

For **hormone balance, anxiety, and mental health issues**, the **Organic Acid Test (OAT)** provides crucial insights into **neurotransmitter metabolism, adrenal function, oxidative stress, and detox pathways**, all of which influence **mood, anxiety, and hormone regulation**.

## **Key Markers for Hormones, Anxiety, and Mental Health:**

### **1. Neurotransmitter Metabolism (Mood, Anxiety, Depression, and Focus)**

- **HVA (Homovanillic Acid) → Dopamine Metabolism**
  - **Low HVA** → Can indicate **low dopamine**, contributing to **low motivation, fatigue, depression, ADHD, and executive dysfunction**.
  - **High HVA** → Can indicate excessive dopamine breakdown, often linked to **stress, agitation, and impulsivity**.
- **VMA (Vanillylmandelic Acid) → Norepinephrine/Epinephrine Metabolism**
  - **Low VMA** → Suggests low **norepinephrine/epinephrine**, leading to **fatigue, low energy, and poor stress response**.
  - **High VMA** → May indicate excessive **stress response, hypervigilance, anxiety, and adrenal overactivation**.
- **HVA/VMA Ratio**
  - **High Ratio** → Can suggest a **dopamine-dominant state**, linked to **anxiety, irritability, and aggression**.
  - **Low Ratio** → Can indicate **norepinephrine dominance**, leading to **low motivation, depression, and sluggishness**.
- **5-HIAA (5-Hydroxyindoleacetic Acid) → Serotonin Metabolism**
  - **Low 5-HIAA** → Suggests low **serotonin**, which is associated with **depression, anxiety, sleep disturbances, and PMS**.
  - **High 5-HIAA** → May indicate excessive serotonin metabolism, sometimes due to **stress, inflammation, or SSRI use**.

- **Quinolinic Acid → Neuroinflammation & Excitotoxicity**
  - **High levels** are linked to **chronic stress, anxiety, depression, brain fog, and neurotoxicity**.
  - Can indicate **overactive immune response** (common in anxiety and depression).
- **Kynurenic Acid → Inflammation & Glutamate Balance**
  - Imbalances suggest **neuroinflammation**, which can contribute to **mood disorders, cognitive decline, and poor stress resilience**.

## 2. Adrenal Function & Stress Response

- **Pyroglutamic Acid → Glutathione & Detox Pathway**
  - **Low levels** → Indicate **poor stress resilience, adrenal fatigue, and oxidative stress**, all of which affect **hormone balance and anxiety levels**.
- **2-Hydroxybutyric Acid → Early Stress & Oxidative Stress Indicator**
  - **High levels** suggest excessive **stress response**, leading to **adrenal burnout, anxiety, and hormonal imbalances**.
- **Orotic Acid → Ammonia Detox & Liver Function**
  - **Elevated levels** may indicate **liver detox issues**, which can impact **hormone metabolism** and contribute to **brain fog, fatigue, and anxiety**.

### 3. Estrogen, Progesterone, and Cortisol Balance

- **Citric Acid (Krebs Cycle Marker)**
  - **Low levels** indicate **poor mitochondrial function**, affecting **hormone production, energy, and mood stability**.
  - Often found in **adrenal fatigue, estrogen dominance, and anxiety disorders**.
- **Succinic Acid → Mitochondrial Function & Hormone Production**
  - **Low levels** are associated with **low energy, adrenal insufficiency, and hormone imbalances**.
- **Methylmalonic Acid (MMA) → Vitamin B12 Status**
  - **Low B12 levels** contribute to **depression, memory issues, and nervous system dysfunction**.
- **Pyridoxic Acid (Vitamin B6) → Neurotransmitter Support**
  - **B6 is essential for serotonin and dopamine production**, so **low levels** can worsen **mood disorders, anxiety, and PMS**.
- **Pantothenic Acid (Vitamin B5) → Adrenal & Stress Support**
  - **Low levels** impact **cortisol production**, leading to **burnout, anxiety, and poor hormone regulation**.

### 4. Oxidative Stress & Inflammation (Affects Mood & Hormones)

- **Oxalic Acid → Pain, Inflammation, and Energy Production**
  - High levels can contribute to **fatigue, brain fog, and oxidative stress**, which impact **mental clarity and hormone function**.
- **CoQ10 (Ubiquinone) → Mitochondrial Energy & Antioxidant Support**
  - **Low levels** are linked to **fatigue, depression, and poor hormonal balance**.

## 5. Detoxification (Liver Detox & Hormone Metabolism)

- **Glucaric Acid → Estrogen Detoxification**
  - **Elevated levels** may indicate impaired **estrogen metabolism**, leading to **estrogen dominance, PMS, and mood swings**.
- **Xanthurenic Acid → Tryptophan Metabolism & Estrogen Connection**
  - Imbalances suggest **estrogen dominance and serotonin issues**, which can worsen **PMS, anxiety, and mood instability**.

### Summary:

For **hormone balance, anxiety, and mental health**, focus on these key markers:

✓ **Neurotransmitter metabolism** (HVA, VMA, 5-HIAA, Quinolinic Acid) →

Determines **dopamine, serotonin, and norepinephrine function**.

✓ **Adrenal markers** (Pyroglutamic Acid, 2-Hydroxybutyric Acid) → Measures **stress resilience and burnout risk**.

✓ **Mitochondrial function** (Citric Acid, Succinic Acid) → Affects **hormone production and energy levels**.

✓ **Vitamin markers** (MMA, Pyridoxic Acid, B5) → Supports **neurotransmitter and hormone balance**.

✓ **Detox & estrogen metabolism** (Glucaric Acid, Xanthurenic Acid) → Impacts **PMS, mood swings, and estrogen dominance**.