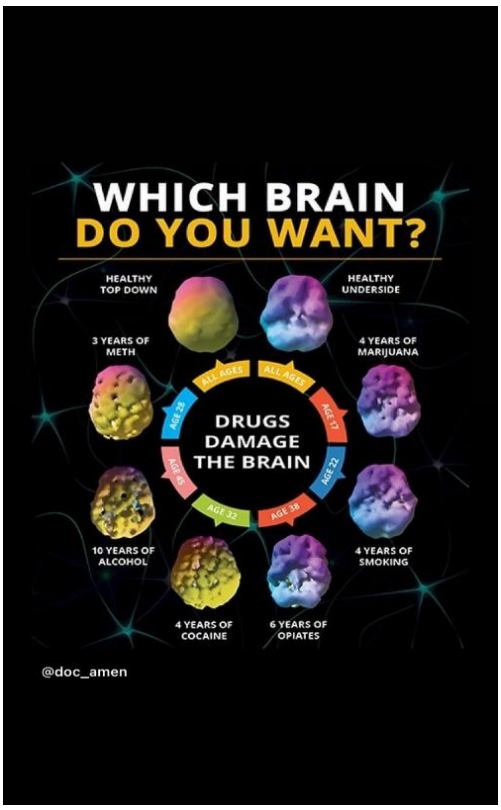
THE GUT-BRAIN LINK

1. Introduction

The gut and brain are deeply connected.

THE BRAIN



2. Risk factors to brain health

- Alcohol
- Drugs
- Smoking
- Marijuana – it stays 30 days in your system
- Concussions (sport injuries)
- Head injuries
- **Emotional trauma and loss** – When we love someone, they come to live in the emotional or limbic center of our brains. They occupy nerve cell pathways and physical live in the neurons and synapses of the brain. When we lose people, our brain gets confused and disorientated. Since the person lives in the neuronal connections, we expect to see them, hear them, feel them, and touch them. When we can't hold them or talk to them

as we usually do, the brain centers where they live become inflamed searching for them. Overactivity in the limbic system – the brain's emotional centers – has been associated with depression and low serotonin levels, which is why we have trouble sleeping, feel obsessed, lose our appetites, want to isolate ourselves, and lose the joy we have for live. A deficit in endorphins, which modulate pain and pleasure pathways in the brain, also occurs, which may be responsible for physical pain we feel. Basically, we become a neurochemical mess.

- Exposure to solvents, pesticides, ..
- Mold
- Viruses
- Electromagnetic fields (power lines, cellphone use)
- Sleep apnea
- Noise can damage the delicate nerve endings that transfer the electrical information from the hair cells inside your ear to your brain, potentially causing inflammatory reactions within the brain itself.
- Covid – 19 inflammation: Oxygen therapy, Curcumins (Tumeric), Omega 3, Vit D, Quercetin (Found in foods like berries, apples, green tea).
- Cholesterol – food to combat it: Almonds, Olive Oil, Asparagus, Oatmeal, Pinto Beans, Blueberries, tomatoes, Avocados, Dark chocolate, Barley and Eggplant.
- **Watch out for automatic negative thoughts –** you don't have to believe everything that comes up in your head. Challenge your thoughts and write them down.

THE GUT

"All disease begins in the gut." — Hippocrates

3. How your digestive system influences your brain and emotions

- The human body contains two brains — one in your head, and one in your gut.
- The gut-brain axis is the two-way communication system between the digestive tract and the central nervous system.
- Scientists now know that gut health plays a key role in mental well-being, mood, and cognition.

4. What Is the Gut-Brain Axis?

- A bi-directional communication system between the enteric nervous system (ENS) and the central nervous system (CNS).
- Communicates through:
    - Neural pathways (vagus nerve)
    - Immune system
    - Endocrine system (hormones)
    - Microbial metabolites (short-chain fatty acids, neurotransmitters)

5. Role of the gut microbiome

- Trillions of bacteria, fungi, and other microbes live in the intestines.
- These microbes:
    - Produce **neurotransmitters** like serotonin, dopamine, and GABA.
    - Help regulate **inflammation** and **stress response**.

- Influence **mood, anxiety, and cognition**.

6. How the Gut Affects the Brain

- Gut bacteria can:
  - Send signals via the **vagus nerve**.
  - Affect **serotonin levels** (90% made in the gut!).
  - Influence the **hypothalamic-pituitary-adrenal (HPA) axis**, which controls stress.
- Disruption (dysbiosis) linked to:
  - Depression
  - Anxiety
  - Autism spectrum disorders
  - Parkinson's disease

7. How the Brain Affects the Gut

- Stress, anxiety, and emotions can alter:
  - Gut motility (leading to IBS or discomfort)
  - Microbial composition
  - Digestive secretions
- Example: "Butterflies in your stomach" = real nervous system effect!

8. Lifestyle and Nutrition

Ways to support a healthy gut–brain connection:

- Eat **fiber-rich, fermented, and prebiotic** foods
- Limit **processed foods and sugar**
- Manage stress (mindfulness, sleep, exercise)
- Stay hydrated
- Consider **probiotics and psychobiotics** (microbes that support mental health)

Research Highlights

- **Animal studies:** Mice given probiotics showed reduced anxiety-like behaviors.
- **Human trials:** Certain probiotic strains (e.g., *Lactobacillus* and *Bifidobacterium*) improved mood and reduced cortisol.
- **Emerging field:** "Nutritional psychiatry" — using diet to support mental health.

9. INFLAMMATION

Indicators of inflammation:

Depression

Anxiety

Chronic inflammation may be the reason we can't lose weight.

Body aches

Joint pain

Chronic fatigue

Skin concerns

Weight gain

Digestive issues

Impaired immunity

Poor sleep

Headaches

Brain fog

10. FLUSHING TOXINS OUT

Castor Oil

Castor oil is a natural vegetable oil extracted from the seeds of the *Ricinus communis* plant.

Known for its thick texture and unique fatty acid composition, especially ricinoleic acid.

It has been used for thousands of years as a natural remedy for digestion, skin, and overall wellness.

Castor oil remains one of nature's most powerful remedies for gut cleansing and beyond.

From relieving constipation and supporting digestion to boosting skin and hair health, it's a true multi-purpose oil.

Used wisely and safely, castor oil can be an essential part of your natural wellness toolkit.

Castor Oil and Gut Cleansing

One of the most powerful and well-known uses of castor oil is for gut cleansing. When consumed, the ricinoleic acid in castor oil stimulates the intestines, causing natural contractions that help move waste and impurities out of the digestive system. This makes it an effective natural method to relieve occasional constipation and support overall digestive health.

Why Castor Oil is the Best for Gut Cleansing

- Natural and effective: Unlike harsh chemical laxatives, castor oil comes from a plant source.
- Fast-acting: Results are often noticeable within 2–6 hours of consumption.
- Deep cleanse: Helps empty the intestines, giving a "reset" feeling to the gut.
- Versatile use: Can be taken internally or applied externally (as packs) for digestive support.

How to Use Castor Oil for Gut Cleansing

Here's a traditional method for using castor oil as a gut cleanse.
Always consult your healthcare provider before use, especially if pregnant, nursing, or on medication.

1. Take 1–2 tablespoons of cold-pressed castor oil on an empty stomach.

2. Mix with a small amount of warm water, juice, or ginger tea to mask the strong taste.
3. Stay hydrated by drinking water throughout the day.
4. Expect results within a few hours. Stay near a restroom as it works quickly.

Note: Castor oil should not be used as a daily laxative. It is best for occasional cleanses or relief of temporary constipation.

Other Powerful Uses of Castor Oil

Beyond gut cleansing, castor oil is a multi-purpose natural remedy with a wide range of benefits for the body, skin, and hair.

- Skin care: Moisturizes dry skin, soothes irritation, and may help with acne scars.
- Hair growth: Popular as a scalp treatment to strengthen hair and promote thickness.
- Joint and muscle relief: Used in massage or packs to ease soreness and stiffness.
- Immune support: Castor oil packs applied to the abdomen are believed to stimulate lymphatic flow.
- Wound healing: Its antimicrobial properties help protect cuts and abrasions.

Precautions and Safety

While castor oil is natural, it is also very potent.
Overuse may cause cramping, diarrhea, or dehydration.
Pregnant women should avoid internal use as it can stimulate uterine contractions.
Always start with a small dose and monitor how your body responds.

11. RESTORING THE GUT

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A leaking gut leads to diabetes, autoimmune deceases, high blood pressure and other diseases. To heal a leaking gut cut out grains, lectins and the night shade family (eggplant, tomatoes, potato and tomatillos).

Ginger: Brew a cup of ginger tea. Ginger is known for its anti-inflammatory properties. It reduces bloating and helps with digestion.
Cinnamon: Balance sugar levels and has antimicrobial properties.
Turmeric: Turmeric has potent anti-inflammatory and antioxidant effects.

How to make L. reuteri yogurt: A step-by-step guide
https://drdavisinfinitehealth.com/2019/07/how-to-make-l-reuteri-yogurt-step-by-step/

This “yogurt” fermented with two unconventional strains of *Lactobacillus reuteri* achieve effects that include:

- Smoothing of skin wrinkles due to an explosion of dermal collagen
- Accelerated healing, cutting healing time in almost half
- Reduced appetite, the so-called “anorexigenic” effect—food still tastes good, but you are almost completely indifferent to temptation

- Increased testosterone in men
- Increased libido
- Preservation of bone density—Obtaining *L. reuteri* is one of the most important steps you can take to prevent osteoporosis
- Deeper sleep—though this benefit is enjoyed by less than 20% of people
- Increased empathy and desire for connectedness with other people
- Probiotic effects that may include prevention of small intestinal bacterial overgrowth,
- The majority of benefits are a result of *L. reuteri*'s ability to provoke hypothalamic release of oxytocin, a hormone that is proving to be the key to substantial age-reversal and health effects.

You will need:

–Glass or ceramic bowl or other vessel large enough to hold at least one quart of liquid

–2 tablespoons of prebiotic fiber such as inulin or raw potato starch

–Starter: Either 10 tablets BioGaia Gastrus or 2 tablespoons previous batch of *L. reuteri* yogurt (whey or curds or mixture of both)

–1 quart of half-and-half or other liquid (to make with coconut milk, several additional steps and ingredients are required)

–Some method of maintaining at 100 degrees F (37.8).

Yields: Around 8 one-half-cup servings

Method:

Make sure your bowl or other vessel is clean after washing with hot soap and water.

Add 2 level tablespoons of prebiotic fiber (inulin)

Add 10 crushed tablets of Gastrus (that provide 200 million CFUs of *L. reuteri*, a relatively small number). Crush the tablets with a mortar and pestle or by putting into a plastic bag and crushing with a rolling pin or heavy bottle/glass until reduced to a coarse powder. (The tablets are flavored with mint and mandarin, but the taste does not show in the final product, nor in subsequent batches.) Once you have made your first batch, make subsequent batches with two tablespoons of the prior batch, rather than crushed tablets; it can be any mixture of whey or solid curds, as both contain *L. reuteri*.

Mix either crushed tablets or 2 tablespoons prior yogurt with prebiotic fiber.

Add a little, e.g., 2 tablespoons, of your choice of dairy; I used organic half-and-half, as this yields the best texture. Make a slurry by stirring; this prevents clumping of the prebiotic fiber.

Stir in remainder of half-and-half or other liquid.

Cover lightly with plastic wrap or other means. Ferment by maintaining at 100 degrees F (37.8) for 36 hours. Prolonged fermentation—far longer than the 6 or so hours of commercial yogurts that explain why the bacterial counts are so low–in the presence of prebiotic fibers yields far higher bacterial counts in the tens to hundreds of billions per serving.

I used a basin-type sous vide device, but you can use a stick sous vide, yogurt maker with adjustable temperature control, or Instant Pot. (Just be careful with the Instant Pot or yogurt makers without adjustable temperature, as they are set to be compatible with conventional yogurt microorganisms and are often too hot and kill *L. reuteri;* if your device heats to 110 degrees F or higher, it will likely kill L. reuteri and you should find an alternative means of heating. If in doubt, turn on your device and measure the temperature reached with a thermometer first before you ruin a batch.) Keep your materials out of the way of fans, heating/cooling vents, or other sources of air contamination.

The end-result for me is rich, thick, and delicious, better tasting—and with far higher probiotic bacterial counts—than anything you can buy in a store. Once refrigerated, the “yogurt” is so thick that it can stand upright on a plate.
Serve with fresh or frozen berries.

12. ASHWAGANDA

- Definition: *Withania somnifera*, commonly known as Ashwagandha, is an adaptogenic herb in Ayurvedic medicine.
- Traditional uses: stress reduction, vitality, immune support.
- Emerging scientific interest: modulation of inflammation and neuroendocrine function.
- Ashwagandha shows **anti-inflammatory** and **anxiolytic/antidepressant** potential.
- Mechanistically, it modulates the **HPA axis** and **cytokine activity**, linking inflammation control with mental well-being.
- More rigorous trials are needed to define clinical efficacy and safety profiles.

Biochemistry and Mechanisms

- Active compounds: *Withanolides*, *alkaloids*, and *saponins*.
- Mechanisms:
    - Anti-inflammatory: downregulates NF-κB, COX-2, and pro-inflammatory cytokines (IL-1β, IL-6, TNF-α).
    - Antioxidant: increases SOD, catalase, and glutathione peroxidase.
    - HPA axis modulation: reduces cortisol and supports adrenal balance.

Inflammation and Mental Health Connection

- Chronic inflammation contributes to depression, anxiety, and cognitive decline.
- Elevated CRP, IL-6, and TNF-α are linked to depressive symptoms.
- Ashwagandha's anti-inflammatory actions may indirectly improve mood and cognitive performance.

Research Evidence – Mental Health

- Randomized controlled trials (RCTs):
  - Chandrasekhar et al., 2012 (JANA) – 64 adults with chronic stress; 300 mg/day *W. somnifera* root extract ↓ cortisol by 27%, ↓ anxiety/stress scores (PSS, HAM-A).
  - Lopresti et al., 2019 (Medicine) – 60 adults with stress/anxiety; 240–480 mg/day for 8 weeks ↓ cortisol, improved sleep and mood.
- Mechanisms proposed: adaptogenic stress modulation + anti-inflammatory effect.

Research Evidence – Inflammation

- **Human trials** show ↓ CRP and inflammatory cytokines in stressed individuals.
- **Animal studies** demonstrate suppression of NF-κB and increased antioxidant enzymes.
- Potential use as adjunct in inflammatory disorders (rheumatoid arthritis, metabolic syndrome).

Safety and Dosage

- Typical dose: 300–600 mg/day of standardized root extract (≥5% withanolides).

- Generally well tolerated; mild GI upset possible.
- Caution in hyperthyroidism, pregnancy, and concurrent sedative or thyroid medication use.

13. ✿ SAFFRON

Saffron's bioactive carotenoids and volatile oils confer strong anti-inflammatory and antioxidant effects.

These mechanisms overlap with its mood-enhancing and neuroprotective benefits.

Saffron is a spice derived from the *Crocus sativus* flower.

Known for its vibrant red color and high cost, it's traditionally used in cooking and medicine.

Mental Health Benefits

- **Depression:** Multiple studies suggest saffron may be as effective as conventional antidepressants for mild to moderate depression.
- **Anxiety:** Saffron has shown anxiolytic (anti-anxiety) effects, helping reduce symptoms in clinical trials.
- **Premenstrual Disorders:** It may alleviate symptoms of PMS and PMDD, offering a natural alternative to pharmaceutical treatments.
- **Cognitive Health:** Early research indicates saffron could support memory and cognitive function, with potential applications in mild cognitive impairment and Alzheimer's disease.

Mechanisms of Anti-Inflammatory Action

- **NF-κB inhibition:** suppresses transcription of pro-inflammatory genes.
- **Cytokine modulation:** decreases IL-1β, IL-6, TNF-α levels.
- **COX and LOX enzyme inhibition:** reduces prostaglandin and leukotriene synthesis.
- **Oxidative stress reduction:** increases total antioxidant capacity and glutathione.
- **Microglial regulation:** limits neuroinflammation in brain tissue (animal and cell studies).

Saffron and Systemic Inflammation

- **Animal studies:**
    - Crocin and crocetin reduce inflammatory markers in models of arthritis, diabetes, and colitis.
    - Downregulate oxidative and inflammatory pathways (NF-κB, iNOS, COX-2).
- **Human evidence:**
    - Supplementation (20–100 mg/day) can reduce serum CRP and malondialdehyde (MDA) in metabolic syndrome and diabetic patients.
    - Improved endothelial function and decreased oxidative stress biomarkers.

Saffron, Inflammation, and Mental Health

- Chronic inflammation contributes to **depression, anxiety, and neurodegeneration**.
- Saffron targets this pathway via:

- **Anti-inflammatory signaling** (lowering cytokine activity in the CNS).
- **Monoamine modulation** – increases serotonin, dopamine, and norepinephrine.
- **Neuroprotective actions** – prevents oxidative neuronal injury and hippocampal damage.

Research Evidence – Mood and Cognition

- **Meta-analysis (Lopresti & Drummond, 2014, *Hum Psychopharmacol*)** – Saffron extracts (30 mg/day) comparable to fluoxetine and imipramine in mild-to-moderate depression.
- **Clinical trials (2016–2022)**: Saffron reduces depressive and anxiety symptoms in adults, with improvements in sleep and stress biomarkers.
- **Inflammatory biomarkers**: Several trials show reductions in IL-6 and CRP after saffron supplementation in patients with depression and metabolic conditions

Dosage and Safety

- **Typical dose:** 20–100 mg/day of standardized saffron extract (2% safranal, 3% crocin).
- **Safety:** Well tolerated; mild dizziness or GI upset in rare cases.
- **Cautions:** Pregnancy (uterotonic in high doses), and potential interactions with serotonergic drugs.

How It Works

- Saffron's active compounds, such as crocin and safranal, are believed to influence serotonin levels in the brain—similar to how many antidepressants work.
- It also exhibits antioxidant and anti-inflammatory properties, which may contribute to its mental health benefits.

⚠ Considerations and Side Effects

- Generally well-tolerated in doses used for supplementation.
- Possible side effects include nausea, dizziness, or dry mouth, especially at high doses.
- Always consult a healthcare provider before starting any supplement, especially if you're on medication.

🌿 Research Outlook

- Saffron is gaining traction in integrative and functional psychiatry as a complementary treatment.

14. THE EFFECT OF ALCOHOL ON THE GUT

Alcohol doesn't only affect the brain and liver — it also has **major impacts on the gastrointestinal (GI) tract**.

The gut is home to the **microbiome**, a community of microbes essential for digestion, immunity, and mental health.

Alcohol disrupts this balance, leading to inflammation, poor nutrient absorption, and disease risk.

Alcohol disrupts gut health at every level — structural, microbial, and immune.

Protecting your gut means protecting your **overall health and mental well-being**.

Effect Area	**Alcohol's Impact**
Gut lining	Damages barrier → leaky gut
Microbiome	Reduces good bacteria, increases harmful ones
Digestion	Impairs nutrient absorption, causes gastritis
Immunity	Increases inflammation
Brain	Affects mood and cognition via gut–brain axis

Alcohol and the Gut Lining

- The gut lining acts as a **protective barrier** between the intestines and the bloodstream.
- Alcohol:
  - **Damages intestinal cells** and weakens tight junctions.
  - Causes **"leaky gut"**, allowing toxins (like endotoxins) to pass into the blood.
  - Triggers **systemic inflammation** and can stress the liver (via the gut–liver axis).

Alcohol and Gut Microbiota

- Alcohol disrupts the **microbial balance**:
    - Decreases beneficial bacteria (like *Lactobacillus* and *Bifidobacterium*).
    - Increases harmful bacteria (like *Proteobacteria*).
    - Reduces microbial diversity overall.
- These changes can contribute to:
    - Digestive problems
    - Inflammation
    - Mood and cognitive disorders (via the gut–brain axis)

Alcohol and Digestion

- Alcohol interferes with **digestive enzyme secretion**, leading to:
    - **Poor nutrient absorption** (especially vitamins B1, B12, folate, and zinc).
    - **Gastritis** (inflammation of the stomach lining).
    - **Acid reflux** and **ulcer formation**.
- Chronic alcohol use can damage the **pancreas**, further impairing digestion.

Immune and Inflammatory Effects

- Alcohol activates immune cells in the gut, increasing **cytokine release** (inflammatory molecules).
- This chronic inflammation contributes to:
    - **Irritable bowel syndrome (IBS)**

- **Liver inflammation (alcoholic hepatitis)**
- **Increased infection risk**

Gut–Brain Consequences of alcohol

Disruption of the gut microbiome can alter neurotransmitter production (e.g., serotonin, GABA).

This may lead to:

- **Anxiety or depression**
- **Sleep disturbances**
- **Cognitive decline**

The result: Alcohol affects both the **gut and the brain**, forming a harmful feedback loop.

Recovery and Protection

To reduce or reverse alcohol-related gut damage:

- **Stop alcohol consumption.**
- Eat a **fiber-rich, probiotic diet** (yogurt, kefir, sauerkraut).
- **Stay hydrated**.
- Include **antioxidant-rich foods** (fruits, vegetables, green tea).
- Consult healthcare professionals if chronic digestive symptoms persist.

15. GLUTEN

Gluten-related inflammation may contribute to mental health issues such as anxiety, depression, and cognitive dysfunction—even in people without celiac disease.

🌾 What Is Gluten and Why It Matters

- **Gluten** is a protein found in wheat, barley, and rye.
- In people with **celiac disease**, gluten triggers an autoimmune response that damages the small intestine and can lead to systemic inflammation.
- Even those without celiac disease may experience **non-celiac gluten sensitivity**, which can cause symptoms including fatigue, brain fog, and mood disturbances.

🔥 Inflammation and the Brain

- Gluten-induced inflammation can release **cytokines**, inflammatory chemicals that enter the bloodstream and may cross the **blood-brain barrier**, affecting brain function.
- This inflammation is linked to:
    - **Mood disorders** like depression and anxiety
    - **Cognitive issues** such as memory problems and brain fog
    - **Behavioral changes** including irritability and fatigue

Mental Health Impacts

- Studies suggest gluten may influence **neurotransmitter activity**, particularly serotonin, which plays a key role in mood regulation.
- People with gluten sensitivity often report:
    - Increased **anxiety and depression**
    - Difficulty concentrating or **mental fatigue**
    - **Sleep disturbances** and emotional instability

16. BEST FOODS FOR MENTAL HEALTH

The brain needs a steady supply of **nutrients** to function properly.

Certain foods can help:

- Improve **mood and focus**
- Reduce **anxiety and depression**
- Support **memory and brain health**

“You are what you eat” applies to your **mind** too!

Key Nutrients for Mental Health

Nutrient	Role in Brain Health	Food Sources
Omega-3 fatty acids	Build brain cell membranes; reduce inflammation	Fatty fish (salmon, sardines), flaxseeds, walnuts
B vitamins (especially B6, B12, folate)	Support neurotransmitter production (serotonin, dopamine)	Leafy greens, eggs, beans
Magnesium	Calms the nervous system; reduces anxiety	Spinach, pumpkin seeds, almonds, dark chocolate
Zinc	Helps regulate mood and brain signaling	Oysters, nuts, chickpeas, meat
Vitamin D	Linked to serotonin synthesis and mood	Sunlight, fatty fish, egg yolks

Nutrient	Role in Brain Health	Food Sources
Antioxidants	Protect brain cells from stress	Berries, colorful vegetables, green tea

Brain-Boosting Food Groups

🐟 **1. Fatty Fish**

- Rich in **EPA and DHA omega-3s**
- Supports memory, learning, and emotional regulation
- Examples: salmon, mackerel, sardines, trout

🌾 **2. Whole Grains**

- Provide steady glucose for brain energy
- Contain fiber and B vitamins
- Examples: oats, quinoa & brown rice

3. Leafy Greens & Vegetables

- High in **folate, magnesium, and antioxidants**
- Linked to slower cognitive decline
- Examples: spinach, kale, broccoli

🍓 **4. Berries & Colorful Fruits**

- Rich in **flavonoids** and antioxidants
- Improve memory and protect against stress
- Examples: blueberries, blackberries, oranges, apples

5. Nuts & Seeds

- Provide **healthy fats**, **magnesium**, and **tryptophan**
- Support serotonin production
- Examples: walnuts, almonds, pumpkin seeds, chia seeds

6. Fermented Foods

- Contain **probiotics** that improve gut microbiome balance
- Support mood via the **gut–brain axis**
- Examples: yogurt, kefir, kimchi, sauerkraut

🍫 7. Dark Chocolate

- Contains **flavonoids**, **magnesium**, and **serotonin precursors**
- Boosts mood and focus (in moderation!)

8. Water & Green Tea

- Dehydration can impair concentration and mood
- Green tea contains **L-theanine**, which promotes calm alertness

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4. Foods That Can Harm Mental Health

- **Sugar** → mood swings, fatigue
- **Ultra-processed foods** → inflammation and gut imbalance
- **Trans fats** → impair cell function and mood (microwave popcorn, frozen pizza, fries, doughnuts, fried chicken..
- **Caffeine or alcohol** → disrupt sleep and anxiety balance

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5. The Gut–Brain Link

- A healthy gut = a healthy mind
- Eat for your **microbiome**:
    - **Prebiotic foods:** garlic, onions, bananas, asparagus
    - **Probiotic foods:** yogurt, miso, kombucha

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6. Sample "Mood-Boosting Plate"

Meal	Example
Breakfast	Oatmeal topped with berries and walnuts
Lunch	Grilled salmon with quinoa and leafy greens
Snack	Yogurt with chia seeds and dark chocolate
Dinner	Lentil soup with veggies and olive oil
Drink	Green tea or water with lemon

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7. Summary

✅ Focus on **whole, unprocessed foods**

✅ Include **omega-3s, antioxidants, and probiotics**

✅ Limit **sugar, no alcohol, and avoid processed snacks**

✅ Remember: **Good food = good mood!**

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