

PHYSICIAN FACTSHEET: Inflammatory Bowel Disease & Diet

How to prevent and treat IBD with nutrition

Inflammatory bowel disease (IBD) is a category of gastrointestinal (GI) illnesses that include ulcerative Colitis (UC) and Crohn's Disease (CD).

Approximately 5 million people worldwide suffer from its symptoms.

The incidence of IBD has been increasing worldwide, particularly in areas with high or rising intakes of animal protein and fat (1).

Diets high in animal protein (2), particularly processed meat (3) are associated with an increased risk of developing IBD.

The progression of IBD is thought to be mainly environmental. A whole food plant-based diet can alleviate symptoms and help patients achieve remission (4).

"Diets high in animal protein are associated with an increased risk of developing IBD"

Peters et al., 2022

Pathomechanisms Influenced by Diet

The GI tract has a carefully balanced homeostasis between the gut bacteria (microbiome) and the intestinal endothelial lining. This allows nutrient extraction through the gut wall whilst avoiding transmission of harmful bacteria. Disruption of intestinal integrity or the microbiome can cause a cascade of inflammation that can contribute to the development of IBD.

Changes in the gut microbiome

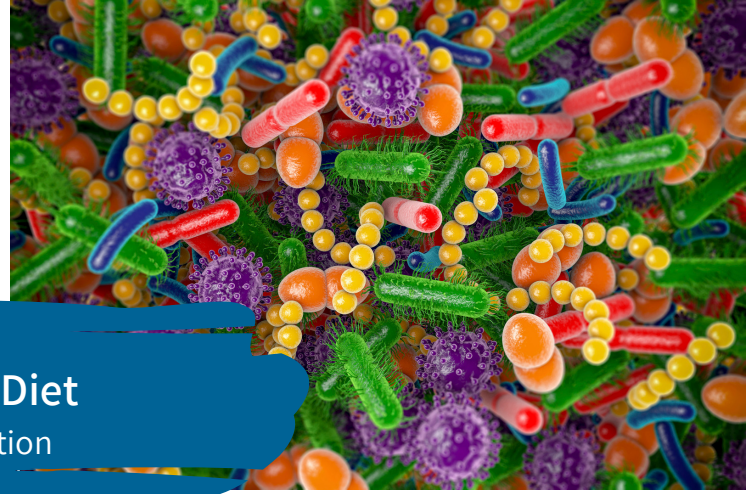
The bacterial makeup of the gut microbiome differs across populations and among individuals. Overgrowth of certain bacteria (*E. coli*, *C. difficile*) and a concurrent decrease in other bacteria (*Bifidobacterium* spp., *Lactobacillus* spp.) can lead to impaired permeability of the gut endothelium and inflammation.

- Consumption of high-fat milk and sugared beverages is associated with lower gut microbiome diversity. Coffee, tea and red wine, which all have a high polyphenol content, are associated with increased diversity (5).
- Food additives like maltodextrin (MDX) and carrageenan exert harmful impacts on intestinal homeostasis. MDX seems to impair the antibacterial response to *E. coli*, particularly in patients with CD (6).

Changes in the gut endothelium

The integrity of the endothelial barrier is affected by the gut microbial makeup, resulting in increased permeability in IBD.

- Meat-derived dietary protein increases quantities of branched-chain fatty acids, ammonia, nitric oxide, and sulphur-containing compounds that disrupt the mucosal barrier and increase inflammation (7).
- Short-chain fatty acids (SCFAs) produced by the beneficial fermentation of carbohydrates and fibre maintain gut homeostasis and are anti-inflammatory. A plant-based diet, low in sugars, promotes SCFA-producing bacteria and reduces endothelial inflammation (8).
- Increased intake of omega-6 fatty acids (n-6), such as linoleic acid, found in red meat, cooking oil and margarine, can lead to the production of proinflammatory arachidonic acid, found in higher concentrations in the mucosa of patients with ulcerative colitis (9).



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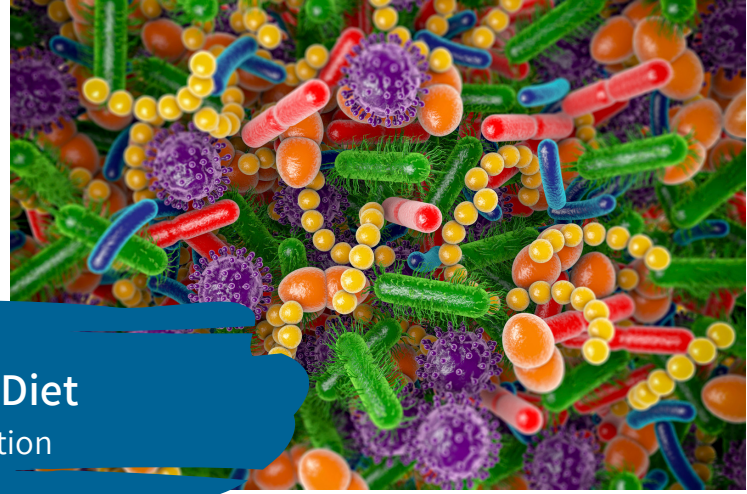
The Scientific Evidence

Epidemiological evidence

- A review of 19 studies with a total of 2,600 patients and 4,000 controls found higher IBD risk was associated with a Western diet pattern, including a high intake of total fat, n-6 and meat. High intake of fruit and fibre was associated with a lower risk for CD and high vegetable intake with a lower risk for UC (10).
- A French cohort followed over 10 years (n=67581) found that high total protein intake, particularly from animal sources, was associated with an increased risk for IBD (HR=3.31). Meat and fish, but not eggs or dairy were associated with increased risk (11).
- In a case-control study with 87 patients and 144 controls, high sucrose (OR 2.85), animal fats (OR 4.09) and cholesterol consumption (OR 4.57) were associated with an increased risk of IBD. Conversely, fruit, fluids (in liquids and solid foods), vitamin C and magnesium intake were negatively associated with IBD (12).
- High meat (particularly red and processed meat), and high alcohol intake are associated with an increased risk of IBD (13).
- A Japanese analysis of the dietary impact on IBD revealed that high intakes of total fat, animal fat, n-6 fatty acids, animal protein, milk protein and the n-6:n-3 ratio are all correlated with the development of IBD (14). The same study showed a negative correlation with vegetable protein.
- A case study of 229 IBD patients using a predominantly plant-based diet reported 100% remission of CD after 12 months and 90% remission after 2 years. For UC, the remission rate was 86% at 12 months (4).

Evidence from RCTs and meta-analyses

- In a meta-analysis of 14 mainly European observational studies on **fruit and vegetable** intake and the risk of IBD, an increased consumption of fruit was associated with a **decreased risk of IBD**. High vegetable consumption was associated with lower UC risk. Vegetable consumption lowered the risk of CD in European studies, but not in studies from Asia (15).
- A **low-FODMAP** (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) diet (LFD) showed **relief of IBD** symptoms compared to control diets (16). The low-FODMAP diet also showed significant improvements in specific symptom scores and numbers of patients reporting adequate symptom relief but had no significant effect on markers of inflammation (17).
- **Fructans can increase IBD symptoms**. Thirty-two IBD patients responsive to an LFD were challenged with different FODMAPs vs. glucose as the control. Participants took part in three 3-day challenges. IBD symptoms worsened during the fructan challenge, but not for intakes of glucose or sorbitol (18).
- Studies in children have shown that exclusive **enteral nutrition (EN) can induce remission** as effectively as steroids (19). Data is less robust in adults. EN is not effective for UC. Remission in CD can also be achieved with total parenteral nutrition but is not a long-term option, and relapses are common (20).
- A 2019 Cochrane review of 18 RCTs concluded that the effects of dietary interventions on IBD are not yet clear due to the high dietary diversity in those studies (21).



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General Recommendations

Maximize the intake of **high-quality plant foods** such as vegetables, whole grains, legumes, fruits, nuts, seeds, herbs, and spices; your health will benefit from every step towards more whole plant foods.

Eliminate or limit all processed foods, refined carbohydrates, and sugar-sweetened foods and beverages.

Eliminate red and processed meat products such as burgers, sausages, bacon, ham, salami, dried meat, canned meat, and pastrami (22).

Eliminate or limit other animal products such as poultry, fish, eggs, cheese, and dairy.

Make sure to **cover potentially critical nutrients** with a wide variety of plant foods, enriched foods/drinks, or supplements (especially vitamin B12 and vitamin D).

Disease Specific Recommendations

Consume a diet **high in fruits and vegetables**, and avoid most aspects of a typical Western diet, including animal protein, dairy, high intakes of fat, and highly processed foods.

A **short-term low-fodmap diet** could improve symptoms in patients in remission.

Exclusive **enteral nutrition can induce remission in children** as effectively as steroids. Data is less robust in adults. Enteral nutrition is not effective for UC.

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