



Sodium Butyrate: Gut-Brain Axis & Anxiety/Depression

Sodium butyrate, a short-chain fatty acid (SCFA) produced by gut bacteria during fiber fermentation, has profound effects on **mental health** through the **gut-brain axis**.

1. Gut Microbiome & Mood Regulation

- Supports a **healthy gut barrier**, preventing **leaky gut** and systemic inflammation, which are linked to depression and anxiety.
- Increases **gut microbiota diversity**, promoting beneficial bacteria associated with mental well-being.
- Modulates the **vagus nerve**, a key communication pathway between the gut and brain, impacting stress resilience.

2. Anti-Inflammatory & Neuroprotective Effects

- Reduces **neuroinflammation**, which is elevated in both **depression and anxiety**.
- Inhibits **pro-inflammatory cytokines** (TNF- α , IL-6) that disrupt neurotransmitter balance.
- Crosses the **blood-brain barrier**, directly reducing oxidative stress and inflammation in the brain.

3. Neurotransmitter & Epigenetic Modulation

- Enhances **BDNF (Brain-Derived Neurotrophic Factor)**, supporting neuroplasticity and mood stability.
- Regulates **GABA & serotonin**, promoting relaxation and emotional balance.
- Acts as an **HDAC inhibitor**, influencing gene expression related to mood disorders and cognitive function.

4. Stress & HPA Axis Regulation

- Balances **cortisol levels**, preventing excessive stress responses.
- Supports **mitochondrial function**, reducing fatigue and mental fog common in depression.

Clinical Considerations

- Beneficial for individuals with **gut dysbiosis, IBS, or chronic inflammation** affecting mood.
- Works best alongside **prebiotics (fiber) and a whole-food diet** to sustain SCFA production naturally.

- Dosing varies (typically **300-600 mg/day**), with some experiencing initial detox-like effects as gut microbiota shift.

Bottom Line

Sodium butyrate enhances **gut integrity, reduces neuroinflammation, and modulates neurotransmitters**, making it a promising tool for **anxiety, depression, and overall mental health** via the gut-brain axis.

