M., & Watanabe, T. (2024). NOD2-mediated dual negative regulation of inflammatory responses