

Crohn's Disease Microbiome Protocol

Evidence-based dietary, probiotic, and supplement strategies
to support remission, reduce recurrence, and restore gut health

Covers: Crohn's Disease / Dietary Therapy / Postoperative Prevention / Flare Reduction

Based on 16 systematic reviews, meta-analyses, and RCTs | Published March 2026

What This Protocol Addresses

Crohn's disease (CD) is a chronic inflammatory bowel disease that can affect any part of the gastrointestinal tract, from mouth to anus, though it most commonly involves the terminal ileum and colon. Unlike ulcerative colitis, which is limited to the colon's surface, Crohn's involves transmural inflammation that penetrates the full thickness of the intestinal wall. This means CD can cause complications that go far beyond surface inflammation: strictures (narrowing), fistulae (abnormal tunnels between organs), and abscesses.

This protocol targets the **gut microbiome dysfunction** that both drives and results from Crohn's inflammation. Research consistently shows that CD patients have reduced microbial diversity, depleted anti-inflammatory bacteria (especially *Faecalibacterium prausnitzii*), and overgrowth of pathogenic species. Correcting these imbalances through dietary therapy, targeted supplementation, and careful probiotic selection can meaningfully support remission alongside medical treatment.

Important: This protocol complements medical treatment. It does not replace it.

Crohn's disease is a serious condition requiring professional management. CD can cause strictures, fistulae, abscesses, and bowel obstruction. This protocol is designed to be used **alongside** your gastroenterologist-prescribed treatments (biologics, immunomodulators, corticosteroids, 5-ASA agents). Never stop or reduce prescribed medications without consulting your doctor. The strategies here have the strongest evidence when used as adjuncts to standard therapy.

A Key Difference From Ulcerative Colitis

In UC, multi-strain probiotic formulas (like VSL#3) have strong RCT evidence for inducing and maintaining remission. In Crohn's disease, the evidence is fundamentally different. A 2020 Cochrane review found only two small trials (46 total participants) testing probiotics for CD induction, with very low certainty evidence showing no benefit. A 2024 meta-analysis of 45 RCTs confirmed that probiotics are not effective for CD maintenance (OR 1.49, 95% CI 0.64-3.50). This is why our protocol leads with **dietary therapy**, which has far stronger evidence in CD, and recommends only the one probiotic with positive CD-specific data: *Saccharomyces boulardii*.

Sources: Limketkai et al. (2020) Cochrane Database Syst Rev. DOI: 10.1002/14651858.CD006634.pub3; Estevinho et al. (2024) United Eur Gastroenterol J. DOI: 10.1002/ueg2.12636.

The CD Microbiome Fingerprint

Understanding which bacteria are depleted and which are overgrown in CD is the foundation for targeted intervention. CD dysbiosis is characterized by reduced species richness, a collapse of anti-inflammatory butyrate producers, and blooming of oxygen-tolerant pathobionts that thrive in the inflamed gut environment.

What Is Depleted in CD

Bacterium	Role	How to Restore
F. prausnitzii	Top butyrate producer; secretes MAM protein that inhibits NF-κB signaling	Inulin/FOS, resistant starch, Mediterranean diet, reduce processed food
Roseburia spp.	Major butyrate producer; co-depleted with F. prausnitzii in CD	Resistant starch, whole grains (during remission), psyllium
Bifidobacterium spp.	Immune modulation; barrier support; cross-feeds butyrate producers	GOS, inulin/FOS, fermented foods (during remission)
Clostridium clusters IV/XIVa	SCFA production; drive Treg differentiation; maintain mucosal tolerance	Dietary fiber diversity; 30+ plant foods per week
Bacteroides fragilis	PSA induces IL-10-producing Tregs via TLR-2 on dendritic cells	Plant polysaccharides; diverse vegetable intake

What Is Overgrown in CD

Bacterium	Problem	What Helps
Adherent-invasive E. coli (AIEC)	Invades via M cells; promotes Th17; persists in macrophages; drives TNF-alpha	CDED diet excludes emulsifiers that promote AIEC adhesion
Enterobacteriaceae	Bloom in inflammatory, oxygen-rich environment; linked to postoperative recurrence	Reduce inflammation; restore anaerobic environment via butyrate
Ruminococcus gnavus	Mucolytic; degrades protective mucus layer; expands during flares	Restore microbial diversity to limit niche dominance
Fusobacterium nucleatum	Pro-inflammatory; associated with disease severity and CRC risk	Competitive exclusion via multi-strain diversity

Sources: Caparros et al. (2021) Gut Microbes. DOI: 10.1080/19490976.2021.1949096; Quevrain et al. (2015) Gut. DOI: 10.1136/gutjnl-2014-307649.

F. prausnitzii: The Sentinel Bacterium

Faecalibacterium prausnitzii deserves special attention in any CD protocol. It is the single most consistently depleted bacterium in Crohn's disease, and its abundance (or lack thereof) predicts postoperative recurrence. In 2015, researchers identified the specific protein responsible for its anti-inflammatory effects: a 15 kDa molecule called MAM (Microbial Anti-inflammatory Molecule) that directly inhibits the NF-κB signaling pathway in intestinal epithelial cells.

Why *F. prausnitzii* Matters So Much in CD

F. prausnitzii is the most abundant bacterium in the healthy human colon, comprising up to 5-15% of total bacteria. In CD patients, its abundance drops dramatically. Low *F. prausnitzii* levels predict relapse after surgery and are associated with more severe disease course. Its MAM protein inhibits NF-κB (the master inflammatory switch) with a dose-dependent effect. You cannot currently take *F. prausnitzii* as a supplement because it is an obligate anaerobe that dies on contact with oxygen. Instead, this protocol focuses on feeding and supporting *F. prausnitzii* through prebiotics and dietary strategies.

How to Support *F. prausnitzii* Growth

Strategy	Mechanism	Evidence
Inulin/FOS (2-5g, build slowly)	Selectively fermented by <i>F. prausnitzii</i> ; direct prebiotic fuel	Multiple in vitro and in vivo studies show dose-dependent growth
Resistant starch (cooked/cooled rice, potatoes)	Fermented to butyrate by cross-feeding network including <i>F. prausnitzii</i>	Dietary intervention studies show increased <i>Faecalibacterium</i> abundance
Mediterranean-style diet	High in plant polyphenols, fiber diversity, and olive oil; low in processed food	CDED design principles based on removing dietary triggers
Avoid emulsifiers (polysorbate 80, carboxymethylcellulose)	Emulsifiers disrupt mucus layer, promote AIEC adhesion, harm <i>F. prausnitzii</i> niche	Chassaing et al. showed emulsifiers induce dysbiosis in murine models

Sources: Quevrain et al. (2015) Gut. DOI: 10.1136/gutjnl-2014-307649; Caparros et al. (2021) Gut Microbes. DOI: 10.1080/19490976.2021.1949096.

Dietary Therapy: The Lead Intervention

Unlike UC where probiotics lead the evidence, in Crohn's disease **dietary therapy** has the strongest randomized controlled trial support. The Crohn's Disease Exclusion Diet (CDED) paired with partial enteral nutrition (PEN) produced 75.6% sustained remission at 12 weeks in a landmark 2019 RCT, significantly outperforming exclusive enteral nutrition (45.1%, $p=0.01$). A 2022 pilot RCT confirmed efficacy in adults (68% remission at week 6, 80% sustained at week 24).

The Crohn's Disease Exclusion Diet (CDED)

The CDED is a whole-food diet specifically designed to reduce exposure to dietary components that damage the microbiome and intestinal barrier. It was developed by Prof. Arie Levine's team and tested in multiple RCTs. The diet excludes processed foods, emulsifiers, wheat, dairy (except aged cheeses), animal fats, red and processed meat, maltodextrins, sulfites, and carrageenan. It emphasizes chicken, fish, eggs, rice, potatoes, fruits, vegetables, and olive oil. The CDED is paired with partial enteral nutrition (a polymeric formula like Modulen providing 25-50% of calories) to ensure adequate nutrition while the gut heals.

Study	Design	Key Results
Levine et al. (2019) Gastroenterology	RCT, n=74 children, mild-to-moderate CD, 12 weeks	Week 12 remission: 75.6% CDED+PEN vs 45.1% EEN ($p=0.01$; OR 3.77); tolerance: 97.5% vs 73.6%
Yanai et al. (2022) Lancet Gastroenterol Hepatol	Pilot RCT, n=44 adults, biologic-naïve, mild-to-moderate CD, 24 weeks	Week 6 remission: 68%; 80% sustained at week 24; 35% endoscopic remission; no serious adverse events
Sigall Boneh et al. (2024) Inflamm Bowel Dis	Comprehensive review of CDED evidence, implementation, and guidance	CDED established as evidence-based alternative to EEN; works in both pediatric and adult populations

CDED Implementation Phases

Phase 1 (Weeks 1-6, strict): CDED + 50% of calories from polymeric formula (Modulen, Ensure, or similar). This is the induction phase with the most restricted food list.

Phase 2 (Weeks 7-12, moderate): CDED + 25% of calories from formula. More foods are reintroduced gradually while maintaining the core exclusions.

Phase 3 (Week 13+, maintenance): Flexible CDED principles with broader food choices. Continue avoiding key triggers (emulsifiers, processed foods, excessive dairy) long-term.

Sources: Levine et al. (2019) *Gastroenterology*. DOI: 10.1053/j.gastro.2019.04.021; Yanai et al. (2022) *Lancet Gastroenterol Hepatol*. DOI: 10.1016/S2468-1253(21)00299-5; Sigall Boneh et al. (2024) *Inflamm Bowel Dis*. DOI: 10.1093/ibd/izad255.

Probiotic Selection for CD

Given the weak evidence for conventional bacterial probiotics in Crohn's disease, this protocol recommends a focused approach: *Saccharomyces boulardii*, the only probiotic with a positive RCT specifically for CD maintenance. *S. boulardii* is a beneficial yeast, not a bacterium, which gives it unique advantages for CD patients who frequently need antibiotics.

Saccharomyces boulardii: The CD-Specific Probiotic

In a 2000 RCT by Guslandi et al., 32 CD patients in remission were randomized to mesalamine alone vs. mesalamine + *S. boulardii* 1g/day for 6 months. The relapse rate was 37.5% with mesalamine alone vs. just 6.25% with *S. boulardii* added. While this is a small study that needs replication, it remains the only probiotic RCT showing a significant benefit specifically for CD maintenance. *S. boulardii* works through mechanisms distinct from bacterial probiotics: it degrades *C. difficile* toxins, stimulates secretory IgA, enhances brush border enzymes, and reduces TNF-alpha signaling.

Why S. boulardii Is Uniquely Suited to CD

Advantage	Why It Matters for CD
Antibiotic-resistant	<i>S. boulardii</i> is a yeast, unaffected by antibacterial antibiotics. CD patients often need antibiotics for abscesses, fistulae, or bacterial overgrowth.
C. difficile protection	Degrades <i>C. difficile</i> toxins A and B. CD patients on immunosuppressants are at elevated <i>C. difficile</i> risk.
Anti-inflammatory action	Reduces TNF-alpha and IL-6 via NF-kB modulation; distinct from bacterial probiotic pathways.
Secretory IgA boost	Stimulates mucosal IgA production, supporting the first line of barrier defense.
Safe with immunosuppression	Generally well-tolerated in immunosuppressed patients, though caution is warranted with central venous catheters (rare fungemia reports).

S. boulardii Dosing for CD

- Maintenance dose:** 250-500mg (5-10 billion CFU) once or twice daily
- During/after antibiotics:** 250mg twice daily, continue for 2 weeks after antibiotics end
- Look for:** CNCM I-745 strain (most studied). Common brands: Florastor, Jarrow Formulas.
- Caution:** Avoid in patients with central venous catheters or severe immunocompromise (risk of fungemia, though extremely rare).

Sources: Guslandi et al. (2000) Dig Dis Sci. DOI: 10.1023/a:1005588911207; Waitzberg et al. (2024) Adv Ther. DOI: 10.1007/s12325-024-02783-3.

Targeted Supplements

Vitamin D: The Priority Supplement for CD

Vitamin D deficiency affects 50-70% of Crohn's disease patients and is associated with increased disease activity, higher relapse rates, and accelerated bone loss (worsened by corticosteroid use). The landmark VITAL trial (n=25,871) showed that vitamin D supplementation at 2000 IU/day reduced autoimmune disease incidence by 22%. For CD patients specifically, vitamin D supports tight junction integrity, antimicrobial peptide production, and Th17/Treg immune balance.

Parameter	Recommendation
Starting dose	2000-4000 IU/day vitamin D3 (cholecalciferol)
Target blood level	25(OH)D > 30 ng/mL; optimal range 40-60 ng/mL
Testing frequency	Baseline, then every 3-6 months until target achieved
If severely deficient (<20 ng/mL)	Loading dose: 50,000 IU/week for 8 weeks, then maintenance. Coordinate with your doctor.
Absorption tip	Take with fat-containing meal for best absorption. CD patients with ileal disease may need higher doses due to malabsorption.

Omega-3 Fatty Acids (EPA + DHA)

A meta-analysis of RCTs found that omega-3 supplementation may slightly reduce IBD relapse risk (RR 0.85, 95% CI 0.72-1.01), with modest anti-inflammatory effects on CRP and IL-6. The VITAL trial showed a 15% autoimmune disease reduction with omega-3 alone. EPA and DHA support resolvins and protectin production, which actively promote mucosal healing resolution.

Omega-3 Dosing for CD

Dose: 2-4g EPA+DHA daily (combined). Enteric-coated fish oil preferred to reduce fishy aftertaste and GI irritation.

Take with meals containing fat for optimal absorption.

Alternative: Algal omega-3 for vegetarians/vegans (provides DHA; some include EPA).

Curcumin: A Cautious Adjunct

Curcumin (the active compound in turmeric) has strong evidence in ulcerative colitis but more limited data in Crohn's disease specifically. A 2020 systematic review noted that curcumin acts through NF-κB inhibition and TNF-alpha reduction, but large CD-specific RCTs are lacking. It can be considered as a low-risk adjunct, particularly during remission maintenance.

Curcumin Dosing for CD

Dose: 500mg-1g/day of curcumin extract during remission maintenance

Bioavailability: Standard curcumin is poorly absorbed. Use formulations with piperine (black pepper extract), phospholipid complexes (Meriva), or nano-curcumin.

Note: Evidence is stronger for UC than CD. Use as adjunct, never as replacement for prescribed medications.

Sources: Hahn et al. (2022) BMJ. DOI: 10.1136/bmj-2021-066452; Ajabnoor et al. (2020) Eur J Nutr. DOI: 10.1007/s00394-020-02413-y; Goulart et al. (2020) J Med Food. DOI: 10.1089/jmf.2020.0129; O'Sullivan (2016) Expert Rev Gastroenterol Hepatol. DOI: 10.1586/17474124.2016.1120157.

The Protocol: Two Phases

This protocol is designed for patients with mild-to-moderate CD who are in early remission or have recently achieved remission with medical therapy. Phase 1 focuses on dietary induction and foundational supplementation. Phase 2 transitions to long-term maintenance. Always coordinate changes with your gastroenterologist.

Phase 1: Calm and Nourish (Weeks 1-8)

Category	What to Take/Do	When	Notes
Diet	CDED Phase 1 + partial enteral nutrition (PEN)	All meals	50% calories from formula (weeks 1-6), then 25% (weeks 7-8)
S. boulardii	250-500mg daily	With a meal	CNCM I-745 strain preferred; continue through any antibiotics
Vitamin D3	2000-4000 IU/day	Morning with fat	Test 25(OH)D; target 40-60 ng/mL. Load if deficient.
Omega-3	2g EPA+DHA daily	With meals	Enteric-coated fish oil preferred; reduces GI irritation

Phase 2: Sustain and Diversify (Weeks 9-16+)

Category	What to Add or Adjust	Notes
Diet transition	Move to CDED Phase 2/3; reduce formula to 25% or less	Gradually reintroduce foods while maintaining core exclusions
Add curcumin (optional)	500mg-1g/day curcumin extract	Use piperine or phospholipid form; adjunct only
Introduce prebiotics	Start inulin/FOS at 2g/day; build to 5g over 4-6 weeks	Feeds <i>F. prausnitzii</i> directly; stop if symptoms worsen
Expand diet diversity	Aim for 30+ different plant foods per week	Fiber diversity directly correlates with microbiome diversity
Maintain S. boulardii	250mg daily long-term	Especially important if history of <i>C. difficile</i> or frequent antibiotics
Omega-3 maintenance	2-4g EPA+DHA daily	Continue indefinitely; anti-inflammatory and resolvins support

Sources: Levine et al. (2019) *Gastroenterology*. DOI: 10.1053/j.gastro.2019.04.021; Guslandi et al. (2000) *Dig Dis Sci*. DOI: 10.1023/a:1005588911207; Hoteit et al. (2025) *Nutrients*. DOI: 10.3390/nu17040708.

CDED Food Guide

The Crohn's Disease Exclusion Diet targets specific dietary components that research has linked to microbiome disruption and intestinal barrier damage. Here is a practical guide to what to eat and what to avoid during each phase.

Phase 1: Allowed Foods

Category	Allowed
Proteins	Chicken breast, fish (salmon, cod, tilapia), eggs, tofu
Grains	White rice, rice noodles, rice cakes, potatoes (not fried)
Fruits	Bananas, melons, strawberries, blueberries, peeled apples
Vegetables	Carrots, squash, zucchini, cucumbers (peeled), green beans, spinach
Fats	Olive oil (primary fat), coconut oil in small amounts
Formula	Modulen, Ensure, or similar polymeric formula (50% of calories)

What to Avoid (All Phases)

Avoid	Why
Emulsifiers (polysorbate 80, CMC, carrageenan)	Disrupt mucus layer; promote AIEC adhesion; induce dysbiosis in animal models
Wheat and gluten-containing grains	Wheat germ agglutinin increases intestinal permeability
Dairy (except aged/hard cheeses)	Lactose malabsorption common in CD; dairy fat may promote inflammation
Red and processed meat	High in sulfur amino acids; promote sulfate-reducing bacteria (H ₂ S production)
Processed/packaged foods	Contain maltodextrins, artificial sweeteners, and other additives that disrupt microbiome
Alcohol	Increases intestinal permeability; disrupts microbial balance; hepatotoxic with medications

CD Recovery Bone Broth Protocol

Bone broth provides L-glutamine (enterocyte fuel), collagen (tissue repair), and easily absorbable minerals. It is particularly valuable during Phase 1 when the diet is most restricted. To make: simmer chicken or beef bones with apple cider vinegar (2 tbsp per quart of water) for 12-24 hours. Strain and season with turmeric and ginger for additional anti-inflammatory benefit. Consume 1-2 cups daily, especially during flare recovery.

Sources: Sigall Boneh et al. (2024) Inflamm Bowel Dis. DOI: 10.1093/ibd/izad255.

Tracking Your Progress

Metric	How to Track	Target	Frequency
Fecal Calprotectin	Stool test (at-home kits available)	Below 150 mcg/g; remission below 50 mcg/g	Every 3 months, or if symptoms change
CRP / ESR	Blood test via doctor	CRP below 5 mg/L	Every 3-6 months
Vitamin D 25(OH)D	Blood test	40-60 ng/mL	Every 3-6 months until target achieved
Stool Frequency and Consistency	Daily diary	1-3 formed stools/day; no blood or urgency	Daily tracking
Body Weight	Scale + food diary	Stable weight; adequate caloric intake	Weekly weigh-ins; labs every 6 months
CDAI or HBI	Symptom questionnaire via gastroenterologist	CDAI < 150 or HBI < 5 = clinical remission	Every clinic visit

Fecal calprotectin is your most important number.

This biomarker directly reflects intestinal inflammation and is more sensitive than symptoms alone. Many CD patients feel 'fine' while subclinical inflammation continues to cause stricturing or fistulizing damage. A rising calprotectin (even without symptoms) should prompt discussion with your gastroenterologist. At-home test kits are now available from several companies. In CD, calprotectin is especially useful for monitoring postoperative recurrence at the anastomotic site.

Nutritional Monitoring

Crohn's disease uniquely threatens nutritional status through malabsorption (especially with ileal disease), reduced intake during flares, and medication side effects. A 2025 RCT found that probiotic supplementation improved body weight, BMI, and nutritional markers (calcium, riboflavin, folate) in CD patients. Monitor these additional markers:

Nutrient	Why It Matters in CD	How to Monitor
Iron / Ferritin	Chronic blood loss and malabsorption cause iron deficiency anemia in ~40% of CD patients	Serum ferritin + transferrin saturation every 3-6 months
Vitamin B12	Terminal ileum disease or resection impairs B12 absorption	Serum B12 annually; methylmalonic acid if borderline

Nutrient	Why It Matters in CD	How to Monitor
Folate	Methotrexate depletes folate; sulfasalazine impairs absorption	Serum folate annually; supplement if on MTX
Zinc	Depleted by diarrhea and inflammation; needed for mucosal healing	Serum zinc annually; supplement 15-30mg if low

Sources: Hoteit et al. (2025) Nutrients. DOI: 10.3390/nu17040708; Forbes et al. (2016) ESPEN guideline. DOI: 10.1016/j.clnu.2016.12.027.

Advanced: Fecal Microbiota Transplantation

Fecal microbiota transplantation (FMT) is an emerging clinical treatment for IBD. A 2026 meta-analysis of 6 RCTs (220-230 patients) found FMT significantly improved clinical remission vs controls (OR 3.24, 95% CI 1.43-7.41, $p=0.005$) and endoscopic response (OR 6.80, 95% CI 2.96-15.63, $p<0.0001$). However, most evidence comes from UC trials; CD-specific RCT data remains limited.

FMT is **not a DIY intervention**. It is performed under medical supervision at specialized centers. It may be appropriate for patients with moderate-to-severe CD who have not responded adequately to standard therapies. Discuss with your gastroenterologist if you are interested.

Source: Ikram et al. (2026) *Inflammopharmacology*. DOI: 10.1007/s10787-026-02174-w.

Postoperative Considerations

Up to 50% of CD patients will require surgery, and endoscopic recurrence at the anastomotic site occurs in 70-90% within the first year. The gut microbiome plays a central role: *F. prausnitzii* depletion and Enterobacteriaceae overgrowth after surgery predict recurrence. This protocol is especially relevant for postoperative patients.

Postoperative Protocol Priorities

1. Begin *S. boulardii* as soon as oral intake resumes (protects against *C. difficile* and antibiotic-associated dysbiosis)
2. Start vitamin D loading early (surgery depletes stores; target 40-60 ng/mL)
3. Transition to CDED as soon as solid food is tolerated (typically 2-4 weeks post-op)
4. Monitor fecal calprotectin at 3, 6, and 12 months to detect subclinical recurrence
5. Colonoscopy at 6-12 months per guidelines (Rutgeerts score assessment)

Sources: Caparros et al. (2021) *Gut Microbes*. DOI: 10.1080/19490976.2021.1949096; Shehab et al. (2026) *Inflamm Bowel Dis*. DOI: 10.1093/ibd/izaf186.

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Medical Disclaimer

This protocol is for educational purposes only and does not constitute medical advice. It is not intended to diagnose, treat, cure, or prevent any disease. Crohn's disease is a serious medical condition that can cause life-threatening complications including bowel obstruction, perforation, abscess, and fistulae. It requires professional management by a qualified gastroenterologist.

Always consult your gastroenterologist before starting any new supplement regimen or making changes to your treatment plan. Never stop or adjust prescribed medications (biologics, immunomodulators, corticosteroids, 5-ASA agents) without consulting your doctor. The strategies presented here are designed as adjuncts to standard medical therapy, not replacements.

The information presented here is based on published peer-reviewed research, but individual results may vary. If you experience worsening symptoms, bloody stool, fever, severe abdominal pain, or signs of bowel obstruction, seek immediate medical attention.

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