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High-Fat Diets Worsen Inflammation

Analysis by Dr. Joseph Mercola | August 12, 2025

STORY AT-A-GLANCE

- High-fat diets worsen inflammatory bowel disease (IBD) symptoms by increasing inflammation, weakening gut barriers, and promoting harmful bacteria while reducing beneficial microbes in the digestive system
- Ketogenic diets dramatically intensify colitis severity, causing weight loss, colon shortening, elevated inflammatory markers, and increased intestinal permeability in research studies
- Western dietary patterns high in fats and processed foods disrupt gut microbiota balance, erode intestinal mucus layers, and activate inflammatory pathways throughout the body
- Complex carbohydrates and fiber protect against gut inflammation by feeding beneficial bacteria that produce short-chain fatty acids, which strengthen the gut lining naturally
- Reducing fat intake below 30% of daily calories while choosing whole foods, avoiding vegetable oils, and increasing fiber helps heal gut inflammation and restore digestive health

Inflammatory bowel disease (IBD) is a chronic condition affecting millions globally, characterized by inflammation and damage to the gastrointestinal tract. It comes in two types — Crohn's disease and ulcerative colitis — and when left untreated, your risk for serious complications like bowel obstruction, fistulas, or colorectal cancer, increases.

While your immune system plays a role in IBD, research shows that it's not the only component. In fact, the flareups can be largely traced to your diet, especially one high in fat.

A High-Fat Diet Intensifies Gut Damage

In a study published in Food & Function, researchers investigated how the **ketogenic diet** — an eating plan emphasizing high fat and minimal carbohydrates — affects the severity of colitis. For the experiment, the team used an animal model to closely monitor what happened when colitis was chemically induced after a month on the ketogenic diet.[1]

Going into the specifics, mice were fed either a ketogenic diet or a standard diet for a month. During the final week, the subjects were given dextran sulfate sodium (DSS) to chemically induce colitis.

- **Dramatic health changes occurred —** Mice on the ketogenic diet experienced severe weight loss, more intense colitis symptoms, and a shortening of their colons, which is a sign of extensive inflammation and damage. Disease activity index (DAI) scores, which measure symptoms like diarrhea severity, blood in stool, and weight loss, were much higher in mice fed a ketogenic diet compared to the control diet.

- **Key inflammatory markers skyrocketed —** Blood and colon tissue samples showed sharply increased levels of harmful cytokines, such as IL-1α, IL-6, TNF-α, and IL-17. Each of these is linked directly to inflammation, tissue damage, and immune dysfunction. In short, high levels of these markers indicate that a ketogenic diet turns up inflammation dramatically when gut trouble starts.

- **Ketogenic diet weakened the gut barrier —** A healthy gut barrier allows nutrients to enter your tissues while blocking harmful substances. And as you can guess, mice on the ketogenic diet had lower activity of critical genes responsible for barrier integrity. "Increased intestinal permeability and decreased expressions of intestinal epithelial barrier associated genes were observed due to ketogenic diet administration," the researchers said.

- **Fat changed gut bacteria composition negatively —** It encouraged harmful types such as Proteobacteria and Enterobacteriaceae while significantly reducing beneficial bacteria like Erysipelotrichaceae. Such microbial imbalance — also known as gut dysbiosis — is directly tied to increased gut permeability and inflammatory bowel conditions.

- **Gut metabolism was altered —** The high-fat mice group showed increased amounts of bile metabolites such as taurochenodeoxycholic acid and cholic acid, known to act as irritants and damage the gut lining. At the same time, bile metabolites linked to fatty acid synthesis were reduced, thus contributing to colitis.

Western-Style Eating Fuels Chronic Gut Inflammation

The impact of high-fat diets was investigated further in a comprehensive review published in Cells. Here, researchers explored the relationship between typical Western dietary habits and their damaging impact on gut health and systemic inflammation. The participants were adults who were following common Western eating patterns characterized by high levels of fats, refined sugars, processed foods, and low fiber intake.[2]

Unsurprisingly, the findings show that dietary habits consistently damage gut health, leading directly to persistent inflammation in various parts of the body. These harmful dietary practices disrupted the balance of beneficial gut bacteria, setting the stage for inflammation-driven diseases like obesity, diabetes, and inflammatory bowel conditions.

- **High fat dramatically alters gut microbiota —** Populations of keystone gut strains are reduced. As noted by the researchers:

> *"Several studies have linked HFD-driven alterations in gut microbiota with increased gut barrier permeability, referred to as the leaky gut syndrome.*

It is suggested to be caused by reduction in gut barrier — promoting microbes, such as Akkermansia muciniphila, Bifidobacterium spp., Bacteroidetes spp., Lactobacillus spp. and Clostridiales spp., accompanied by an increase in microbes disrupting gut barrier integrity, such as Oscillibacter spp. and Desulfovibrio spp."

- **Unhealthy dietary habits eroded the integrity of the intestinal mucus layer —** When this layer thins out due to poor dietary choices, harmful bacteria and toxins come into direct contact with your intestinal lining, damaging cells and causing chronic inflammation. On the other end, the researchers pointed out that gut bacteria support a healthy mucus layer:[3]

  "[E]xamples of bacteria strains with beneficial effects on the intestinal barrier are Bacteroidesvulgatus and Bacteroidesdorei, which increase TJ (tight junctions) expression and produce bacteriocins, proteins that inhibit the growth of specific bacteria, limiting the growth of harmful strains and helping to re-establish healthy microbiota."

- **High-fat foods activate inflammatory pathways —** This is particularly seen from examples high in fats from animal products and processed snacks. Specifically, they trigger toll-like receptor 4 (TLR4), a key player in activating the inflammatory nuclear factor-kappa B (NF-κB) pathway:[4]

  "The increase in both Firmicutes and Actinobacteria on HFD is positively correlated with the gene expression of proinflammatory cytokines in colonic macrophages (TNF-α, IL-1β, and IL-6). It is thus suggested that the observed changes are due to TLR4 activation as described above. TLR-bearing macrophages have also been identified in adipose tissue, skeletal muscles, and the liver."

- **Increased dietary fat and refined sugar consumption altered bile acid metabolism —** Specifically, increased fat consumption led to higher bile acid (BA) production, resulting in altered gut health:

> *"It has been shown that HFD (high-fat diet) increases total BAs and total secondary BAs along with elevated BA concentration in the caecum, while chronically high gut and fecal BA concentrations can reduce gut barrier integrity.*
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> *Thus, the HFD-associated gut hyperpermeability can be related to increased BA secretion. Moreover … a 10-fold increase in BA synthesis on HFD was associated with enriched bile composition in hydrophobic BAs … which are indicated to stimulate intestinal permeability when administered at high concentrations."*[5]

Healthy Carbs Protect Against Gut Inflammation

Research published in Frontiers in Immunology examined the role carbohydrates play in IBD, specifically how different types of carbs affect gut inflammation and microbiota balance. Rather than lumping all carbs together, this review broke down how different carbs, such as refined sugars and fiber-rich complex carbs, influenced gut health and inflammation.[6]

The review included various studies conducted primarily on animal models and human participants with chronic IBDs, such as Crohn's disease and ulcerative colitis.

- **Not all carbs are created equal —** Refined sugars, such as those found in soda and candy, severely harmed gut health. Meanwhile, complex carbohydrates — particularly those rich in fiber — showed remarkable protective effects on gut inflammation and microbiome balance.

- **Healthy food results in a healthier gut —** Digging deeper into these beneficial carbs, the researchers highlighted fiber-rich foods like whole fruits, vegetables, and properly prepared whole grains as powerful defenders against gut inflammation. Dietary fiber dramatically increased the abundance of beneficial bacteria, especially those producing short-chain fatty acids (SCFAs), such as butyrate.

These SCFAs are crucial nutrients that strengthen your gut lining, helping protect your bloodstream from toxins and reducing inflammation. The researchers discovered clear differences in inflammation levels when comparing diets high in complex carbs versus those dominated by refined sugars. Animal studies consistently showed that diets rich in complex carbohydrates reduced inflammatory markers dramatically.

- **The diet of IBD patients —** The study noted that people diagnosed with IBD generally follow an unhealthy diet, giving you an insight on how to take care of your own gut health:[7]

  > *"IBD patients have been reported to consume more sugar and confectionary foods than healthy control participants.*
  >
  > *In the European Prospective Investigation into Cancer (EPIC) study, Antoine Racine et al. found that high sugar and soft drink consumption combined with low vegetable intake was linked to an elevated risk of developing UC (ulcerative colitis), in line with another large cohort study. And this association seems to be more pronounced in female patients, likely due to the influence of estrogen, on the pathogenesis and clinical course of IBD in women."*

Strategies to Reduce Fat Consumption and Manage Inflammation

Healing your gut starts with changing the way you eat. Here are practical steps to tackle the root causes of your gut issues and reclaim your health:

1. **Moderate your fat intake —** As seen in the published studies, high fat intake eventually harms your health. That's because your body is designed to burn glucose for energy, especially from healthy sources of carbohydrates. Hence, dietary fat, even from healthy sources, needs to be limited.

In addition, I recommend keeping your total fat intake to below 30% of your daily calories because of a metabolic switch in your body called the Randle Cycle. When fat consumption goes beyond this range, your body begins burning fat for fuel, which hampers glucose metabolism. Since glucose is unable to enter your mitochondria because your cells are still on "fat" mode, it ends up back in your bloodstream, which raises blood sugar levels.

2. **Avoid vegetable oils —** In addition to high-fat intake, excess linoleic acid (LA), an omega-6 polyunsaturated fat (PUF), is a big driver of systemic inflammation, as well as gut damage. In a previous article, I showed how LA induces metabolic stress to certain beneficial bacteria strains, such as Bifidobacterium breve (B. breve), while also increasing pathogenic strains, namely E. coli.

   That said, I recommend keeping your LA intake below 5 grams a day. If you can keep it below 2 grams, that's even better. To help you keep track, I recommend you download the Mercola Health Coach app, which will be out this year. One of its main features is the Seed-Oil Sleuth, which calculates your vegetable oil intake to the tenth of a gram.

3. **Choose healthy carbohydrates —** Replace refined carbohydrates with whole, nutrient-packed foods like sweet potatoes, whole fruits, root vegetables, and white rice. Incorporating resistant starches, such as green bananas, also feed your beneficial gut bacteria reduce inflammation. For reference, most adults need around 250 grams of carbohydrates daily to give your body the fuel it needs.

4. **Add sufficient amounts of dietary fiber —** This is an important component for gut health, as this is what your beneficial bacteria ferment to produce SCFAs that strengthen your gut barrier. In light of this, aim for around 30 grams of fiber per day.

   However, don't just start eating fiber indiscriminately, especially if you have gut dysbiosis. That's because even bad bacteria ferment dietary fiber, and once they do, endotoxins are produced. For an in-depth understanding of this approach, read "Butyrate — The Metabolic Powerhouse Fueling the Gut and Beyond."

To fully utilize dietary fiber, again, feed your gut by consuming around 200 to 250 grams of healthy carbohydrates from whole, unprocessed foods.

5. **Incorporate healing foods —** Consistently include gut-nourishing foods like bone broth, collagen-rich meats, and fiber-rich root vegetables in your meals. These foods help repair your gut lining, maintain gut microbiome balance, and steadily reduce inflammation, allowing your gut to heal naturally over time.

Frequently Asked Questions (FAQs) About High-Fat Diets and Irritable Bowel Disease

Q: What is Inflammatory Bowel Disease (IBD), and what causes flare-ups?

A: IBD includes Crohn's disease and ulcerative colitis, which are conditions characterized by chronic gut inflammation. Flare-ups aren't solely due to immune dysfunction — diet, especially high-fat consumption, significantly contributes to inflammation and damage in the gastrointestinal tract.

Q: How does a high-fat diet impact gut health and inflammation?

A: Studies indicate high-fat diets, such as ketogenic or typical Western diets, worsen gut inflammation, damage the intestinal barrier, negatively alter gut microbiota, increase harmful inflammatory markers, and disrupt bile acid metabolism, which impacts gut barrier integrity.

Q: Why are carbohydrates important for gut health, and are all carbs beneficial?

A: Not all carbohydrates have equal effects. Refined sugars, common in processed foods, worsen gut inflammation. In contrast, complex carbohydrates and dietary fiber from whole fruits, vegetables, and properly prepared whole grains promote

healthy gut bacteria, enhance gut barrier integrity, and significantly reduce inflammation.

Q: How does dietary fat and sugar consumption affect gut bacteria and inflammation?

A: High dietary fats and refined sugars lead to negative changes in gut bacteria composition by reducing beneficial microbes and increasing harmful strains. This imbalance increases intestinal permeability and activates inflammatory pathways, raising the risk of systemic inflammation and gut-related diseases.

Q: What practical dietary changes can help reduce gut inflammation and improve gut health?

A: To manage gut inflammation, moderate your fat intake by keeping it below 30% of your total daily calories, and avoid vegetable oils rich in inflammatory omega-6 fats. Incorporate healthy carbohydrates, such as sweet potatoes, fruits, root vegetables, and resistant starches, into your diet.

Aim for at least 30 grams of dietary fiber daily from whole, unprocessed sources. Additionally, regularly consume healing foods like bone broth, collagen-rich meats, and fiber-rich vegetables to help repair and strengthen your gut lining naturally.

Sources and References

- [1] Food Funct. 2021 Oct 19;12(20):10210-10225
- [2, 3, 4, 5] Cells. 2021 Nov 14;10(11):3164
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