2-HG - 2-Hydroxyglutarate
2-HPAA - 2-Hydroxyphenylacetic Acid
3-MG - 3-Methylglutaric Acid
3-MGA - 3-Methylglutaconic Acid
3-PHP - 3-Phosphate Hydroxypyruvate
3-Pser - 3-Phosphoserine
4AB - 4-Aminobutyraldehyde
4ABT - 4-Aminobutyrate Transaminase
4Fe-4S - Tetrakis(Λ³-iron(+) ion) Tetrasulfane Tetrasulfanide
4-HB - 4-Hydroxybenzoic Acid
4-HBA - 4-Hydroxybenzaldehyde
4-HBS - 4-Hydroxybenzoate Synthase
4-HCA - 4-Hydroxycinnamic Acid
4-Mel - 4-Methylimidazole
4-MeIA - Methylimidazole Acetaldehyde
4-MeIAase - 4-Methylimidazole Acetate Hydrolase
5-HIA - 5-Hydroxyindoleacetaldehyde
5-HIAA - 5-Hydroxyindoleacetic Acid
5-MTHF - 5-Methyltetrahydrofolate
5,10-MTHF - 5, 10-Methylene TetrahydroFolate
6PGL - 6-Phosphogluconolactone
6PG - 6-Phosphogluconate
6PGD - 6-Phosphogluconate Dehydrogenase
AA - Amino Acids
AAA - Acetoacetic Acid
AAC - Acetoacetyl-CoA
AADC - Aromatic L-Amino Acid Decarboxylase
AAO - L-Amino-Acid Oxidase
ABCD4 - ATP-Binding Cassette 4
AC - Aconitase
ACAD8 - Isobutyryl-CoA Dehydrogenase
ACADL - Long-Chain Specific Acyl-CoA Dehydrogenase
ACADM - Medium-Chain Specific Acyl-CoA Dehydrogenase
ACADS - Short-Chain Specific Acyl-CoA Dehydrogenase
ACADSB - Short/Branched Chain Acyl-CoA Dehydrogenase
ACADV - Very Long-Chain Specific Acyl-CoA Dehydrogenase
ACMS - 2-Amino-3-Carboxymuconic-6-Semialdehyde
ACSM1/2B - Mitochondrial Medium-chain Acyl-CoA Synthetases
A-CoA - Acetyl-CoA
AChE - Acetylcholinesterase
ACOD - cis-Aconitate Decarboxylase
ACOT - Acyl-CoA Thioesterase
ACOX - Peroxisomal Acyl-Coenzyme A Oxidase
ACSL - Acyl-CoA Synthetase (Long-Chain)
ACSM - Acyl-CoA Synthetase (Medium-Chain)
ACSS - Acyl-CoA Synthetase (Short-Chain)
ACSVL - Acyl-CoA Synthetase (Very Long-Chain)
ACTH - Adrenocorticotropic Hormone
ADC - Arginine Decarboxylase
ADK - Adenylate Kinase (Myokinase)
ADH - Alcohol Dehydrogenase
ADHFE - Hydroxyacid-Oxoacid Transhydrogenase
ADO - 2-Aminoethanethioldioxygenase
AdoCbl(III) - Adenosylcobalamin
ADP - Adenosine Diphosphate
ADS - Adenylsuccinate
ADSL - Adenylosuccinate Lyase
ADSS - Adenylosuccinate Synthetase
AFMID - Arylformamidase
AGAT - Arginine:Glycine Amidinotransferase
AGXT - Alanine-Glyoxylate Aminotransferase
AHCY - S-Adenosylhomocysteine Hydrolase
AICAR - 5-Aminoimidazole-4-Carboxamide Ribonucleotide
AIR - 5-Aminoimidazole Ribonucleotide
AIRS - AIR Synthetase
α-KB - α-ketobutyrate
α-KG - α-Ketoglutarate
α-KGDH - alpha-Ketoglutarate Dehydrogenase (Complex)
Al - Aluminium
Ala - Alanine
ALDH - Aldehyde Dehydrogenase
ALP - Alkaline Phosphatase
ALT - Alanine Aminotransferase
AMP - Adenosine Monophosphate
AMPD - AMP Deaminase
AMPK - AMP-activated Protein Kinase
ARG1 - Arginase
AGS - Agmatinase
AR - Aldose Reductase
AO - Aldehyde Oxidase
APS - Adenosine-5'-Phosphosulfate
APSK - APS Kinase
AQP9 - Aquaporin-9
ASA - Argininosuccinate
ASDC - Aspartate Decarboxylase
ASL - Arginino Succinase
Asp - Aspartate
ASPT - Aspartate Transcarbamoylase
ASS - Argininosuccinate Synthetase
AST - Aspartate Aminotransferase
ASMT - Acetylserotonin O-Methyltransferase
ATP - Adenosine Triphosphate
AUH - Methylglutaconyl-CoA Hydratase
BCKDH - Branched-Chain Alpha-Keto Acid Dehydrogenase (Complex)
BCAT - Branched-Chain-Amino-Acid Aminotransferase
BH4 - Dihydrobiopterin
BH₄ - Tetrahydrobiopterin
BHB - β-hydroxybutyric Acid
BHMT - Betaine-Homocysteine S-methyltransferase
BPG - Biphosphoglycerate
BPGM - BPG Mutase
BPGP - 2,3 BPG Phosphatase
Br - Bromine
Ca - Calcium
CAIR - 5-Aminoimidazole-4-Carboxylate Ribonucleotide
cAMP - Cyclic Adenosine Monophosphate
Car - Carnosine
Car-AcAl-IA - Carnosine-Acetaldehyde-Imidazolidinone Adduct
CAT - Catalase
CBS - Cystathionine B-Synthase
CSAD - Cysteine Sulfinic Acid Decarboxylase
CDO - Cysteine Dioxygenase
CDP - Cytidine 5'-Diphosphate
CK - Creatine Kinase
CGL - Cystathionine gamma-Lyase
CHAC1 - Glutathione-Specific gamma-Glutamylcyclotransferase 1
ChaT - Choline Acetyltransferase
CHDH - Choline Dehydrogenase
Cl - Chloride
CMPK - UMP-CMP Kinase
CNMT - Carnosine N-Methyl Transferase
CNDP - Cytosolic Non-Specific Dipeptidase
CO - Carbon Monoxide
CO₂ - Carbon Dioxide
Co - Cobalt
CoA - Coenzyme A
CN - Hydrogen Cyanide
CNCbl(III) - Cyanocobalamin
Cob(II)alamin [any] - AdoCbl(III), MeCbl(III), OH-Cbl(III)alamin
COMT - Catechol O-methyltransferase
CP - Carbamoyl Phosphate
CPS1 - Carbamoyl Phosphate Synthase1
CR - Carbonyl Reductase
Cr - Chromium
Cre - Creatine
CRH - Corticotrophin-Releasing Hormone
CRNS - Carnosine Synthase
CPT - Carnitine O-Palmitoyltransferase
CS - Citrate Synthase
Cu - Copper
CYP - Cytochrome P450 monooxygenase
DAT - Dopamine Transporter
DAO - Diamine Oxidase
DBH - Dopamine Beta Hydroxylase
DHBA - 3,4-Dihydroxybenzeneacetic Acid
DHF - Dihydrofolate
DHFR - Dihydrofolate Reductase
DHAP - Dihydroxyacetone Phosphate
DHI - 5,6-Dihydroxyindole
DHICA - 5,6-Dihydroxyindole-2-Carboxylic Acid
DHMA - 3,4-Dihydroxymandelaldehyde
DHMC - 3,4-Dihydroxymandelic Acid
DMG - Dimethylglycine
DMGDH - DMG Dehydrogenase
DHO - Dihydroorotate
DHOase - Dihydroorotase
DHODH - Dihydroorotate Dehydrogenase
DOPAC - 3,4-Dihydroxyphenylacetic Acid
DOPAL - 3,4-Dihydroxyphenylacetaldehyde
DPCK - Dephospho-CoA Kinase
DT - L-Dopachrome Tautomerase
dTMP - Thymidine Monophosphate
dUMP - Deoxyuridine Monophosphate
E4P - Erythrose-4-Phosphate
ECHS1 - Enoyl-CoA Hydratase
ENO - Enolase
ENPP - Ectonucleotide Pyrophosphatase/Phosphodiesterase
ETC - Electron Transport Chain
ETHE1 - Sulphur Dioxygenase
F1,6BP - Fructose 1,6-Bisphosphate
F2,6BP - Fructose 2,6-Bisphosphate
F6P - Fructose-6-Phosphate
FAA - 4-Fumarylacetoacetic Acid
FAAS - Fumarylacetoacetase
FAD - Adeflavin
FADS - FAD Synthetase
FAICAR - 5-Formamidoimidazole-4-Carboxamide Ribonucleotide
FBPase - Fructose 1,6-Bisphosphatase
FBPase2 - Fructose 2,6-Bisphosphatase
Fe - Ferritin
FGAM - Formylglycinamidine Ribonucleotide
FGAR - Formylglycinamide Ribonucleotide
FIGLU - Formimidoylglutamic Acid
FIGLU-THF - Formiminoglutamate-THF
FMN - Flavin Mononucleotide
FMO - Flavin Monooxygenase
FOLH - Folate Hydrolase
FR - Flavin Reductase (uncharacterised, possibly MMACHC)
FS - Fumarase
FT - Formiminotransferase
FTase - AICAR Transformylase
FTCD - Formiminotransferase Cyclodeaminase
G3P - Glycerol-3-Phosphate
G3PP - Glycerol-3-Phosphate Phosphatase
G6Pase - Glucose 6-Phosphatase
G6PD - Glucose-6-Phosphate Dehydrogenase
GABA - Gamma-Aminobutyric Acid
GAD - Glutamate Decarboxylase
GAG - Glycosaminoglycan
GAMT - S-Adenosylmethionine:Guanidinoacetate Methyltransferase
GAP - Glyceraldehyde-3-Phosphate
GAPDH - Glyceraldehyde 3-Phosphate Dehydrogenase
GARS - GAR Synthetase
GARTfase - GAR Transformylase
GAT - Guanidinoacetate
GBBH - gamma-Butyrobetaine Hydroxylase
GCA - gamma-Glutamylcysteine Synthase
GCH1 - GTP Cyclohydrolase I
GCL - Glutamate-Cysteine Ligase
GDP - Guanosine Diphosphate
GDH - Glutamate Dehydrogenase
GFAT - Glutamine:Fructose-6P Amidotransferase
GGCT - gamma-Glutamyl Cyclotransferases
GHB - γ-Hydroxybutyrate
GK - Glucokinase
Glc-1,6-BP - Glucose-1,6-Bisphosphate
GlcNAc - N-Acetylglucosamine
GlcNAc-1-P - GlcNAc 1-Phosphate
GlcNAc-6-P - GlcNAc 6-Phosphate
GLN - Glutaminase
Gln - Glutamine
GLS - Glutathione Synthase
Gly - Glycine
GLYCK - Glycerol Kinase
GLYDH - Glycolaldehyde Dehydrogenase
GLYP - Glycogen Phosphorylase
GLYS - Glycogen Synthase
Glut - Glutamate
GNMT - Glycine N-Methyltransferase
GOR - Glyoxylate Reductase
GOX - Glycolate Oxidase
GPD - Glycerol-3-Phosphate Dehydrogenase
GPX - Glutathione Peroxidase
GR - Glutathione Reductase
GS - Glutamine Synthetase
GS-Ado - S-Adenosylglutathione
GS-Me - S-Methylglutathione
GSA - Glutamate-5-Semialdehyde
GSH - Glutathione, reduced
GSK3β - Glycogen Synthase Kinase-3 beta
GSSG - Glutathione disulfide (oxidised)
GSSH - Glutathione Persulfide
GTP - Guanosine Triphosphate
GTase - Glycosyltransferases
H - Hydrogen
H₂O - Water
H₂O₂ - Hydrogen Peroxide
H2S - Hydrogen Sulfide
H2NTP - 7,8-Dihydroneopterin Triphosphate
HAAO - 3-Hydroxyanthranilic Acid Dioxygenase
HAL - Histidine Ammonia-Lyase
HAS - Hyaluronic Acid Synthase
HADH - 3-Hydroxyacyl-CoA Dehydrogenase
HBDH - Hydroxybutyrate Dehydrogenase
HCDH - 3-Hydroxyacyl-CoA Dehydrogenase
HCO₃⁻ - Bicarbonate
HDC - Histidine Decarboxylase
HK - Hexokinase
HIBADH - 3-Hydroxyisobutyrate Dehydrogenase
HIBCH - 3-Hydroxyisobutyryl-CoA Hydrolase
HICA - 2-Hydroxyisocaproate
HIF - Hypoxia-Inducible Factor
HIVA - 2-Hydroxyisovalerate
HGA - Homogentisic Acid
HGD - Homogentisate 1,2-Dioxygenase
HMGCL - Hydroxymethylglutaryl-CoA Lyase
HMPAL - 3-Methoxy-4-Hydroxyphenylacetaldehyde
HMT - Histidine Methyltransferase
HOGA - 4-Hydroxy-2-Ketoglutarate Aldolase
HPCL - HydroxyPyruvate Carboxy-Lyase
HPRT - Hypoxanthine-Guanine Phosphoribosyltransferase
HT - Histidine Transaminase
HTMLA - β-hydroxy-κ-N-trimethyllysine Aldolase
HTDH - Hypotaurine Dehydrogenase
HVA - Homovanillic Acid
HYPDH - 4-Hydroxyproline Dehydrogenase

I - Iodine
IAA - Imidazole Acetaldehyde
IAcA - Imidazole Acetic Acid
IAL - Imidazolelactate-Lyase
ICL - Isocitrate Lyase
IDH - Isocitrate Dehydrogenase
IDO - Indoleamine 2,3-Dioxygenase
IFN - Interferon
IMP - Inosine Monophosphate
IMPDH - IMP Cyclohydrolase
IP3 - Inositol Trisphosphate
IQ - Indole-5,6-Quinone
IVD - Isovaleryl-CoA Dehydrogenase
K - Potassium
KADC - Ketoacid Decarboxylase (Microbial)
KAT - Kynurenine Aminotransferase
KIC - alpha-Ketoisocaproate
KIV - alpha-Ketoisovalerate
KMBA - 2-Oxo-4-Methylbutyric Acid
KMO - Kynurenine 3-Monooxygenase
KYNU - Kynureninase
LDH - Lactate Dehydrogenase
LMBD1 - Lysosomal Cobalamin Transport Escort Protein
LPA - Lipoamide
LPH4 - Lactoyl-PH4
MAA - Maleylacetoacetic Acid
MAAI - Maleylacetoacetate Isomerase
MAS - Malate Synthase
MAO - Monoamine Oxidase
MDH - Malate Dehydrogenase
ME1 - NADP-dependent Malic Enzyme
MeCbl(III) - Methylcobalamin
MetHb - Methemoglobinemia
Mg - Magnesium
MHPG - 3-Methoxy-4-Hydroxyphenylglycoaldehyde
MIF - Macrophage Migration Inhibitory Factor
MA - Methylmalonic Aciduria
MCCC - Methylcrotonoyl-CoA Carboxylase
MMAA - (Cbl)A MA Type A protein, GTPase
MMAB - (Cbl)B ATPCob(I)alamin Adenosyltransferase
MMACHC - (Cbl)C MA and Homocystinuria Type C protein
MMADHC - (Cbl)D MA and Homocystinuria Type D protein
MMCM - Methylmalonyl-CoA Mutase
MMC-R - Methylmalonyl-CoA Racemase
MMP - Matrix Metalloproteinase
MMSA - Methylmalonic Semialdehyde
Mn - Manganese
Mo - Molybdenum
Mo-MPT - Mo-Molybdopterin
MS - Methionine Synthase
MT - Methionine Transaminase
MTA - 5'-Methylthioadenosine
MTHFR - Methylene TetraHydroFolate Reductase
MTR - 3-Methoxytyramine
MTRR - Methionine Synthase Reductase
NTSC2 - Cytosolic 5'-nucleotidase II
Na - Sodium
Na+/K+-ATPase - Sodium-Potassium ATP Pump
N-Ac-Put - N-Acetyl-Putrescine
N-Ac-ABAL - N-Acetyl-Gamma-Aminobutyraldehyde
N-Ac-GABA - N-Acetyl-Gamma-Aminobutyrate
NAD - Nicotinamide Adenine Dinucleotide
NADK - NAD Kinase
NADPT - NAD(P)+ Transhydrogenase
NADSYN - NAD Synthetase
NAGK - N-Acetylglucosamine Kinase
NAM - Nicotinamide
NAMPT - Nicotinamide Phosphoribosyltransferase
NAPRT - Nicotinate Phosphoribosyltransferase
N-AS - N-Acetylspermine
N-ASD - N-Acetylspermidine
NCS - Norcoclaurine Synthase
NDPK - Nucleoside Diphosphokinase
NET - Norepinephrine Transporter
NH₃ - Ammonia
NMNAT - Nicotinamide Mononucleotide Adenylyltransferase
NO - Nitric Oxide
NOS - Endothelial Nitric Oxide Synthase
O₂ - Oxygen
OAA - Oxaloacetate
OAADPR - 2'-O-Acetyl-ADP-Ribose
OAT - Ornithine Aminotransferase
ODC - Ornithine Decarboxylase
OH-Cbl(III)alamin - Hydroxycobalamin
OH-ENPP - 4-Hydroxy-Enol-Phenylpyruvate
OH-Glut - 4-Hydroxyglutamate
OH-GlutSA - 4-Hydroxyglutamate Semialdehyde
OH-KG - 4-Hydroxy-2-Ketoglutarate
OH-P5C - Pyrroline Hydroxycarboxylate
OH-PA - 4-Hydroxyphenylacetaldehyde
OH-PAA - 4-Hydroxyphenylacetic Acid
OH-PD - 4-Hydroxyphenylpyruvate Dioxygenase
OH-PHA - 1-Hydroxy-2-Oxopropryl Tetrahydropterin
OH-PLA - Hydroxyphenyllactic Acid
OH-PPA - 4-Hydroxyphenylpyruvic Acid
OH-PPD - 4-Hydroxyphenylpyruvate Dioxygenase
OH-Pyr - Hydroxypyruvate
OMP - Orotidine-5'-Monophosphate
OMPDC - OMP Decarboxylase
OPRT - Orotate Phosphoribosyltransferase
OTC - Ornithine Transcarbamoylase
Ox - Oxalate
OXH - Oxaloacetase (Microbial)
P5C - Pyrroline-5-Carboxylate
P5CR - P5C Reductase
P5P - Pyridoxal 5'-Phosphate
PA - Phenylacetic Acid
PAcAL - Phenylacetaldehyde
PAGM - Phosphoacetylglucosamine Mutase
PAGN - Phenylacetylglutamine
PAGS - Phenylacetylglutamine Synthetase
PAH - Phenylalanine Hydroxylase
PAICS,C - AIR carboxylase
PAICS,N - SAICAR synthetase
PALA - Pyruvaldehyde
PAMOAT - Pyridoxamine:Oxaloacetate Aminotransferase
PAN - Pantetheine Kinase
PAO - Polyamine Oxidase
PAP - Adenosine 3',5'-Diphosphate
PAPS - 3'-Phosphoadenosine-5'-Phosphosulfate
PAT - Phenylalanine Aminotransferase
PATK - Panthenate Kinase
PC - Phosphocreatine
PCB - Pyruvate Carboxylase
PCC - Propionyl-CoA Carboxylase
PDH - Pyruvate Dehydrogenase (Complex)
PDH-OP - O-Phospho-L-Seryl-PDH E1 alpha Subunit
PDK - Pyruvate Dehydrogenase Kinase
PDP - Pyruvate Dehydrogenase Phosphatase
PEPC - Phosphoenolpyruvate Carboxykinase
PEPCK - Phosphoenolpyruvate Carboxykinase
PFAS - Phosphoribosylformylglycinamidine Synthase
PFK-1 - Phosphofructokinase
PFK-2 - 6-Phosphofructo-2-Kinase
PGAM - Phosphoglycerate Mutase
PGCtα - PPAR-gamma Coactivator 1-Alpha
PGI - Phosphoglucose Isomerase
PGK - Phosphoglycerate Kinase
PGLS - 6-Phosphogluconolactonase
PGM - Phosphoglucomutase
PHACA - Phenylacetate 2-Hydroxylase
PHGDH - Pyridoxine 3-Hydroxy-5-Carboxylate Dehydrogenase
PHD - Prolyl Hydroxylase
PHGDH - Phosphoglycerate Dehydrogenase
PHT - Phenylpyruvate Tautomerase
Pi - Phosphate
PK - Pyridoxal Kinase
PKM - Pyruvate Kinase
PKA - Protein Kinase A
PKC - Protein Kinase C
PLA - Phenylacetic Acid
PLD - Prolidase
PMP - Pyridoxamine 5'-Phosphate
PNMT - Phenylethanolamine N-Methyltransferase
PNP - Purine Nucleoside Phosphorylase
PNPO - Pyridoxine 5'-Phosphate Oxidase
PPA - Phenylpyruvic Acid
PPAR - Peroxisome Proliferator-Activated Receptor
PPAT - Amidophosphoribosyltransferase
PPGB - Lysosomal Protective Protein

COLOUR KEY (Labels)

ATP, ADP, AMP, GTP, GDP
TPP
FAD, FMN
NAD+, NADH, NADP, NADPH
P5P
Q, QH₂
REACTION
TRANSAMINATION
TRANSPORTERS
MICROBIAL / PATHOGENIC
PROMOTER
INHIBITOR
*MDX OAT MARKER#
(Others - Illustrative)

*For data interpretation purposes, only.
I am not affiliated with, endorsed by,
or sponsored by MosaicDX

Vitamin B6 Metabolism

Pyridoxine 5'-Phosphate
Pyridoxal 5'-Phosphate
Pyridoxamine 5'-Phosphate
Pyridoxine
Pyridoxal
Pyridoxamine
Extracellular Space
Inner Cell Membrane
Oxalate Metabolism
Glycolaldehyde
Pyridoxine
Pyridoxal
Pyridoxamine
Pyridoxine 5'-Phosphate
P5P
PMP
Caffeine, pH >7.3
Acetaldehyde
Taurine, Pantothine

Purine Metabolism

Xanthine
Urate
Hypoxanthine
Inosine
IMP
ADS
AMP
Purine Nucleotide Cycle (Muscle)
Peroxynitrite
Spontaneous
Superoxide
FAICAR
SAICAR
AICAR
ADSL
Fumarate
PRPP
Acetaldehyde, eATP, TNF-α, IL-1β, IL-6, LPS, Angiotensin II, Hypoxia, ROS, Histamine, IFN-γ, IFN-α (Fibroblasts)

Pyrimidine Metabolism

Uracil
UDP
UTP
Uridine
UMP
OMP
Orotate
DHO
CP-Asp
CP
Carbamoyl Phosphate Synthetase II
Aspartate Transcarbamylase
Dihydroorotase
Dihydroorotate Dehydrogenase
Orotate Phosphoribosyltransferase
OMP Decarboxylase
UMP-CMP Kinase
Nucleoside Diphosphokinase
Nucleoside Triphosphate Pyrophosphohydrolase
Ribonucleotide Reductase
Thymidylate Synthase
Thymidine Kinase
Deoxycytidylate Deaminase
Deoxyuridine Triphosphatase
Thymidylate Kinase
Nucleoside Diphosphokinase
Ribonucleotide Reductase
Thioredoxin Reductase
Glutaredoxin
Glutathione Reductase
Thioredoxin
Ribonucleotide Reductase
Glutaredoxin
Glutathione Reductase
Glutathione
Ribonucleotide Reductase
Thioredoxin Reductase
Thioredoxin
Deoxycytidine Kinase
Deoxycytidine Monophosphate Deaminase
Deoxyuridine Triphosphatase
Thymidylate Kinase
Nucleoside Diphosphokinase
Ribonucleotide Reductase
Glutaredoxin
Glutathione Reductase
Glutathione
Ribonucleotide Reductase
Thioredoxin Reductase
Thioredoxin

Urea Cycle

NO
Citrulline
CP
Ornithine
ASA
Arginine
Agmatine
Creatine
GATM
Urea
Urine
Collagen
2 x AA
Hydroxyproline
OH-Collagen
Collagen Disorders
HED3
Arthritis
HIF-1α Hydroxylation

Polyamine Metabolism

Putrescine
SAMeA
N-Ac-Put
N-Ac-ABAL
N-Ac-GABA
4AB
Astrocyte
N-ASD
N-AS
Spermidine
Spermine
MTA
PRPP
Pentose Phosphate Pathway
PGC1α

BH4 De Novo Synthesis

GTP
H2NTP
PTP
OH-PH4
Formate
GCH1
PTPS
Sepiapterin
SR (Brain)
AR / CR (Peripheral Tissue)
Queuosine, MnSOD, GSH, Vit C, [..]
LPH4
BH4
Non-enzymatic
Oxidative Stress
Bacterial Qu Biosynthesis (GTP → preQ₀ → preQ₁ → Qu)
Diet / Microbiome
Queuosine Synthesis
Queuine
Qu-tRNA (Aspartate, Asparagine, Histidine, Tyrosine)
Other Proteins With Aspartate, Asparagine, Histidine, Tyrosine
Qu-tRNA (Queuosine at position 36)

Vitamin B12 Metabolism

Cob(III)alamin [any]
Lysosome
Cytosol
ABCD4 + LMBD1
OH-Cob(III)alamin
CNCbl(III)
Cob(II)alamin
AdoCbl(III)
MeCbl(III)
Cob(I)alamin
MMACHC
MMADHC
MMAA
MMAB
MMAA
MMAB
GS-Ado, SAH, H⁺
GS-Me, SAH, H⁺
GSH, SAMe
Methionine
Homocysteine
MS
MTRR
MTHFR
MMA-CoM-Co

Tryptophan Metabolism

N-Acetylserotonin
Serotonin
Melatonin
5-HTP
Tryptophan
Tryptophan Biosynthesis Pathway
SAT + Heme
S. marcescens, HSV-1
Oxidative Stress, Hypoxia
Ca, LPA, cAMP-PKA
HSV-1
ASMT
AADC
TPH + Fe
BH₄
O₂

Kynurenine Pathway

Kynurenate
Kynurenine
N-L-formylkynurenine
3-Hydroxykynurenine
3-Hydroxyanthranilic Acid
Quinolinate
ACMS
<SPONTANEOUS>
Aflatoxin B1, Territrem B, Cytosol, Nattokinase, Acetyl-L-Carnitine
IFN-γ, IFN-α, TNF-α, Cortisol
IDO1 + Heme
KMO + FAD + Fe
KYNU + P5P
HAAO + Fe
Oxidative Stress

NAD+ Pathway

Nicotinic Acid Mononucleotide
Nicotinic Acid
Nicotinic Acid Dinucleotide
NAD+
NADP
Nicotinamide
Nicotinamide Mononucleotide
NAPRT
NAMPT
NADSYN1
NADK
NMNAT1 + Zn²⁺
NMNAT2/3
cAMP-PKA
MAPK, TNF-α, Low Oestrogen -> Low SIRT3
PKC
Aspergillus
Isocitrate
NADP IDH + Mg²⁺
α-KG

Glucose Metabolism

Serum Glucose
Glucose
Glucose 1-Phosphate
Glucose 6-Phosphate
UDP-Glucose
UDP-Glucuronic Acid
Glycogen
Glycogenin
Glycogen Primer
Fructose 6-Phosphate
Glucosamine-6-Phosphate
F2,6BP
Fructose 1,6-Biphosphate
Dietary GlcNAc
GlcNAc-6-P
Glyceraldehyde 3-Phosphate
GlcNAc-1-P
1,3-Biphosphoglycerate
2,3-BPG
UDP-GlcNAc
3-Phosphoglycerate
2-Phosphoglycerate
Phosphoenolpyruvate
Glycoproteins / Proteoglycans
Hyaluronic Acid
Sulfated GAGs
Glycocalyx Assembly
Pentose Phosphate Pathway
Ribulose 5-Phosphate
Ribose 5-Phosphate
Xylulose 5-Phosphate
Sedoheptulose 7-Phosphate
Erythrose 4-Phosphate
Fructose 6-Phosphate
Glyceraldehyde 3-Phosphate
D-Ribose
Non-Oxidative
Glycolysis
Gluconeogenesis
Glycogenolysis
Glycogenesis
Glycogen Storage Diseases
Hypoxia
Insulin
Glucagon
Cortisol
Fatty Acids
Low pH
cAMP->PKA (see Figure 18)
Oxidative Stress, Pb, Gliotoxin, Phenylalanine, Oxalate, T3
Maintains Endothelial Barrier, Vascular Integrity, Immune Signalling
TNF-α, IL-1β, Heparanase, MMPs, Oxidative Stress
Cd,Cu,Pb
GR + FAD
GSH
GSSG
6PGL
6PG
6PGD
Ru5P
R5P
PRPP
PRPS
PGM2
R1P
Glc-1,6-BP
RPIA
RPE + Fe²⁺
S7P
F6P
E4P
GAP
TALDO1
TKT + TPP
Xu5P
F1,6BP
ALD
DHAP
GPD1/2 + Ca²⁺
G3P
GLYCK
Glycerol
"Overflow" Cytosolic NADH → NAD+ Redox
Cytosol (Hepatocyte)
Plasma
Dietary Intake
Lipolysis Pathway
Cytosol
Plasma
Cytosol
Mitochondrial Matrix
Carnitine
SLC25A20
CPT1
CPT2
Acyl-CoA (Pool, C4-20)
Acyl-CoA (Cn), Carnitine
Acylcarnitine (Cn), CoA
Acylcarnitine (Cn), CoA
Acyl-CoA (n-1)
Acyl-CoA (n+1)
Fatty Acids
Fatty Acids (C4-10)
ACSS1/2 (C2), ACSM1/2/3/5/6 (C3-C10), ACSL1/4/5/6 (C10-C16), ACSL1/3/4/5/6 (C16-C20), ACSF2 (C2-C20)
Fatty Acid Oxidation Cycle
Acyl-CoA (Cn-2)
3-Ketoacyl-CoA
L-3-Hydroxyacyl-CoA
trans-Δ²-Enoyl-CoA
ACADVL (C14-20)
ACADL (C10-18)
ACADM (C6-12)
ACADS (C4-6)
(Even-Chain, Final Cycle Only)
Bacillus spp., Pseudomonas spp., Staphylococcus spp., Escherichia spp., Shewanella spp., Serratia spp., Paenibacillus spp., [..]
Candida spp., Lactobacillus spp., Bacteroides spp., Clostridium spp., Enterococcus spp., Streptococcus spp., K. pneumoniae, S. cerevisiae, E. coli, P. indigofera, A. calcoaceticus., [..]
Lactobacillus spp., Aspergillus spp., Penicillium spp., C. albicans, S. mutans, E. coli, B. fragilis, K. pneumoniae, N. meningitidis, P. intermedia, P. gingivalis, R. dentocariosa, V. parvula, H. pylori, S. cerevisiae, P. aeruginosa, S. Typhimurium, Y. enterocolitica, Y. pseudotuberculosis, Y. pestis, H. pylori strains 112, G27, 26, 695, Tx30a

Catecholamine Metabolism

Tyrosine
L-DOPA
Dopamine
Norepinephrine
Epinephrine
Normetanephrine
Metanephrine
VMAT1
VMAT2
DAT
NET
Blood Pressure, Urine Volume, Orthostatic Intolerance
Low / High Histamine (cell specific), cAMP-PKA, Ca, K, L-Butyrate
Oxidative Stress, Hypoxia
Autoimmune Antibodies, Fumarate, Na?
p-Cresol
High Cortisol, Low Vitamin D, Stress Immobilisation (Rats), Splanchnic Impulse
Endotheliitis, Cardiovascular Dysregulation, Leaky Junctions, Impaired Blood Brain Barrier, Respiration / MetHb
Acetaldehyde, eATP, IFN-γ, ROS, (Neural) IFN-α → Arachidonic Acid, VEGF, TGFβ, Angiotensin II
Haemoglobin
Mitochondrial Complex I, III
Glycocalyx
S. marcescens, E. faecalis, [..]
T. gondii
Thyroid Pathway
Histone Acetyltransferase Acetyl-*
Phenylalanine Biosynthesis Pathway
Phenylacetyl-CoA
Phenylpyruvate
Phenylalanine
Tyrosine
Histone Acetyltransferase Acetyl-*
Histone Deacetylase

NADPH Oxidase Metabolism

Oxidative Stress, Hypoxia
Oxidative Stress
Oxidative Stress
Oxidative Stress