Mental Health
The Kynurenine Pathway

Custom Metabolic Assays To Uncover Hidden Factors of Illness

Tryptophan Metabolites & Neuroinflammation

Cognitive Fatigue & Long Covid Syndrome

Pro-Inflammatory Mediators

Quantifying REDOX Balance

Methylation Patterns

Circadian Regulation

Let Our Clinical Diagnostic Laboratory Experts Support Your Clinical Decision Making

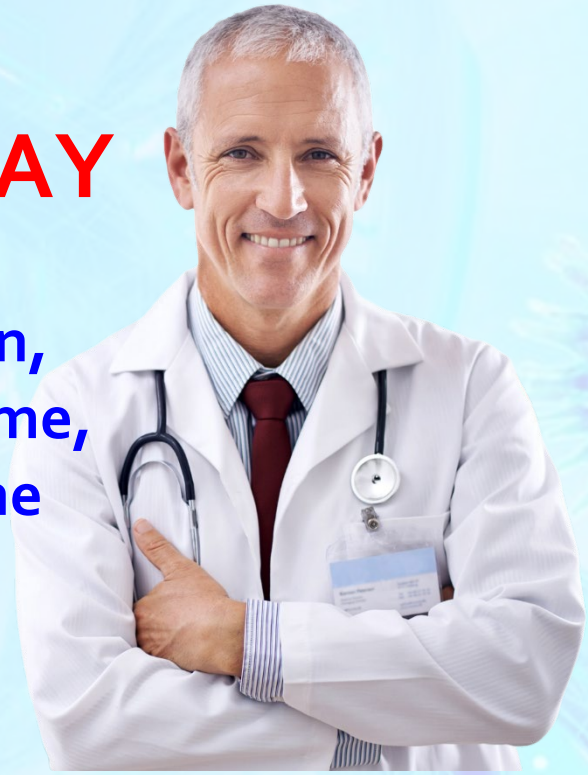
Longevity NUTRICARE
Where Health Gets Perfected

Longevity NutriCare LLC is a CLIA Accredited Laboratory located at 6605 Cypresswood Drive, Suite 125, Spring, Texas 77379

Support@LongevityNutriCare.com * 281-369-9471 * LongevityNutriCare.com

KYNURENINE PATHWAY

Addressing Chronic Inflammation, Brain Fatigue, Long Covid Syndrome, Mental Health And Sleep Hygiene



Kynurenine Pathway

TRYPTOPHAN

Serotonin Synthesis

Cytokines

IDO

INFLAMMATION

Kynurenine

5-HTP

DDC

Neuroprotective

Vitamin B2

Kynurenic Acid

Serotonin

3-OH Kynurenine

Methylation

Microglia

Vitamin B6

Melatonin

Neurotoxic

blocks the binding neurotransmitter glutamate to NMDA receptors.

Quinolinic Acid

Magnesium

NAD+

TRYTOPHAN METABOLISM

Longevity NUTRICARE

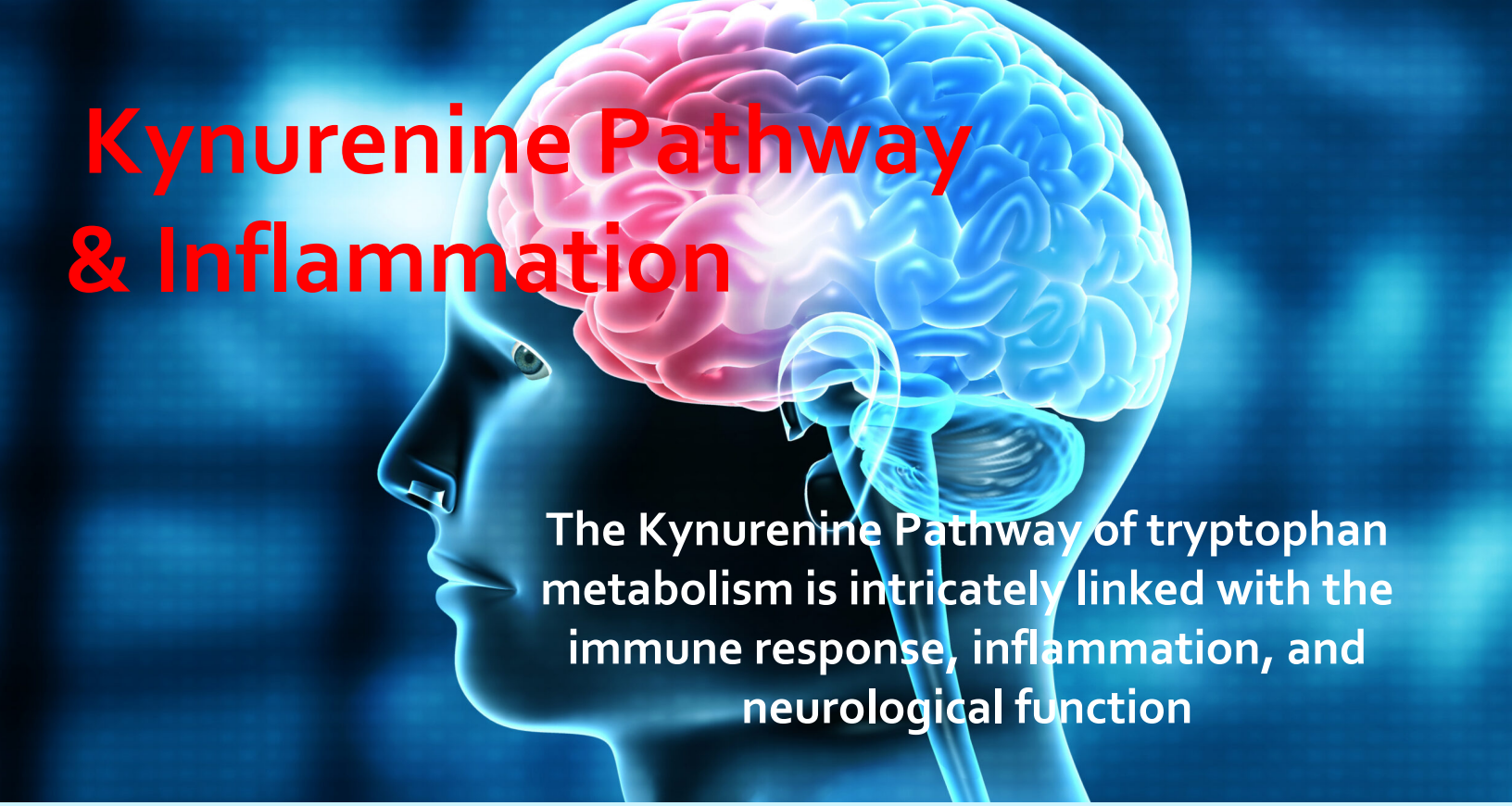
Where Health Gets Perfected

www.LongevityNutriCare.com

Support@LongevityNutriCare.com

The Kynurenine Pathway (KP) of tryptophan metabolism plays a crucial role in the balance between neuroprotection and neurotoxicity. Dysregulation of this pathway has been associated with several neurodegenerative and neuropsychiatric disorders, largely due to the potential role of KP metabolites in mediating neuroinflammation.

1) **Initiation of the Pathway:** The metabolism of tryptophan via the kynurenine pathway begins with its conversion into kynurenine. This step is catalyzed by two primary enzymes: indoleamine 2,3-dioxygenase (IDO) and tryptophan 2,3-dioxygenase (TDO). Both enzymes can be induced by pro-inflammatory stimuli, especially IDO, which is upregulated by pro-inflammatory cytokines like interferon-gamma (IFN-γ).
2) **Neuroactive Metabolites:**
    a) **Kynurenic Acid (KYNA):** Produced in astrocytes, KYNA acts as an antagonist at NMDA and α7 nicotinic acetylcholine receptors. It has neuroprotective effects but, in elevated concentrations, might also contribute to cognitive dysfunctions.
    b) **Quinolinic Acid (QUIN):** This is synthesized in microglia and acts as an NMDA receptor agonist. Elevated levels can lead to excitotoxicity, which is damaging to neurons and is associated with several neurodegenerative conditions.
3) **Neuroinflammation:** An imbalance favoring the production of QUIN over KYNA can contribute to neuroinflammation. QUIN's agonistic action on NMDA receptors can lead to excitotoxic neuronal death. Moreover, QUIN can generate reactive oxygen species (ROS) and exacerbate inflammation. Chronic inflammation can upregulate IDO, leading to a sustained increase in kynurenine metabolites, which further skews the balance towards neurotoxic effects.
4) **Role in Neurodegenerative Diseases:** Dysregulation of the kynurenine pathway is observed in various neurodegenerative conditions, including:
    a) **Alzheimer's Disease (AD):** Elevated levels of QUIN and reduced KYNA levels have been reported in the brains of AD patients. QUIN can promote amyloid-beta aggregation, a hallmark of AD pathology.
    b) **Parkinson's Disease (PD):** KP dysregulation is suggested to be involved in the dopaminergic neuronal loss characteristic of PD.
    c) **Huntington's Disease (HD):** Elevated QUIN levels have been observed in the brains of HD patients and are believed to contribute to the striatal neurodegeneration seen in HD.
5) **Neuropsychiatric Implications:** Changes in the KP have also been associated with neuropsychiatric disorders like depression, schizophrenia, and bipolar disorder. The balance between KYNA and QUIN can influence neurotransmission, synaptic plasticity, and neural integrity, potentially leading to mood and cognitive disturbances.



Kynurenine Pathway & Inflammation

The Kynurenine Pathway of tryptophan metabolism is intricately linked with the immune response, inflammation, and neurological function

Kynurenine Pathway Blood Test
24 Analytes Tested

Tryptophan Metabolites

1) Tryptophan
2) Kynurenine
3) Tryptophan/Kynurenine Ratio
4) Kynurenic Acid
5) Quinolinic Acid
6) 5-Hydroxytryptophan (5-HTP)
7) NAD+/NADH
9) Serotonin
10) Melatonin

Co-Factors

16) Copper
17) Iron
18) Magnesium
19) Vitamin B2
20) Vitamin B6
21) Vitamin B9
22) Active Vitamin B12
23) Vitamin D 25-OH
24) Zinc

Cytokine Storm

11) C-Reactive Protein High Sensitivity (CRPHS)
12) Interleukin-1β
13) Interleukin-6
14) Interleukin-10
15) Tumor Necrosis Factor Alpha

Patient Price: $349.00

Price includes convenient home collection kit, prepaid priority overnight shipping of samples to laboratory

Kynurenine Pathway & Mood Disorders

The Kynurenine Pathway plays a key role in the metabolism of the amino acid tryptophan, leading to the production of various metabolites that impact brain function and neurotransmitter balance

Kynurenine Pathway Mood Disorder Blood Test
30 Analytes Tested

Tryptophan Metabolites

1) Tryptophan
2) Kynurenine
3) Tryptophan/Kynurenine Ratio
4) Quinolinic Acid
5) 5-Hydroxytryptophan (5-HTP)
6) Melatonin (am and pm samples)

Neurotransmitters

8) Acetylcholine
9) Dopamine
10) Glutamate
11) Norepinephrine
12) Gamma-Aminobutyric Acid (GABA)
13) Serotonin

Co-Factors

14) Copper
15) Iron
16) Magnesium
17) Vitamin B2 (Riboflavin)
18) Vitamin B6
19) Vitamin B9 (Folate)
20) Vitamin B12
21) Active Vitamin B12
22) Vitamin C
23) Vitamin D 25-OH
24) Zinc

Inflammation

25) Brain-Derived Neurotrophic Factor (BDNF)
26) C-Reactive Protein (CRP)
27) Homocysteine
28) Interleukin-6 (IL-6)
29) ROS

Additional Markers

30) Cortisol (3 samples collected am, midday, evening

Patient Price: $449.00

Price includes convenient home collection kit, prepaid priority overnight shipping of samples to laboratory

Kynurenine Pathway & Sleep

Within the Kynurenine Pathway, 5-10% of tryptophan is converted into serotonin, which contributes to mood stabilization and sleep regulation

Sleep Health
11 Analytes Tested

Tryptophan Metabolites

1) 5-Hydroxytryptophan (5-HTP)
2) Melatonin
3) Tryptophan
4) Kynurenine
5) Tryptophan/Kynurenine Ratio
6) Quinolinic Acid

Co-Factors

7) Magnesium
8) Vitamin B9 (Folate)
9) Vitamin B12
10) Methyl Vitamin B12

Additional Markers

11) Cortisol (3 samples taken am, midday, evening

Patient Price : $249.00

Price includes convenient home collection kit, prepaid priority overnight shipping of samples to laboratory

DNA Methylation

Methylation is a fundamental biochemical process where a methyl group (CH_3) is transferred and attached to another molecule, typically a larger one, with broad implications in gene regulation, cellular function, development, and disease

DNA Methylation: 15 Analytes Tested

DNA Methylation is a primary epigenetic mechanism. While genetics refers to the actual DNA sequence (the genes), epigenetics refers to external modifications to DNA that turn genes "on" or "off." These modifications do not change the DNA sequence but rather affect how genes are expressed.

Methyl Donors and Nutrition: Methyl groups used in methylation processes come from dietary nutrients, especially folate, vitamin B12, and SAMe (S-adenosyl methionine). Diet can play a significant role in methylation processes, and certain nutrients can either promote or inhibit methylation.

Biochemical (Blood) Markers

1) Homocysteine
2) Iron
3) Magnesium
4) Potassium
5) Vitamin B2 (Riboflavin)
6) Vitamin B3 (Niacin)
7) Vitamin B6
8) Vitamin B9 (Folate)
9) Vitamin B12
10) Methyl Vitamin B12
11) Vitamin D 25-OH
12) Zinc

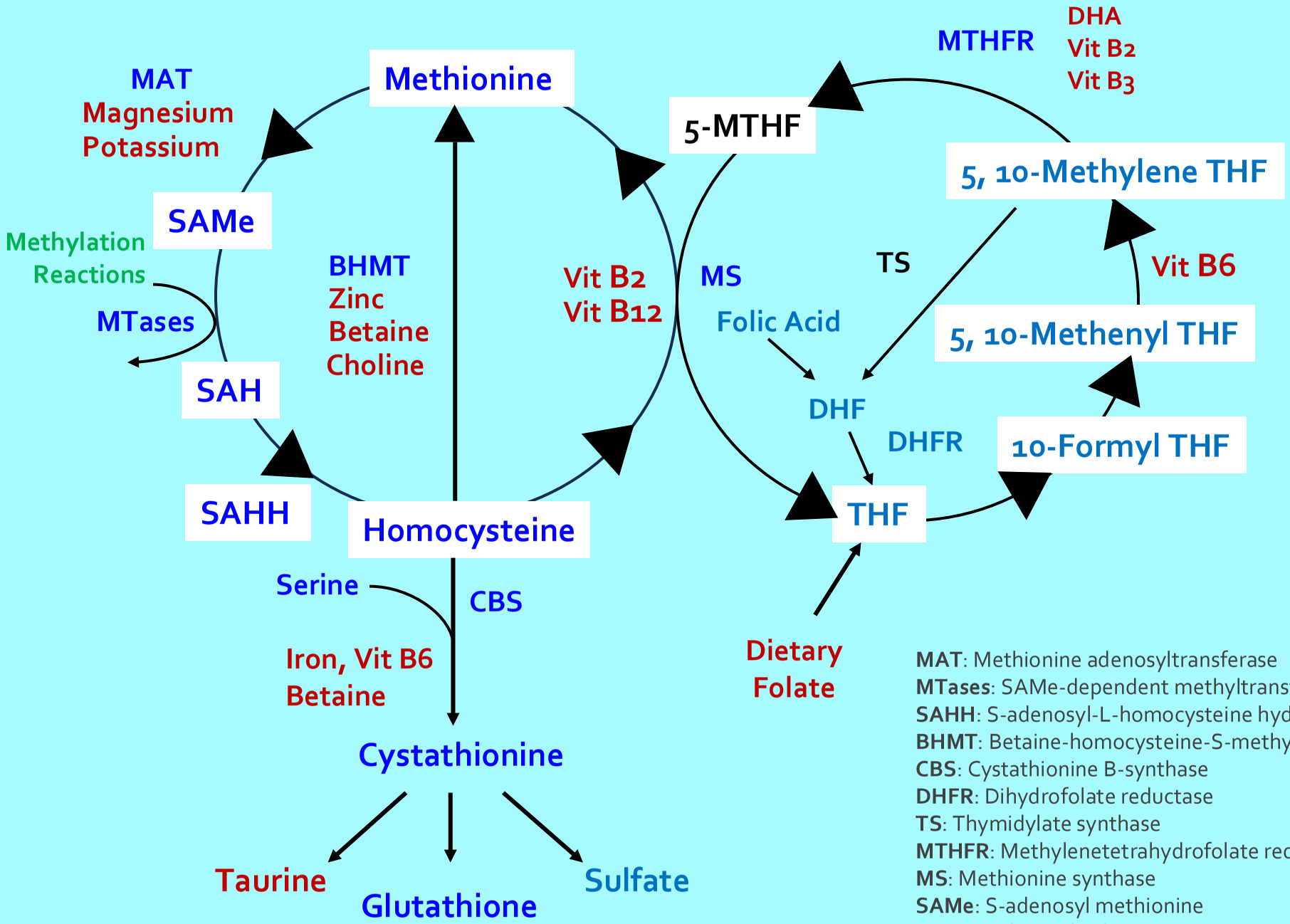
DNA (Genetic) Markers

13) MTHFR
14) MTRR
15) COMT

Patient Price (DNA): $139.00

Patient Price (Blood): $249.00

Price includes convenient home collection kit, prepaid priority overnight shipping of samples to laboratory



MAT: Methionine adenosyltransferase
MTases: SAMe-dependent methyltransferases
SAHH: S-adenosyl-L-homocysteine hydrolase
BHMT: Betaine-homocysteine-S-methyltransferase
CBS: Cystathionine B-synthase
DHFR: Dihydrofolate reductase
TS: Thymidylate synthase
MTHFR: Methylenetetrahydrofolate reductase
MS: Methionine synthase
SAMe: S-adenosyl methionine
SAH: S-adenosyl-L-homocysteine
THF: Tetrahydrofolate
DHF: Dihydrofolate
5-MTHF: L-5-methyltetrahydrofolate

METHYLATION