

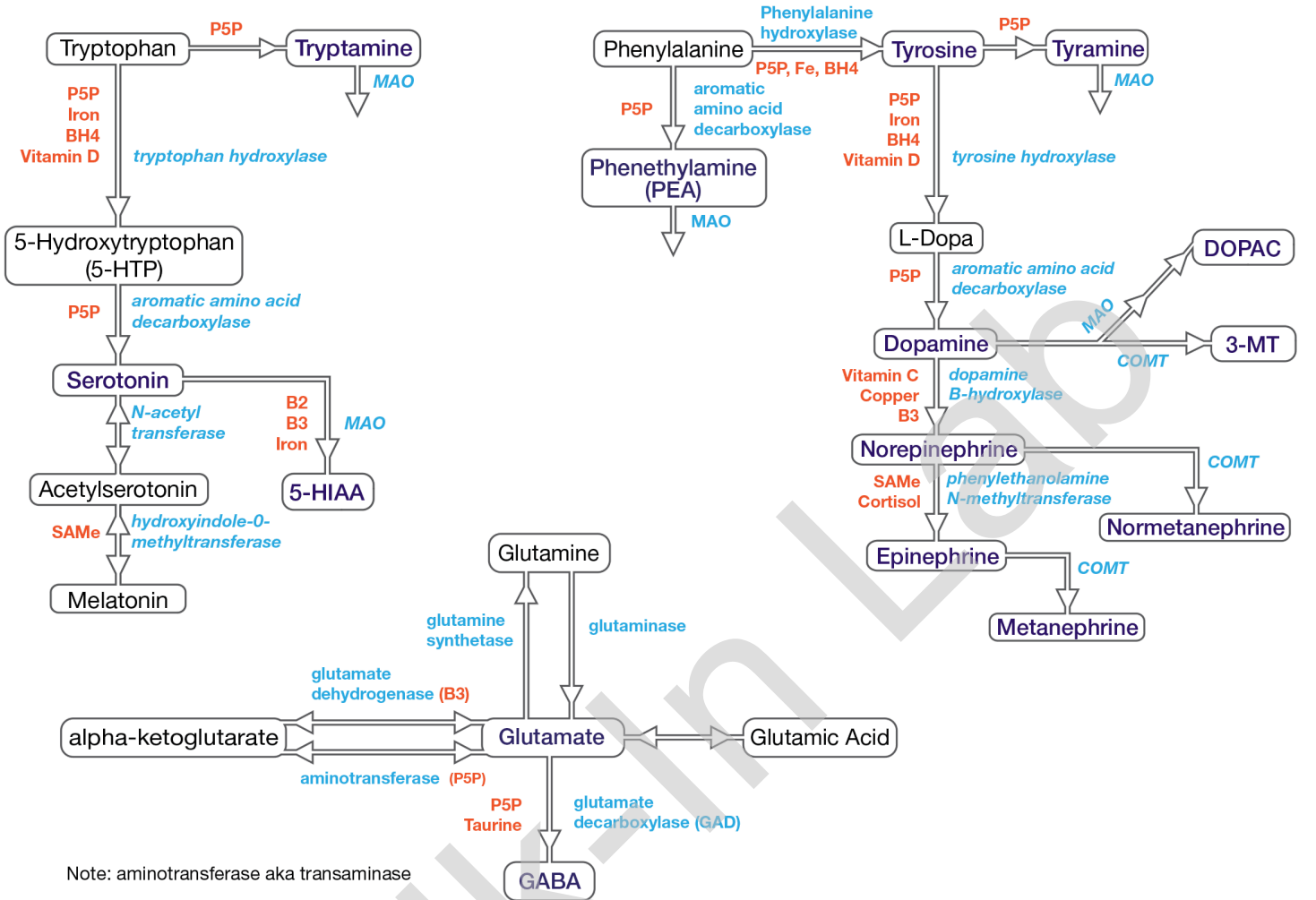
Analyte	Result	Unit per Creatinine	L	WRI	H	Reference Interval
Serotonin	70.2	µg/g				60 – 125
Dopamine	168	µg/g				125 – 250
Norepinephrine	28.7	µg/g				22 – 50
Epinephrine	3.4	µg/g				1.6 – 8.3
Norepinephrine / Epinephrine ratio	8.4					< 13
Glutamate	17	µmol/g				12.0 – 45.0
Gamma-aminobutyrate (GABA)	3.4	µmol/g				2.0 – 5.6
Glycine	804	µmol/g				450 – 2200
Histamine	28	µg/g				14 – 44
Phenethylamine (PEA)	35	nmol/g				32 – 84
Creatinine	25.5	mg/dL				30 – 225



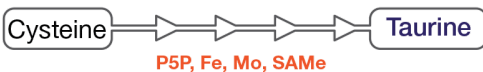
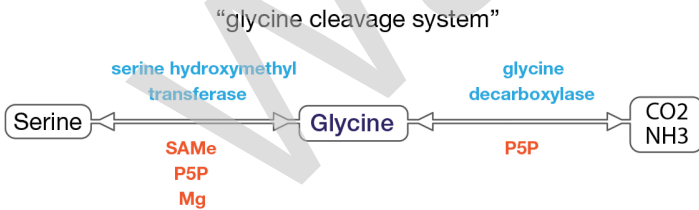
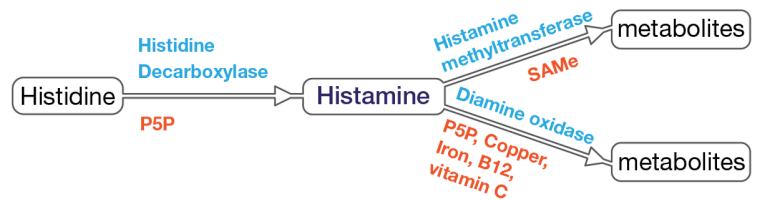
Neurotransmitter Comments:

- Urinary neurotransmitter levels provide an overall assessment of the body's ability to make and break down neurotransmitters and are representative of whole body levels. Neurotransmitters are secreted all through the body, in neurons of the central and peripheral nervous systems, as well as the gastrointestinal microbiome. The enzymes, cofactors and precursors in neurotransmitter metabolism in general are the same in the periphery and in the central nervous system. Therefore abnormal levels of neurotransmitters in urine may provide important clinical information, and may be associated with many symptoms including cognitive and mood concerns, diminished drive, fatigue and sleep difficulties, cravings, addictions and pain, and abnormal abundance and diversity within the gastrointestinal microbiome.
- Low range serotonin may contribute to mood concerns including anxiety, OCD, depression, anger and a sense of discontentment. Low range serotonin may also be associated with poor sleep quality and appetite changes, as well as chronic fatigue, rheumatoid arthritis, and over-all lassitude. Failure to regenerate tetrahydrobiopterin [BH4], an essential cofactor for serotonin synthesis, may decrease serotonin levels, and could be reflected in urine. BH4 regeneration may be supported by folates, vitamin B3, C, molybdenum and zinc. Additionally, production of serotonin requires vitamin D, iron and vitamin B6. Tryptophan is the essential precursor of serotonin. 5-HTP may increase serotonin, and L-theanine may affect serotonin function.
- Considerations to address the demonstrated imbalances beyond the identified co-factors and amino acid precursors may include dosage adjustments if indicated, as well as nervine and adaptogenic herbs, methylation support, vitamin D, and gastrointestinal health optimization.

NT Neurotransmitter Pathways



Note: aminotransferase aka transaminase



KEY

MAO = monoamine oxidase
 Cofactors for MAO: **B2, B3, P5P, Fe, Mg**

COMT = catechol-o-methyl-transferase
 Cofactors for COMT: **SAmE, Mg**

P5P = (pyridoxal-5-phosphate) activated form of vitamin B6

BH4 = (tetrahydrobiopterin)

Endogenous levels can be supported with SAmE, vitamin B3, C, Mo, Zn

MTHF = (methyltetrahydrofolate) active form of folate.

SAmE = endogenous levels can be supported with Mg, MTHF, and methylcobalamin supplementation.

Cofactors = ■ Enzymes = ■