Interpretive Guide for Bloodspot Amino Acids

Intervention Options

Amino Acids	LOW	HIGH
	Balanced or custom mixtures of all essential amino acids are recommended for repletion of low levels. Other specific options are shown below.	
Arginine (Arg)	Arg, 500 mg BID	Mn, 15 mg
Histidine (His)	Folate 800 mcg; His, 500 mg TID	
Isoleucine (Ile)		B_6, 100 mg; Check for insulin insensitivity
Leucine (Leu)		B_6, 100 mg; Check for insulin insensitivity
Lysine (Lys)	Carnitine, 1-2 g	Vitamin C, 1 g BID; Niacin, 50 mg; B_6, 100 mg; Iron, 15 mg: α-KG, 300 mg TID
Methionine (Met)		B_6, 100 mg; α-KG, 600 mg BID; Mg, 200 mg BID; SAM, 200 mg BID
Phenylalanine (Phe)		Iron, 30 mg; Vitamin C, 1 gm TID; Niacin, 50 mg; Low Phe diet
Taurine (Tau)	Tau, 300 mg BID; B_6, 100 mg	Vit. E, 800 IU; Vit. C, 1 gm TID; -Carotene, 25,000 IU; CoQ_{10}, 30 mg; Lipoate
Threonine (Thr)		B_6, 100 mg, Zn, 30 mg
Tryptophan (Trp)	5HTP, 50 mg TID	Niacin, 50 mg; B_6, 100 mg BID
Valine (Val)		B_6, 100 mg; Check for insulin insensitivity

Arginine
Low - often reflects a diet poor in high quality protein, causing arginine to be poorly absorbed. Because arginine is required for nitric oxide production, deficiencies have wide-ranging effects on cardiovascular and other systems.
High - may indicate a functional block in the urea cycle. Manganese activates an arginase enzyme, so supplementing with manganese may help.

Histidine
Low - check dietary protein, or malabsorption if other essential AAs are low. Low histidine is associated with rheumatoid arthritis and folate deficiency.
High - may indicate excessive protein intake.

Isoleucine
Low - a chronic deficiency of this AA can cause hypoglycemia and related problems and loss of muscle mass or inability to build muscle.
High - non-fasting specimen, large intake of this AA or incomplete metabolism of it. If other BCAAs are high, add vitamin B_6 to aid metabolism.

Leucine
Low- potential catabolism of skeletal muscle.
High - see isoleucine

Lysine
Low- either poor dietary intake or too high intake of arginine. Low levels can inhibit transamination of collagen synthesis. If concurrent weakness or high triglycerides, add carnitine.
High - impaired metabolism of lysine. Add vitamin C, niacin, α-KG, vitamin B_6, and iron to enhance utilization of lysine.

Methionine
Low- possible poor-quality protein diet. Adverse effects on sulfur metabolism. Improve dietary methionine intake or supplement.
High - excessive intake of methionine-rich protein or inefficient metabolism. If other sulfur-containing AAs are low, then enhance methionine utilization by adding the necessary cofactors, magnesium and vitamin B_6.

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Phenylalanine
Low - can result in altered thyroid function and catecholamine deficits including symptoms of depression, cognitive disorders, memory loss, fatigue, and autonomic dysfunction. Reduce lifestyle stressors and supplement phenylalanine.
High - high protein intake or a block in the conversion of phenylalanine to tyrosine. Iron, vitamin C, and niacin are necessary for this enzymatic step. Check tyrosine level and, if low, supplement tyrosine and iron.

Taurine
Low - may increase risk for oxidative stress, fat maldigestion, high cholesterol, atherosclerosis, angina, arrythmias, and seizure disorders. Supplement taurine or cysteine and vitamin B6, even if fresh fish or lean meat is eaten. Females do not synthesize taurine as easily as males.
High - may be due to excessive inflammation in the body or to supplementation of other amino acids.

Threonine
Low - associated with the increased catabolic state of diabetes or hyperinsulinemia. Supplement threonine and BCAAs.
High - excessive dietary intake or possible insufficient metabolism of threonine. The initial step here requires (vitamin B_6) and zinc is needed to phosphorylate vitamin B6 to its active coenzyme form, so supplementation with vitamin B_6 and zinc can be helpful.

Tryptophan
Low- commonly correlated with depression, insomnia, and schizophrenia. Supplementation with L-tryptophan or 5-hydroxy-tryptophan (5-HTP) may help. 5-HTP is only one enzymatic step away from serotonin.
High - possibly inadequate metabolism of tryptophan. Required nutrients for this process include niacin and vitamin B_6.

Valine
Low- deficiency in this or other BCAAs indicates potential muscle loss. If several essential amino acids (AAs) are low, check for adequate stomach acid. Supplement the BCAAs.
High - vitamin B6 functional deficit. If other BCAAs are high, vitamin B_6 should be given.

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