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Global List of Validated Bioanalytical Tobacco Assays (BTA)

Tobacco Specific Assays with LC-MS/MS Detection

Nicotine pK Assays

Assay	Exposure Component	Measured Analyte	Method of Analysis	LLOQ	Matrix
Trace Nicotine	Nicotine	Nicotine	LC-MS/MS	0.200 ng/mL	Plasma (K_2EDTA)
	Nicotine	Cotinine	LC-MS/MS	1.00 ng/mL	Plasma (K_2EDTA)
	Nicotine	*trans*-3'-hydroxycotinine	LC-MS/MS	1.00 ng/mL	Plasma (K_2EDTA)
Trace Nicotine	Nicotine	Nicotine	LC-MS/MS	0.200 ng/mL	Plasma (Heparin)
	Nicotine	Cotinine	LC-MS/MS	1.00 ng/mL	Plasma (Heparin)
	Nicotine	*trans*-3'-hydroxycotinine	LC-MS/MS	1.00 ng/mL	Plasma (Heparin)
Nicotine	Nicotine	Nicotine	LC-MS/MS	0.500 ng/mL	Serum
	Nicotine	Cotinine	LC-MS/MS	1.00 ng/mL	Serum

Exposure Marker Assays

Assay	Exposure Component	Measured Analyte	Method of Analysis	LLOQ	Matrix
Total 1-OHP	Pyrene	1-Hydroxypyrene	LC-MS/MS	10.0 pg/mL	Urine
Total 3-OH BaP	Benzo[a]pyrene	3-Hydroxybenzo[a]pyrene	LC-MS/MS	25.0 fg/mL	Urine
Mercapturic Acids	Acrolein	3-Hydroxypropylmercapturic Acid (3-HPMA)	LC-MS/MS	10.0 ng/mL	Urine
	Acrolein	2-Hydroxypropylmercapturic Acid (2-HPMA)	LC-MS/MS	2.50 ng/mL	Urine
	Crotonaldehyde	3-Hydroxy-1-methylpropylmercapturic Acid (HMPMA)	LC-MS/MS	10.0 ng/mL	Urine
	Acrylonitrile	2-cyanoethyl-mercapruric acid (CEMA)	LC-MS/MS	0.250 ng/mL	Urine
MHBMA	1,3-Butadiene	Monohydroxybutenylmercapturic Acid	LC-MS/MS	100 pg/mL	Urine
Nicotine Equivalents	Nicotine	Nicotine	LC-MS/MS	10.0 ng/mL	Urine
	Nicotine	Cotinine	LC-MS/MS	10.0 ng/mL	Urine
	Nicotine	*trans*-3'-hydroxycotinine	LC-MS/MS	10.0 ng/mL	Urine
	Nicotine	Nicotine-*N*-glucuronide	LC-MS/MS	10.0 ng/mL	Urine
	Nicotine	Cotinine-*N*-glucuronide	LC-MS/MS	20.0 ng/mL	Urine
	Nicotine	*trans*-3'-hydroxycotinine-O-glucuronide	LC-MS/MS	50.0 ng/mL	Urine
Nicotine Equivalents	Nicotine	Nicotine	LC-MS/MS	50.0 ng/mL	Urine
	Nicotine	Cotinine	LC-MS/MS	50.0 ng/mL	Urine
	Nicotine	*trans*-3'-hydroxycotinine	LC-MS/MS	50.0 ng/mL	Urine
	Nicotine	Nicotine-*N*-glucuronide	LC-MS/MS	50.0 ng/mL	Urine
	Nicotine	Cotinine-*N*-glucuronide	LC-MS/MS	200 ng/mL	Urine
	Nicotine	*trans*-3'-hydroxycotinine-O-glucuronide	LC-MS/MS	200 ng/mL	Urine
Total NNAL	Tobacco specific nitrosamines	4-(Methylnitrosamino)-1-(3-pyridyl) -1-butanol	LC-MS/MS	5.00 pg/mL	Urine
Total NNN	Tobacco specific nitrosamines	*N*-Nitrosonornicotine	LC-MS/MS	0.200 pg/mL	Urine
Total NAT/NAB	Tobacco specific nitrosamines	*N*-Nitrosanabasine	LC-MS/MS	2.00 pg/mL	Urine
	Tobacco specific nitrosamines	*N*-Nitrosanatabine	LC-MS/MS	5.00 pg/mL	Urine
S-PMA	Benzene	S-Phenyl mercapuric acid	LC-MS/MS	25.0 pg/mL	Urine
HEMA	Ethylene dioxide	Hydroxyethyl mercapturic acid	LC-MS/MS	0.1 ng/mL	Urine
o-Toluidine	o-Toluidine	o-Toluidine	LC-MS/MS	20 pg/mL	Urine
Aromatic Amines	Aromatic Amines	1-Aminonaphthalene (1-NA)	LC-MS/MS	2.0 pg/mL	Urine
	Aromatic Amines	2-Aminonaphthalene (2-NA)	LC-MS/MS	2.0 pg/mL	Urine
	Aromatic Amines	3-Aminobiphenyl (3-ABP)	LC-MS/MS	0.500 pg/mL	Urine
	Aromatic Amines	4-Aminobiphenyl (4-ABP)	LC-MS/MS	1.0 pg/mL	Urine
Propelyne Glycol	Propelyne Glycol	Propelyne Glycol	LC-MS/MS	250 ng/mL	Urine
COHb (Carboxyhemoglobin)	Carbon monoxide	COHb	Spectrophotometric	0.5%	Whole Blood

Biomarker Assays

Assay	Indication	Measured Analyte	Method of Analysis	LLOQ	Matrix	Comment
11-dTXB2	Platelet activation	11-dehydro Thromboxane B_2	LC-MS/MS	25.00 pg/mL	Urine	
iPF2a-III	Oxidative stress	Isoprostaglandin $F_{2\alpha}$ (type III)	LC-MS/MS	25.0 pg/mL	Urine	
iPF2a-VI	Oxidative stress	Isoprostaglandin $F_{2\alpha}$ (type VI)	LC-MS/MS	25.0 pg/mL	Urine	
Creatinine	Kidney function	Creatinine	LC-MS/MS	50.0 µg/mL	Urine	
2,3 dinor Thromboxane-B2 (TXB2)	Platelet activation	2,3 dinor Thromboxane-B2 (TXB_2)	LC-MS/MS	25.0 pg/mL	Urine	
sICAM	Systemic inflamatory response	sICAM	ELISA	12.5 ng/mL	Plasma	
Malondialdehyde	Lipid peroxidation	Malondialdehyde	EIA	20.0 ng/mL	K_2EDTA	
IL-6	Cytokine, inflamatory marker	IL-6	ELISA	3.12 pg/mL	Serum	
TNFa	Inflamatory response	Tumor necrosis factor alpha	EIA	1.00 pg/mL	Li Hep Plasma	
high sensitivity C-reactive protein	Atherosclerotic cardiovascular disease	hsCRP	Clinical Laboratory	0.25 mg/L	Serum	CAP/CLIA approved assay
Fibrinogen	Chronic COPD	Fibrinogen	Clinical Laboratory	63 mg/dL	Na Citrate Plasma	CAP/CLIA approved assay
IL-6. IL-8, TNFa	Panel assay of inflamation biomarkers	IL-6, IL-8, TNFa	MSD Panel		Li Hep Plasma	In-development
Matrix Metalloproteinase-9	Tumor formation	Metalloproteinase-9	ELISA		Serum	In-development
Surfactant Protein D	COPD development	Surfactant Protein D	ELISA		Serum	In-development
MCP-1	Cytokine, inflamatory marker	Monocyte chemoattractant protein-1	ELISA	40.0 pg/mL	Serum	

For further information on our Bioanalytical Tobacco Assays (BTAs), please contact leslie.poli@celerion.com.