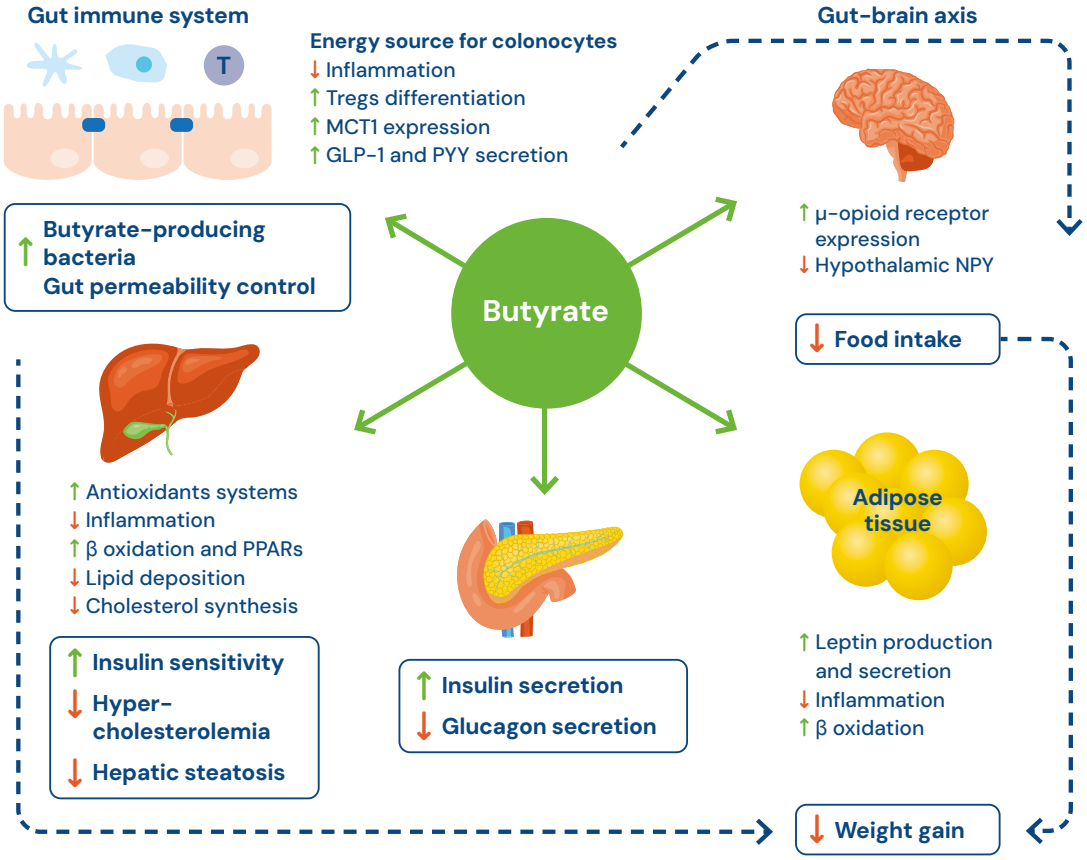
NUTRINED

focus

New research shows how bio-available butyrate combats obesity & obesity-associated metabolic disorders

Butyrate is a vital energy source for colonocytes, supporting gut barrier integrity, reducing inflammation, and modulating immune responses. It aids hormone production (GLP-1, PYY), regulates appetite via gut-brain communication and has systemic effects like improving insulin sensitivity, reducing fat storage and enhancing pancreatic function.

These actions promote metabolic balance, lower food intake and protect against weight gain, making butyrate **essential for gut and metabolic health.**



1. Production and intestinal effects

Fermentation in the intestine

Gut bacteria ferment dietary fibers.

Local effects on the intestine

- **Trophic effects:** butyrate supports the growth and health of intestinal cells.
- **Improved intestinal permeability:** strengthens the gut barrier, reducing "leaky gut."
- **Reduced inflammation:** modulates inflammatory responses locally.
- **Stimulates the goblet cells to release more mucins.**

---

2. Butyrate absorption and systemic circulation

Butyrate as a gut hormone stimulator: activation of GPR41 and GPR43 receptors
Butyrate binds to the free fatty acid receptors GPR41 and GPR43 on enteroendocrine cells in the intestine. This stimulates the secretion of GLP-1 (Glucagon-like Peptide-1) and PYY (Peptide YY).

Indirect influence via gut microbiota:
Butyrate is produced by gut bacteria through the fermentation of dietary fibers. A healthy gut microbiota promotes the secretion of GLP-1 and PYY, supporting metabolic regulation and satiety.

3. Effects on target organs

Liver

- **Reduces hepatic steatosis:** decreases fat accumulation in the liver, lowering the risk of fatty liver disease.
- **Anti-inflammatory effects:** reduces liver inflammation and oxidative stress.
- **Improves insulin sensitivity:** enhances glucose metabolism, reducing insulin resistance.

Pancreas

Increased GLP-1 has direct effects on the pancreas. GLP-1 binds to receptors on the β-cells of the pancreas and promotes the release of insulin in response to elevated blood sugar levels. This is an important mechanism for regulating blood sugar levels.

- **Stimulates insulin secretion:** supports glucose regulation.
- **Reduces lipid accumulation:** protects pancreatic function.

Skeletal muscle

- **Reduces inflammation:** lowers inflammatory markers in muscle tissue.
- **Enhances mitochondrial function:** improves energy production and endurance.
- **Reduces muscle inflammation:** lowers pro-inflammatory markers, supporting recovery and performance.
- **Increases insulin sensitivity:** promotes glucose uptake into muscle cells, reducing blood sugar levels.

Adipose tissue (fat)

- **Improves insulin sensitivity in fat cells:** enhances glucose regulation and reduces metabolic dysfunction.
- **Stimulates Lipolysis:** promotes fat burning and reduces fat storage.
- **Reduces inflammation in adipose tissue:** improves overall metabolic health by lowering inflammatory cytokines.
- **Induces beige/brown fat activation:** increases energy expenditure and heat production (thermogenesis).
- **Indirect influence via the gut-brain axis:** via GLP-1 and PYY, appetite is reduced, and fat storage can be regulated.

4. Gut-brain axis

Brain effects

GLP-1 can signal the brain to reduce appetite, and PYY works similarly by enhancing the signal of satiety.

- **Neuroprotective effects:** Butyrate has anti-inflammatory and epigenetic effects that may protect against neurodegenerative diseases.
- **Boosts energy expenditure:** promotes energy metabolism.

Why Butyflam Coated?

Butyflam Coated offers the highest bioavailability for maximum butyrate absorption and effectiveness:

- **Superior absorption**
  Advanced coating ensures the highest bioavailability.
- **Protected release**
  Shields butyrate from stomach acid for optimal delivery.
- **Targeted action**
  Reaches the colon to support gut health and reduce inflammation.
- **Better tolerance**
  Less odor and fewer digestive side effects.

Roda, Aldo et al. "A new oral formulation for the release of sodium butyrate in the ileo-cecal region and colon." World journal of gastroenterology vol. 13,7 (2007): 1079-84.

Makowski, Zbigniew et al. "The Effects of Sodium Butyrate, Coated Sodium Butyrate, and Butyric Acid Glycerides on Nutrient Digestibility, Gastrointestinal Function, and Fecal Microbiota in Turkeys." Animals : an open access journal from MDPI vol. 12,14 1836. 19 Jul. 2022.

Świątkiewicz, S., et al. "Effects of Sodium Butyrate, Coated Sodium Butyrate, and Butyric Acid Glycerides on Growth Performance, Nutrient Digestibility, Gastrointestinal Tract Function, and Fecal Microbiota in Turkeys." Animals, vol. 12, no. 14, 2022, p. 1839.

Coppola, Serena et al. "Therapeutic Effects of Butyrate on Pediatric Obesity: A Randomized Clinical Trial." JAMA network open vol. 5,12 e2244912. 1 Dec. 2022,

van Deuren, Thirza et al. "Butyrate to combat obesity and obesity-associated metabolic disorders: Current status and future implications for therapeutic use." Obesity reviews : an official journal of the International Association for the Study of Obesity vol. 23,10 (2022): e13498.

Amiri, P., Hosseini, S.A., Roshanravan, N. et al. The effects of sodium butyrate supplementation on the expression levels of PGC-1α, PPARα, and UCP-1 genes, serum level of GLP-1, metabolic parameters, and anthropometric indices in obese individuals on weight loss diet: a study protocol for a triple-blind, randomized, placebo-controlled clinical trial. Trials 24, 489 (2023).