MEDICAL SCHOOL
METABOLOMICS CORE
UNIVERSITY OF MICHIGAN

Gly/TCA/nucleotide and NAD related metabolites
Service Code: NAD

Summary: Profile of Central Metabolism, including glycolysis, pentose-phosphate shunt, TCA cycle, nucleotide pool and NAD related metabolites. One step organic solvent extraction of cultured cells or tissues, separated on a 1mm x150mm HILIC column in a 35 min cycle. All analytes and Internal Standards are measured by ESI^- ionization on a LC-QTOF mass spectrometer and reported as uM normalized to wet tissue weight or cell proteins. CV's are generally 15%.

Container: Eppendorf Tube or equivalent
Normal Volume: Plasma (100 ul) Tissue (50-100 mgs); Cells (2E7).
Minimal Volume: Plasma (50 uL)Tissue (30 mg); Cells (~5E6)
Special Handling: If human or primate, note any known presence of infectious agents.
Sample Collection: Snap freeze by liquid nitrogen. For tissues, resect and snap-freeze as soon as practical in tared centrifuge tube. Provide both sample weight and tared vial weight on sample submission

Reference: Matthew A. Lorenz, Charles F. Burant, and Robert T. Kennedy (2011) "Reducing Time and Increasing Sensitivity in Sample Preparation for Adherent Mammalian Cell Metabolomics", *Anal. Chem.* 83(9): 3406–3414.

Table I: Analytes reported:

Analyte	Abbr.	Mol Formula	LOQ(uM)
Acetyl-CoA	aCoA	$C_{23}H_{38}N_7O_{17}P_3S$	1
Citrate/Isocitrate combined	Cit/i-Cit	$C_6H_8O_7$	1
Succinate	Suc	$C_4H_6O_4$	1
Malate	Mal	$C_4H_6O_5$	1
2-Phosphoglycerate/3-Phosphoglycerate combined	2PG/3PG	$C_3H_7O_7P$	1
Phosphoenolpyruvate	PEP	$C_3H_5O_6P$	1
Adenosine monophosphate	AMP	$C_{10}H_{14}N_5O_7P$	1
Adenosine diphosphate	ADP	$C_{15}H_{23}N_5O_{14}P_2$	1
Adenosine triphosphate	ATP	$C_{10}H_{16}N_5O_{13}P_3$	1
Flavin adenine dinucleotide	FAD	$C_{27}H_{33}N_9O_{15}P_2$	1
Nicotinamide adenine dinucleotide	NAD	$C_{21}H_{28}N_7O_{14}P_2$	1
Nicotinamide adenine dinucleotide,reduced	NADH	$C_{21}H_{29}N_7O_{14}P_2$	1
Nicotinamide adenine dinucleotide phosphate	NADP	$C_{21}H_{29}N_7O_{17}P_3$	1
Nicotinamide adenine dinucleotide phosphate, reduced	NADPH	$C_{21}H_{30}N_7O_{17}P_3$	1

Erythrose 4-phosphate*	E4P	$C_4H_9O_7P$	1
Ribulose 5-phosphate/Xylulose 5-phosphate/ribose-5-phosphate combined*	R5P/X5P/ Ru5P	$C_5H_{11}O_8P$	1
6-phosphogluconate*	6PG	$C_6H_{13}O_{10}P$	1
Sedoheptulose 7-phosphate*	S7P	$C_7H_{15}O_{10}P$	1
Fructose-6-phosphate + glucose-6-phosphate	F6P/G6P	$C_6H_{13}O_9P$	1
Fructose-bisphosphate	FBP	$C_6H_{14}O_{12}P_2$	1
Nicotinic acid (NA)	NA	$C_6NH_5O_2$	1
Nicotinic acid mononucleotide (NaMN)	NaMN	$C_{11}H_{15}N_2O_8P$	1
Quinolinic acid (QA)	QA	$C_7H_5NO_4$	1
nicotinamide mononucleotide (NMN)	NMN	$C_{11}H_{15}N_2O_8P$	1
nicotinamide (NAM)	NAM	$C_6H_6N_2O$	1

*Metabolites are low concentrations and below detection limit in some samples.