

## **Supporting Information**

# **Metabolomics to explore imidacloprid induced toxicity in the central nervous system of the freshwater snail *Lymnaea stagnalis***

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## Material and Methods

**Protein content measurement.** The protein content was determined by the Bradford colorimetric protein assay. For the calibration, bovine serum albumin (BSA) was used (Sigma-Aldrich). The Dye Reagent was purchased from Bio-Rad Laboratories (Richmond, CA, USA). The absorbance was measured with the SPECTRAmax 340PC 96 well-plate reader spectrophotometer (Molecular Devices, Sunnyvale, CA, USA).

**Acetylcholinesterase activity assay.** A potassium-phosphate buffer (0.1M  $\text{KH}_2\text{PO}_4/\text{K}_2\text{HPO}_4$ ) (Sigma-Aldrich), 5mM 5,5'-dithiobis-(2-nitrobenzoic acid) (DTNB) (99%, Sigma-Aldrich), and 0.8 mM S-acetylthiocholine-iodide (ATC) (98%, Sigma-Aldrich) were prepared. The samples were prepared by mixing 15  $\mu\text{L}$  of the CNS homogenate with 135  $\mu\text{L}$  of MilliQ water. Subsequently, a 96-well plate was filled with 50  $\mu\text{L}$  of 5  $\mu\text{M}$  DTNB and 50  $\mu\text{L}$  of 0.8 mM ATC. After 5 minutes of incubation, 50  $\mu\text{L}$  of the CNS sample was added in triplicate to the 96-well plate. The plate was placed in a SPECTRAmax 340PC Spectrophotometer, where the absorbance of the wells was measured at 412 nm for 30 minutes with 20 second intervals. Finally, the maximum rate of change in absorbance ( $V_{\text{max}}$ ) was analyzed with SoftmaxPro5.2. As positive control the AChE-inhibiting organophosphate pesticide chlorpyrifos (Sigma-Aldrich) was used.

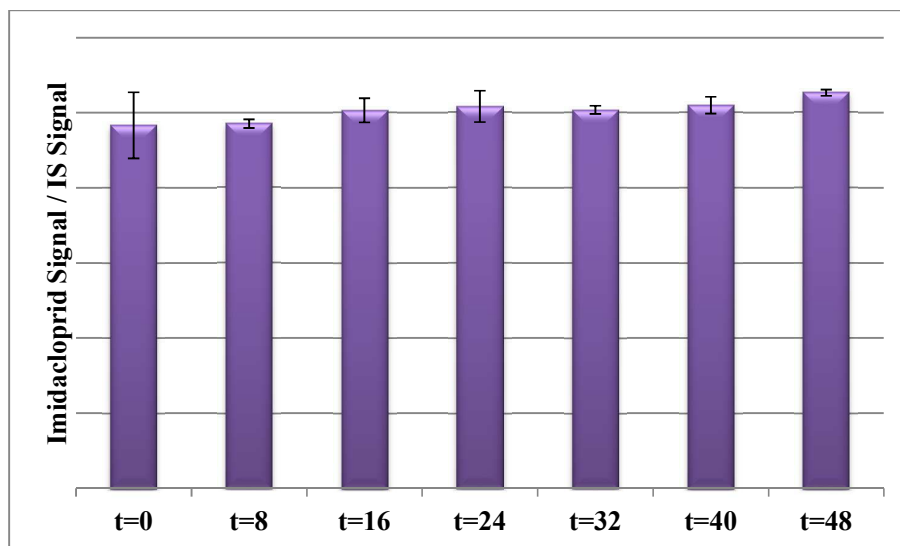
## Results

### Imidaclopid exposure concentrations.

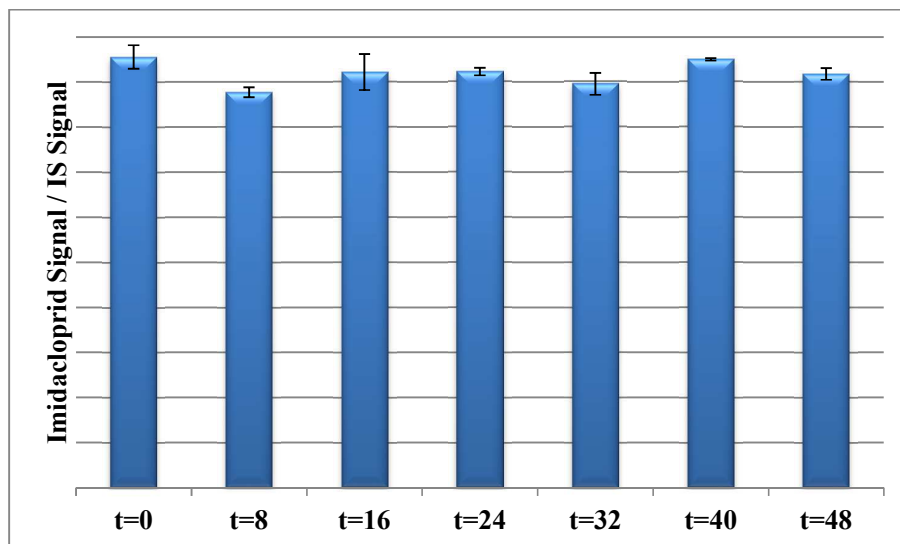
Before the exposure experiment, we have tested if imidaclopid concentrations were stable in copper-free water under the experimental condition of the sequent exposure experiment.

The beakers were filled with 150mL of copper-free water which were spiked with imidaclopid to reach the final concentration of 10  $\mu\text{g/L}$  and 1000  $\mu\text{g/L}$ . The experiment was carried out in triplicate and before injecting to the LC-MS/MS system, the IS was added to the samples. To

test if there was a significant decline in imidacloprid concentrations the analysis of variance (ANOVA) with post hoc Tukey's honestly significant difference (HSD) was performed with the software SPSS (IBM). No significant variations in imidacloprid concentrations were observed at both concentration of 10  $\mu\text{g/L}$  (Figure S1) and 1000  $\mu\text{g/L}$  (Figure S2).

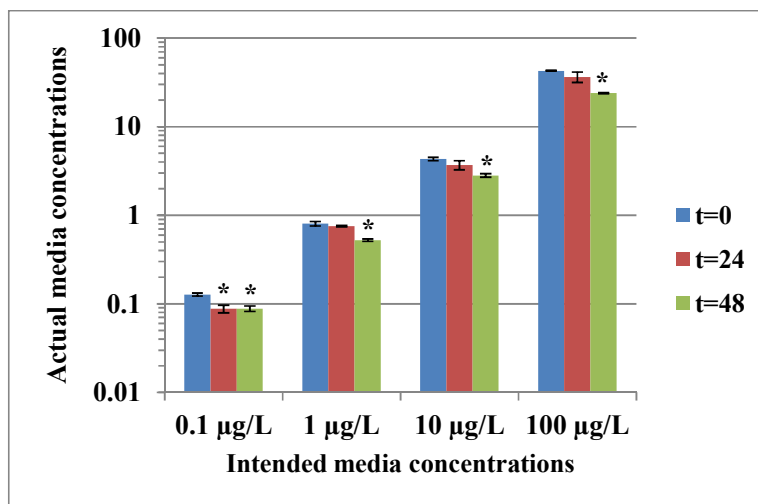


**Figure S1** Concentrations of imidacloprid at 10  $\mu\text{g/L}$  in copper-free water every 8 hours of 48 subsequent hours. (n=3, error bars = SE, \*=p<0.05).



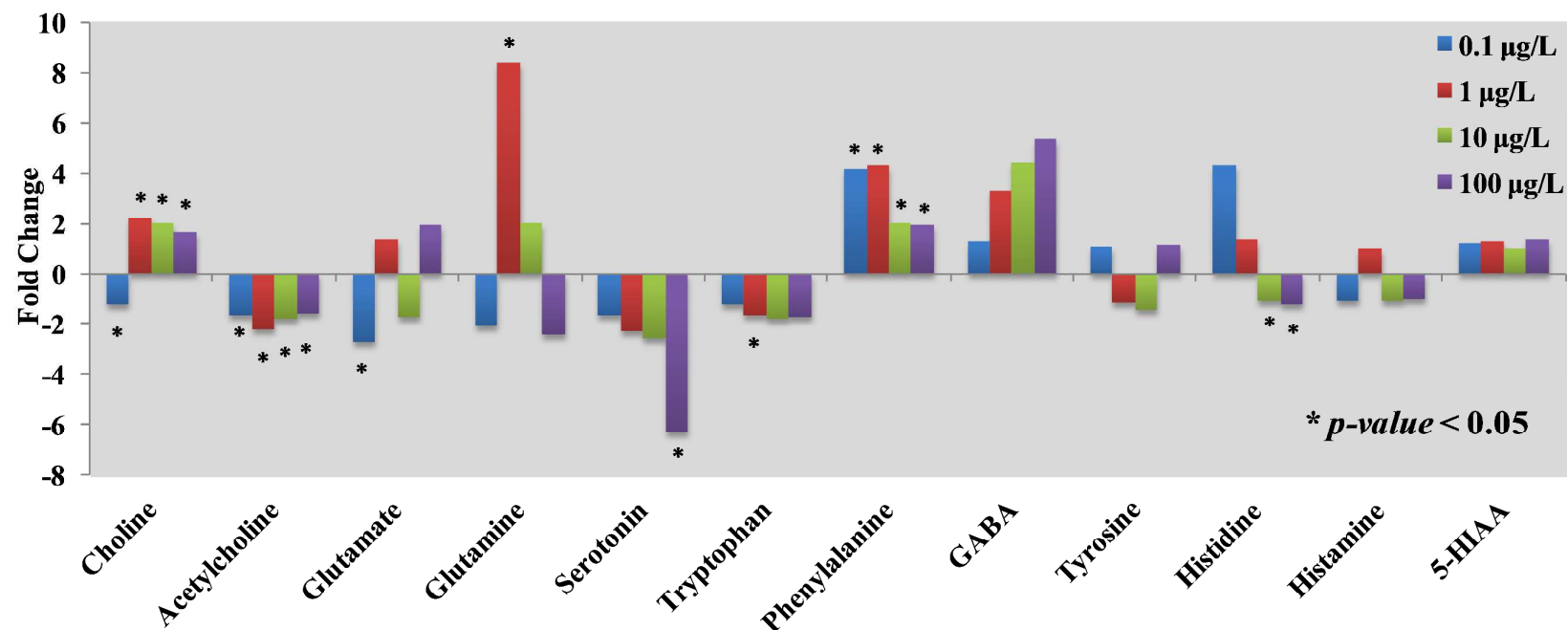
**Figure S2** Concentrations of imidacloprid at 1000  $\mu\text{g/L}$  in copper-free water every 8 hours of 48 subsequent hours. (n=3, error bars = SE, \*=p<0.05).

The concentration of imidacloprid in the exposure media were measured at two subsequent days of incubation (0, 24 and 48 h). The results are shown in Figure S3.



**Figure S3** Actual measured imidacloprid concentrations per exposure group in µg/L in 48 subsequent hours. (n=5, error bars = SE, \*=p<0.05).

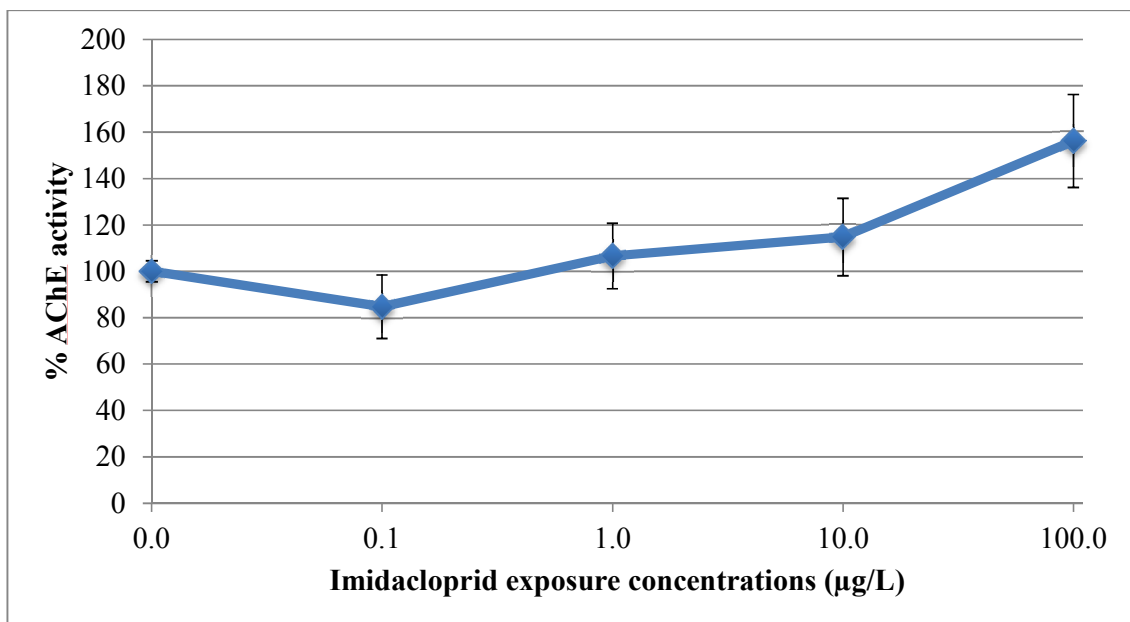
The averaged actual concentrations of imidacloprid over 0, 24 and 48 hours of exposure were  $0.10 \pm 0.01$  µg/L,  $0.7 \mu\text{g} \pm 0.09$  µg/L,  $3.6 \pm 0.43$  µg/L and  $34.4 \pm 5.6$  µg/L for the exposure groups of 0.1 µg/L, 1 µg/L, 10 µg/L and 100 µg/L, respectively. The actual imidacloprid concentrations were in the range of the nominal concentration for the 0.1 and 1 µg/L groups. However for the higher dose groups (10 and 100 µg/L) the concentrations were about 3 times lower than the nominal concentration. For all exposure concentrations there was a significant decrease in imidacloprid concentration after 48 hours (ANOVA,  $p\text{-value} < 0.01$ ). The deviation of the nominal concentrations for the two high dose groups could be due to bioaccumulation of imidacloprid in *L. stagnalis* which is also indicated by the decline of the concentrations in time. It has been found that the bioaccumulation factor of imidacloprid in snails is high<sup>2</sup>.



**Figure S4** Fold changes for the quantified neurotransmitters, precursors and metabolites in *L. stagnalis* CNS exposed to different imidacloprid concentrations.

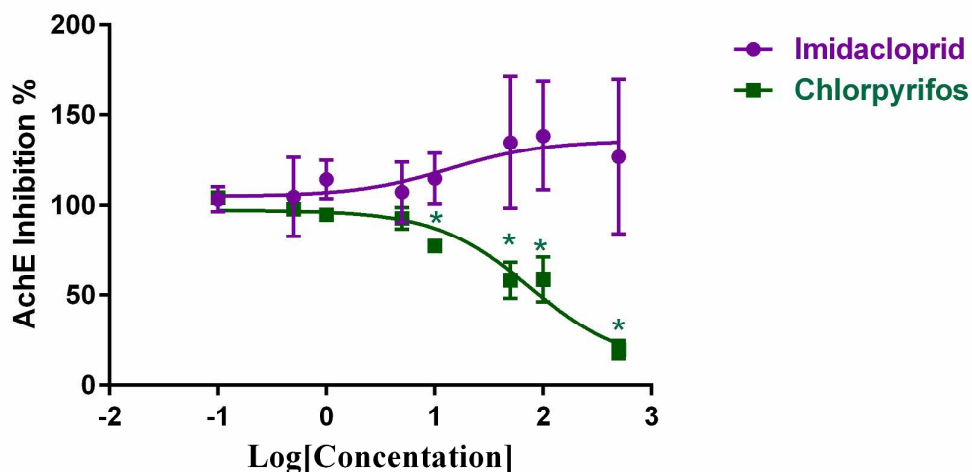
### Traditional toxicological endpoints.

The AChE activity of *L. stagnalis* CNS exposed to different imidacloprid concentrations was tested. The average of  $V_{\max}$  compared to the control group was calculated for all exposure groups (Figure S3).



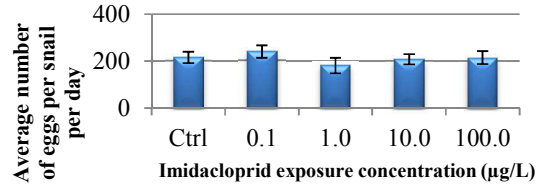
**Figure S5** Average AChE activity in *L. stagnalis* CNS after 10 days of exposure to increasing concentrations of imidacloprid ( $n=10$ ; error bars = SE).

The applicability of AChE bioassay to determine imidacloprid-induced toxic effects has been tested. The reliability was tested by incubating *L. stagnalis* CNS homogenate of unexposed snails with low concentrations of chlorpyrifos. Imidacloprid was tested to determine any intrinsic inhibiting effects on AChE. The protein contents, determined with the Bradford assay, were used to normalize for the heterogeneity in CNS sample sizes. The positive control chlorpyrifos showed a significantly lowered enzyme activity compared to the controls. This result confirmed the applicability of this assay to determine AChE activity in CNS samples of imidacloprid-exposed snails. Imidacloprid did, however, not significantly reduce the enzyme activity (Figure S4).

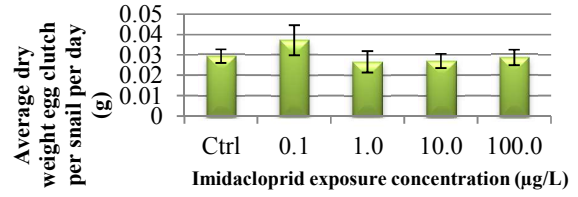


**Figure S6** AChE activity inhibition % in CNS samples after 20 minutes of incubation to imidacloprid and chlorpyrifos, normalized for the controls. ( $n=3$ ; error bars=SE; \* $p$ -value <0.05).

No significant effects were observed on phenotypical endpoint of mortality and reproduction. *L. stagnalis* is able to reproduce through parthenogenesis and for this reason it is a well-suited species for isolated reproduction experiments<sup>3</sup>. Effects on the reproduction of *L. stagnalis* were tested by measuring the number of laid eggs and the dried weight of the egg clutches. The ANOVA performed on the egg count (Figure S5 (A)) and measurements of the dry weight of the egg clutches (Figure S5 (B)) of snails exposed to imidacloprid did not show significant differences between the exposure groups and the control. Even though reproductive outputs have been shown before to be a sensitive endpoint in *L. stagnalis*, the incubation time used in this study was probably too short to induce a significant effect on the snail reproduction<sup>3</sup>. Nevertheless, these results indicate that the lowest effect concentration (LOEC) for the analysed sublethal endpoints in *L. stagnalis* is higher than 34  $\mu\text{g/L}$  for 10 days of exposure. This is in agreement with a high LOEC for imidacloprid found in another aquatic snail species: 25,000  $\mu\text{g/L}$  caused heart rate effects in embryos of *Marisa cornuarietis* after 10 days of exposure<sup>4</sup>. Furthermore, Nyman et al.<sup>2</sup> found that the  $\text{LC}_{50}$  of *L. stagnalis* was about 50,000  $\mu\text{g/L}$  with 4 days of exposure.



**(A)** Average number of eggs per snail per day within groups exposed to different concentrations of imidacloprid for ten days. ( $n=10$ , error bars = SE,  $*p<0.05$ ).



**(B)** Average of the dry weight of egg clutches per snail per day within groups exposed to different concentrations of imidacloprid for ten days. ( $n=10$ , error bars = SE,  $*p<0.05$ )

**Figure S7** Imidacloprid effect on the number of laid eggs (A) and dried egg clutches weights (B) of the freshwater snail *L. stagnalis*.



## Tables and Figures legend:

**Figure S1** Concentrations of imidacloprid at 10 µg/L in copper-free water every 8 hours of 48 subsequent hours. (n=3, error bars = SE, \*=p<0.05).

**Figure S2** Concentrations of imidacloprid at 1000 µg/L in copper-free water every 8 hours of 48 subsequent hours. (n=3, error bars = SE, \*=p<0.05).

**Figure S3** Actual measured imidacloprid concentrations per exposure group in 48 subsequent hours with their original intended imidacloprid concentrations. (n=5; error bars = SE; \*=p-value <0.05).

**Figure S4** Fold changes for the quantified neurotransmitters, precursors and metabolites in *L. stagnalis* CNS exposed to different imidacloprid concentrations.

**Figure S5** Average AChE activity in *L. stagnalis* CNS after 10 days of exposure to increasing concentrations of imidacloprid (n=10; error bars = SE).

**Figure S6** AChE activity inhibition % in CNS samples after 20 minutes of incubation to imidacloprid and chlorpyrifos, normalized for the controls. (n=3; error bars=SE; \*p-value <0.05).

**Figure S7** Imidacloprid effect on the number of laid eggs (A) and dried egg clutches weights (B) of the freshwater snail *L. stagnalis*.

**Table S1** Libraries of metabolite standards used for the target analysis.

**Table S2** Metabolite identified in the different exposure groups. Fold change and p-values corrected by false discovery rate (FDR) are reported. Marked in red the metabolites significantly different for more three exposure concentrations and in green are marked the p-values below 0.05.

**Table S3** Area under the ROC curve (AUC) for metabolite showing AUC > 0.8 in more than three exposure concentrations.

**Figure S8** ROC curves for acetylcholine in the CNS of *L. stagnalis* exposed to increasing concentration of imidacloprid.

**Table S1** Libraries of metabolite standards used for the target analysis.

METABOLITE NAME	Supplier	Analytical Platform	Detected in sample	m/z	Molecular Formula	RT	Mass Error (ppm)
3-METHYL-2-OXOVALERIC ACID	IROA MSMLS	Non-targeted (ToF)	√	130.0630	C6H10O3	2.1	<2ppm
4-GUANIDINO-BUTANOATE	IROA MSMLS	Non-targeted (ToF)	√	145.0851	C5H11N3O2	8.7	<2ppm
4-METHYL-2-OXOVALERIC ACID	IROA MSMLS	Non-targeted (ToF)	√	130.0630	C6H10O3	2.1	<2ppm
5-HIAA	Sigma-Aldrich	Targeted (QqQ)	√	191.0582	C10H9NO3	3.4	<2ppm
5'-METHYLTHIOADENOSINE	IROA MSMLS	Non-targeted (ToF)	√	297.0896	C11H15N5O3S	14.1	<2ppm
ACETYLCHOLINE	Sigma-Aldrich	Targeted (QqQ)	√	146.1176	C7H16NO2	3.0	<2ppm
ADENINE	IROA MSMLS	Non-targeted (ToF)	√	135.0545	C5H5N5	5.8	<2ppm
ALPHALINOLENIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	292.2402	C19H32O2	21.4	<2ppm
ARACHIDIC ACID	IROA MSMLS	Non-targeted (ToF)	√	326.3185	C21H42O2	25.1	<2ppm
ARACHIDONIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	318.2559	C21H34O2	24.1	<2ppm
BETAINE	IROA MSMLS	Non-targeted (ToF)	√	117.0790	C5H11NO2	9.2	<2ppm
CARNITINE	IROA MSMLS	Non-targeted (ToF)	√	161.1052	C7H15NO3	9.8	<2ppm
CHOLINE	Sigma-Aldrich	Targeted (QqQ)	√	104.1075	C5H14NO	6.3	<2ppm
CIS10HEPTADECENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	282.2560	C18H34O2	20.2	<2ppm
CIS1114EICOSADIENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	322.2872	C21H38O2	24.7	<2ppm
CIS1117EICOSATRIENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	320.2715	C21H36O2	24.3	<2ppm
CIS11EICOSENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	324.3028	C21H40O2	24.7	<2ppm
CIS1316DOCOSADIENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	350.3185	C23H42O2	27.4	<2ppm
CIS15TETRACOSENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	380.3654	C25H48O2	29.9	<2ppm
CIS517EICOSAPENTAENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	316.2402	C21H32O2	24.1	<2ppm

CIS814EICOSATRIENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	320.2715	C21H36O2	24.7	<2ppm
CREATININE	IROA	Non-targeted (ToF)	√	113.0589	C4H7N3O	6.0	<2ppm
	MSMLS						
DIETHANOLAMINE	IROA	Non-targeted (ToF)	√	105.0790	C4H11NO2	9.3	<2ppm
	MSMLS						
DIMETHYLBENZIMIDAZOLE	IROA	Non-targeted (ToF)	√	146.0844	C9H10N2	8.9	<2ppm
	MSMLS						
DOCOSAHEXAENOIC ACID	IROA	Non-targeted (ToF)	√	328.2402	C22H32O2	1.9	<2ppm
	MSMLS						
ELAIDIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	296.2715	C19H36O2	21.8	<2ppm
	IROA						
ELAIDIC ACID	MSMLS	Non-targeted (ToF)	√	296.2715	C19H36O2	21.8	<2ppm
GABA	Sigma-Aldrich	Targeted (QqQ)	√	103.0633	C4H9NO2	12.1	<2ppm
GAMMALINOLENIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	292.2402	C19H32O2	21.7	<2ppm
GLUTAMATE	Sigma-Aldrich	Targeted (QqQ)	√	147.0532	C5H9NO4	13.6	<2ppm
GLUTAMINE	Sigma-Aldrich	Targeted (QqQ)	√	146.0691	C5H10N2O3	13.3	<2ppm
	IROA						
GUANINE	MSMLS	Non-targeted (ToF)	√	151.0494	C5H5N5O	7.7	<2ppm
	IROA						
GUANOSINE	MSMLS	Non-targeted (ToF)	√	283.0917	C10H13N5O5	9.0	<2ppm
HENICOSANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	340.3341	C22H44O2	26.5	<2ppm
HEPTADECANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	284.2715	C18H36O2	20.6	<2ppm
HISTAMINE	Sigma-Aldrich	Targeted (QqQ)	√	111.0797	C5H9N3	18.3	<2ppm
HISTIDINE	Sigma-Aldrich	Targeted (QqQ)	√	155.0695	C6H9N3O2	15.8	<2ppm
	IROA						
HYPOXANTHINE	MSMLS	Non-targeted (ToF)	√	136.0385	C5H4N4O	6.0	<2ppm
	IROA						
INDOLE-3-ACETALDEHYDE	MSMLS	Non-targeted (ToF)	√	175.0633	C10H9NO2	6.4	<2ppm
	IROA						
INOSINE	MSMLS	Non-targeted (ToF)	√	268.0808	C10H12N4O5	8.3	<2ppm
	IROA						
LEUCINE	MSMLS	Non-targeted (ToF)	√	131.0946	C6H13NO2	8.6	<2ppm
LINOLEIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	294.2559	C19H34O2	21.6	<2ppm
LINOLELAIDIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	294.2559	C19H34O2	21.8	<2ppm
L-TRYPTOPHAN	Sigma-Aldrich	Targeted (QqQ)	√	204.0899	C11H12N2O2	10.7	<2ppm
L-TYROSINE	Sigma-Aldrich	Targeted (QqQ)	√	181.0739	C9H11NO3	12.1	<2ppm
N6-(DELTA2-ISOPENTENYL)-	IROA	Non-targeted (ToF)	√	203.1171	C10H13N5	8.8	<2ppm

ADENINE	MSMLS						
N-ACETYL-L-LEUCINE	IROA	Non-targeted (ToF)	√	173.1052	C8H15NO3	1.4	<2ppm
	MSMLS						
N-ACETYLPUTRESCINE	IROA	Non-targeted (ToF)	√	130.1106	C6H14N2O	8.8	<2ppm
	MSMLS						
N-ACETYLSEROTONIN	IROA	Non-targeted (ToF)	√	218.1055	C12H14N2O2	5.0	<2ppm
	MSMLS						
NE,NE,NE- TRIMETHYLLYSINE	IROA	Non-targeted (ToF)	√	188.1525	C9H20N2O2	12.7	<2ppm
	MSMLS						
NICOTINAMIDE	IROA	Non-targeted (ToF)	√	122.0480	C6H6N2O	3.0	<2ppm
	MSMLS						
O-ACETYL-L-CARNITINE	IROA	Non-targeted (ToF)	√	203.1158	C9H17NO4	8.8	<2ppm
	MSMLS						
OLEIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	296.2715	C19H36O2	21.6	<2ppm
PALMITOLEIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	268.2402	C17H32O2	18.6	<2ppm
PHENYLALANINE	Sigma-Aldrich	Targeted (QqQ)	√	165.0790	C9H11NO2	10.3	<2ppm
	IROA						
PICOLINIC ACID	MSMLS	Non-targeted (ToF)	√	123.0320	C6H5NO2	5.0	<2ppm
	IROA						
PIPECOLINIC ACID	MSMLS	Non-targeted (ToF)	√	129.0790	C6H11NO2	10.4	<2ppm
	IROA						
PROLINE	MSMLS	Non-targeted (ToF)	√	115.0633	C5H9NO2	9.8	<2ppm
	IROA						
PUTRESCINE	MSMLS	Non-targeted (ToF)	√	88.1001	C4H12N2	12.6	<2ppm
	MSMLS						
SEROTONIN	Sigma-Aldrich	Targeted (QqQ)	√	176.0950	C10H12N2O	10.5	<2ppm
	IROA						
SPERMIDINE	MSMLS	Non-targeted (ToF)	√	145.1579	C7H19N3	15.2	<2ppm
	MSMLS						
STEARIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	298.2872	C19H38O2	22.2	<2ppm
TETRACOSANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	382.3811	C25H50O2	30.3	<2ppm
	IROA						
THIOPURINE S- METHYLESTER	MSMLS	Non-targeted (ToF)	√	166.0313	C6H6N4S	1.5	<2ppm
	MSMLS						
TRICOSANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	√	368.3654	C24H48O2	29.1	<2ppm
	IROA						
TRYPTOPHANAMIDE	MSMLS	Non-targeted (ToF)	√	203.1059	C11H13N3O	5.8	<2ppm
	IROA						
URACIL	MSMLS	Non-targeted (ToF)	√	112.0273	C4H4N2O2	10.6	<2ppm
	IROA						
URIDINE	MSMLS	Non-targeted (ToF)	√	244.0695	C9H12N2O6	6.0	<2ppm

URIDINE-5-MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	√	324.0359	C9H13N2O9P	9.2	<2ppm
UROCANATE	IROA MSMLS	Non-targeted (ToF)	√	138.0429	C6H6N2O2	3.3	<2ppm
VALINE	IROA MSMLS	Non-targeted (ToF)	√	117.0790	C5H11NO2	3.1	<2ppm
XANTHINE	IROA MSMLS	Non-targeted (ToF)	√	152.0334	C5H4N4O2	15.0	<2ppm
5-AMINOIMIDAZOLE-4-CARBOXAMIDE-1-?-D-RIBOFURANOSYL 5'-MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x				
(2-AMINOETHYL)PHOSPHONATE	IROA MSMLS	Non-targeted (ToF)	x				
(R)-MALATE	IROA MSMLS	Non-targeted (ToF)	x				
(S)-1-PHENYLETHANOL	IROA MSMLS	Non-targeted (ToF)	x				
(S)-DIHYDROOROTATE	IROA MSMLS	Non-targeted (ToF)	x				
(S)-LACTATE	IROA MSMLS	Non-targeted (ToF)	x				
1,2-DIDECANOYL-SN-GLYCERO-3-PHOSPHOCHOLINE	IROA MSMLS	Non-targeted (ToF)	x				
1,2-DIPALMITOYL-RAC-GLYCERO-3-PHOSPHOETHANOLAMINE	IROA MSMLS	Non-targeted (ToF)	x				
1,2-DIPALMITOYL-SN-GLYCEROL	IROA MSMLS	Non-targeted (ToF)	x				
10-HYDROXYDECANOATE	IROA MSMLS	Non-targeted (ToF)	x				
12-HYDROXYDODECANOIC ACID	IROA MSMLS	Non-targeted (ToF)	x				
17A,21-DIHYDROXY-4-PREGNENE-3,20-DIONE	IROA MSMLS	Non-targeted (ToF)	x				
1-HYDROXY-2-NAPHTHOATE	IROA MSMLS	Non-targeted (ToF)	x				

1-METHYL-6,7-DIHYDROXY- 1,2,3,4- TETRAHYDROISOQUINOLINE HYDROBROMIDE	IROA MSMLS	Non-targeted (ToF)	x
1-NAPHTHYLAMINE	IROA MSMLS	Non-targeted (ToF)	x
2,3-DIHYDROXYBENZOATE	IROA MSMLS	Non-targeted (ToF)	x
2,3-DIPHOSPHO-D-GLYCERIC ACID	IROA MSMLS	Non-targeted (ToF)	x
2',4'- DIHYDROXYACETOPHENONE	IROA MSMLS	Non-targeted (ToF)	x
2,4-DIHYDROXYPTERIDINE	IROA MSMLS	Non-targeted (ToF)	x
2,4-DIHYDROXYPYRIMIDINE- 5-CARBOXYLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
2,5-DIHYDROXYBENZOATE	IROA MSMLS	Non-targeted (ToF)	x
2,5-DIMETHYLPYRAZINE	IROA MSMLS	Non-targeted (ToF)	x
2,6-DIHYDROXYPYRIDINE	IROA MSMLS	Non-targeted (ToF)	x
25-HYDROXYCHOLESTEROL	IROA MSMLS	Non-targeted (ToF)	x
2-ACETAMIDO-2-DEOXY- BETA-D-GLUCOSYLAMINE	IROA MSMLS	Non-targeted (ToF)	x
2-AMINO-2-METHYL- PROPANOATE	IROA MSMLS	Non-targeted (ToF)	x
2-AMINOETHYL DIHYDROGEN PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2-AMINOPHENOL	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYADENOSINE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYADENOSINE 5'- DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYADENOSINE 5'- TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYCYTIDINE 5'-	IROA	Non-targeted (ToF)	x

DIPHOSPHATE	MSMLS		
2'-DEOXYCYTIDINE 5'- MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2-DEOXY-D-GLUCOSE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYGUANOSINE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYGUANOSINE 5'- DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYGUANOSINE 5'- MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYGUANOSINE 5'- TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYURIDINE 5'- MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2'-DEOXYURIDINE 5'- TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
2-HYDROXY-4- (METHYLTHIO)BUTYRIC ACID	IROA MSMLS	Non-targeted (ToF)	x
2-HYDROXYBUTYRIC ACID	IROA MSMLS	Non-targeted (ToF)	x
2-HYDROXYPHENYLACETIC ACID	IROA MSMLS	Non-targeted (ToF)	x
2-HYDROXYPYRIDINE	IROA MSMLS	Non-targeted (ToF)	x
2-METHOXYETHANOL	IROA MSMLS	Non-targeted (ToF)	x
2-METHYLBUTANAL	IROA MSMLS	Non-targeted (ToF)	x
2-METHYLGLUTARIC ACID	IROA MSMLS	Non-targeted (ToF)	x
2-METHYLMALEATE	IROA MSMLS	Non-targeted (ToF)	x
2-METHYLPROPANAL OXIME	IROA MSMLS	Non-targeted (ToF)	x
2-METHYLPROPANOATE	IROA MSMLS	Non-targeted (ToF)	x
2-OXOADIPATE	IROA	Non-targeted (ToF)	x

	MSMLS		
2-OXOBUTANOATE	IROA	Non-targeted (ToF)	
	MSMLS		x
2-QUINOLINECARBOXYLIC	IROA	Non-targeted (ToF)	
ACID	MSMLS		x
3(2-	IROA	Non-targeted (ToF)	
HYDROXYPHENYL)PROPANO	MSMLS		x
ATE			
3(4-	IROA	Non-targeted (ToF)	
HYDROXYPHENYL)LACTATE	MSMLS		x
3-(4-	IROA	Non-targeted (ToF)	
HYDROXYPHENYL)PYRUVAT	MSMLS		x
E			
3,3-DIAMINOPROPANE	IROA	Non-targeted (ToF)	
	MSMLS		x
3,4-DIHYDROXY-1-	IROA	Non-targeted (ToF)	
PHENYLALANINE	MSMLS		x
3,4-DIHYDROXYBENZOATE	IROA	Non-targeted (ToF)	
	MSMLS		x
3,4-DIHYDROXYPHENYL	IROA	Non-targeted (ToF)	
GLYCOL	MSMLS		x
3,4-	IROA	Non-targeted (ToF)	
DIHYDROXYPHENYLACETAT	MSMLS		x
E			
3',5'-CYCLIC AMP	IROA	Non-targeted (ToF)	
	MSMLS		x
3,5-DIIODO-L-THYRONINE	IROA	Non-targeted (ToF)	
	MSMLS		x
3,5-DIIODO-L-TYROSINE	IROA	Non-targeted (ToF)	
	MSMLS		x
3ALPHA,11BETA,17ALPHA,21-	IROA	Non-targeted (ToF)	
TRETRAHYDROXY-5ALPHA-	MSMLS		x
PREGNAN-20-ONE			
3ALPHA-HYDROXY-5-BETA-	IROA	Non-targeted (ToF)	
CHOLANATE	MSMLS		x
3-AMINO-4-	IROA	Non-targeted (ToF)	
HYDROXYBENZOIC ACID	MSMLS		x
3-AMINO-5-	IROA	Non-targeted (ToF)	
HYDROXYBENZOIC ACID	MSMLS		x



3-AMINOISOBUTANOATE	IROA MSMLS	Non-targeted (ToF)	x
3'-CMP	IROA MSMLS	Non-targeted (ToF)	x
3-DEHYDROSHIKIMATE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXY-3-METHYLGLUTARATE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYANTHRANILATE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYBENZALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYBENZOATE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYBENZYL ALCOHOL	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYBUTANOIC ACID	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYKYNURENINE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYPHENYLACETATE	IROA MSMLS	Non-targeted (ToF)	x
3-HYDROXYPYRUVATE	IROA MSMLS	Non-targeted (ToF)	x
3-METHOXY-4-HYDROXYMANDELATE	IROA MSMLS	Non-targeted (ToF)	x
3-METHOXY-L-TYROSINE	IROA MSMLS	Non-targeted (ToF)	x
3-METHOXYTYRAMINE	IROA MSMLS	Non-targeted (ToF)	x
3-METHYL-2-OXINDOLE	IROA MSMLS	Non-targeted (ToF)	x
3-METHYLADENINE	IROA MSMLS	Non-targeted (ToF)	x
3-METHYLBUTANAL	IROA MSMLS	Non-targeted (ToF)	x
3-METHYLBUTANOL	IROA MSMLS	Non-targeted (ToF)	x
3-METHYLCROTONYL-COA	IROA	Non-targeted (ToF)	x

	MSMLS		
3-METHYLGLUTARIC ACID	IROA MSMLS	Non-targeted (ToF)	x
3-METHYLHISTAMINE	IROA MSMLS	Non-targeted (ToF)	x
3-MT	Sigma-Aldrich	Targeted (QqQ)	x
3-SULFINO-L-ALANINE	IROA MSMLS	Non-targeted (ToF)	x
3-UREIDOPROPIONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
4-ACETAMIDOBUTANOATE	IROA MSMLS	Non-targeted (ToF)	x
4-AMINOBENZOATE	IROA MSMLS	Non-targeted (ToF)	x
4-AMINOBUTANOATE	IROA MSMLS	Non-targeted (ToF)	x
4-AMINOBUTANOIC ACID	IROA MSMLS	Non-targeted (ToF)	x
4-COUMARATE	IROA MSMLS	Non-targeted (ToF)	x
4-HYDROXY-3-METHOXYPHENYLGLYCOL	IROA MSMLS	Non-targeted (ToF)	x
4-HYDROXYBENZALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
4-HYDROXYBENZOATE	IROA MSMLS	Non-targeted (ToF)	x
4-HYDROXY-L-PHENYLGLYCINE	IROA MSMLS	Non-targeted (ToF)	x
4-HYDROXY-L-PROLINE	IROA MSMLS	Non-targeted (ToF)	x
4-HYDROXYPHENYLACETATE	IROA MSMLS	Non-targeted (ToF)	x
4-IMIDAZOLEACETIC ACID	IROA MSMLS	Non-targeted (ToF)	x
4-METHYL-2-OXO-PENTANOIC ACID	IROA MSMLS	Non-targeted (ToF)	x
4-METHYLCATECHOL	IROA MSMLS	Non-targeted (ToF)	x

4-PYRIDOXATE	IROA	Non-targeted (ToF)	
	MSMLS		x
4-QUINOLINECARBOXYLIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
5,6-DIHYDROURACIL	IROA	Non-targeted (ToF)	
	MSMLS		x
5-AMINOLEVULINIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
5-AMINOPENTANOATE	IROA	Non-targeted (ToF)	
	MSMLS		x
5'-DEOXYADENOSINE	IROA	Non-targeted (ToF)	
	MSMLS		x
5-HYDROXYINDOLEACETATE	IROA	Non-targeted (ToF)	
	MSMLS		x
5-HYDROXY-L-TRYPTOPHAN	Sigma-Aldrich	Targeted (QqQ)	x
5-HYDROXY-L-TRYPTOPHAN	IROA	Non-targeted (ToF)	
	MSMLS		x
5-HYDROXYMETHYLURACIL	IROA	Non-targeted (ToF)	
	MSMLS		x
5-METHYLCYTOSINE	IROA	Non-targeted (ToF)	
	MSMLS		x
5-OXO-D-PROLINE	IROA	Non-targeted (ToF)	
	MSMLS		x
5-OXO-L-PROLINE	IROA	Non-targeted (ToF)	
	MSMLS		x
5-PHOSPHO-D-RIBOSE-1-DIPHOSPHATE	IROA	Non-targeted (ToF)	
	MSMLS		x
5-VALEROLACTONE	IROA	Non-targeted (ToF)	
	MSMLS		x
6-DEOXY-L-GALACTOSE	IROA	Non-targeted (ToF)	
	MSMLS		x
6-HYDROXYDOPAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x
6-HYDROXYNICOTINATE	IROA	Non-targeted (ToF)	
	MSMLS		x
6-PHOSPHOGLUCONIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
ACETALDEHYDE	IROA	Non-targeted (ToF)	
	MSMLS		x

ACETOIN	IROA MSMLS	Non-targeted (ToF)	x
ACETYLCHOLINE CHLORIDE	IROA MSMLS	Non-targeted (ToF)	x
ACONITATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 2',3'-CYCLIC MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 3',5'-CYCLIC MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 3',5'- DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 5'-DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 5'- DIPHOSPHORIBOSE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 5'- MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 5'- TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE 5'- TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ADENOSINE-5'- DIPHOSPHOGLUCOSE	IROA MSMLS	Non-targeted (ToF)	x
A-D-GALACTOSE 1- PHOSPHATE DIPOTASSIUM SALT PENTAHYDRATE	IROA MSMLS	Non-targeted (ToF)	x
ADIPIC ACID	IROA MSMLS	Non-targeted (ToF)	x
AGMATINE SULFATE	IROA MSMLS	Non-targeted (ToF)	x
ALANINE	IROA MSMLS	Non-targeted (ToF)	x
ALANINE	IROA MSMLS	Non-targeted (ToF)	x
ALLANTOIN	IROA MSMLS	Non-targeted (ToF)	x

ALLOSE	IROA MSMLS	Non-targeted (ToF)	x
ALLOTHREONINE	IROA MSMLS	Non-targeted (ToF)	x
ALPHA-D-GLUCOSE 1- PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
AMINOADIPATE	IROA MSMLS	Non-targeted (ToF)	x
AMYLOSE	IROA MSMLS	Non-targeted (ToF)	x
ANILINE	IROA MSMLS	Non-targeted (ToF)	x
ANILINE-2-SULFONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
ANTHRANILATE	IROA MSMLS	Non-targeted (ToF)	x
ARABINOSE	IROA MSMLS	Non-targeted (ToF)	x
ARABINOSE	IROA MSMLS	Non-targeted (ToF)	x
ARACHIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
ARGININE	IROA MSMLS	Non-targeted (ToF)	x
ASCORBATE	IROA MSMLS	Non-targeted (ToF)	x
ASPARAGINE	IROA MSMLS	Non-targeted (ToF)	x
ASPARTATE	IROA MSMLS	Non-targeted (ToF)	x
ASPARTATE	IROA MSMLS	Non-targeted (ToF)	x
AZELAIC ACID	IROA MSMLS	Non-targeted (ToF)	x
BENZALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
BENZOATE	IROA MSMLS	Non-targeted (ToF)	x
BENZYL ALCOHOL	IROA MSMLS	Non-targeted (ToF)	x

BENZYLAMINE	IROA MSMLS	Non-targeted (ToF)	x
BETA-ALANINE	IROA MSMLS	Non-targeted (ToF)	x
BETA-CAROTENE	IROA MSMLS	Non-targeted (ToF)	x
BETA-NICOTINAMIDE ADENINE DINUCLEOTIDE 2'- PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
BETA-NICOTINAMIDE ADENINE DINUCLEOTIDE PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
BILIRUBIN	IROA MSMLS	Non-targeted (ToF)	x
BILIVERDIN	IROA MSMLS	Non-targeted (ToF)	x
BIOTIN	IROA MSMLS	Non-targeted (ToF)	x
BIS(2- ETHYLHEXYL)PHTHALATE	IROA MSMLS	Non-targeted (ToF)	x
BIS(3-AMINOPROPYL)AMINE	IROA MSMLS	Non-targeted (ToF)	x
BUTANAL	IROA MSMLS	Non-targeted (ToF)	x
BUTANEDIOL	IROA MSMLS	Non-targeted (ToF)	x
BUTANOATE	IROA MSMLS	Non-targeted (ToF)	x
BUTYRIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
CADAVERINE	IROA MSMLS	Non-targeted (ToF)	x
CAFFEIC ACID	IROA MSMLS	Non-targeted (ToF)	x
CAFFEINE	IROA MSMLS	Non-targeted (ToF)	x
CAPRYLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
CARBAMOYL PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x

CARNOSINE	IROA MSMLS	Non-targeted (ToF)	x
CATECHOL	IROA MSMLS	Non-targeted (ToF)	x
CELLOBIOSE	IROA MSMLS	Non-targeted (ToF)	x
CHENODEOXYCHOLATE	IROA MSMLS	Non-targeted (ToF)	x
CHOLESTEROL PALMITATE	IROA MSMLS	Non-targeted (ToF)	x
CHOLESTERYL ACETATE	IROA MSMLS	Non-targeted (ToF)	x
CHOLESTRA-5,7-DIEN-3BETA- OL	IROA MSMLS	Non-targeted (ToF)	x
CHOLESTRYL OLEATE	IROA MSMLS	Non-targeted (ToF)	x
CHOLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
CHOLINE	IROA MSMLS	Non-targeted (ToF)	x
CINNAMALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
CINNAMATE	IROA MSMLS	Non-targeted (ToF)	x
CIS10PENTADECENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
CIS419DOCOSAHEXAENOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
CIS-4-HYDROXY-D-PROLINE	IROA MSMLS	Non-targeted (ToF)	x
CITRATE	IROA MSMLS	Non-targeted (ToF)	x
CITRULLINE	IROA MSMLS	Non-targeted (ToF)	x
CMP	IROA MSMLS	Non-targeted (ToF)	x
COENZYME A	IROA MSMLS	Non-targeted (ToF)	x
CORTICOSTERONE	IROA MSMLS	Non-targeted (ToF)	x

CORTISOL	IROA MSMLS	Non-targeted (ToF)	x
CORTISOL 21-ACETATE	IROA MSMLS	Non-targeted (ToF)	x
CORTISONE	IROA MSMLS	Non-targeted (ToF)	x
CREATINE	IROA MSMLS	Non-targeted (ToF)	x
CREATINE PHOSPHATE DIBASIC TETRAHYDRATE	IROA MSMLS	Non-targeted (ToF)	x
CYCLOPENTANONE	IROA MSMLS	Non-targeted (ToF)	x
CYS-GLY	IROA MSMLS	Non-targeted (ToF)	x
CYSTATHIONINE	IROA MSMLS	Non-targeted (ToF)	x
CYSTEAMINE	IROA MSMLS	Non-targeted (ToF)	x
CYSTEIC ACID	IROA MSMLS	Non-targeted (ToF)	x
CYSTEINE	IROA MSMLS	Non-targeted (ToF)	x
CYSTINE	IROA MSMLS	Non-targeted (ToF)	x
CYTIDINE	IROA MSMLS	Non-targeted (ToF)	x
CYTIDINE 2',3'-CYCLIC MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
CYTIDINE 5'-DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
CYTIDINE 5'- DIPHOSPHOCHOLINE	IROA MSMLS	Non-targeted (ToF)	x
CYTIDINE 5'-TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
CYTOCHROME C	IROA MSMLS	Non-targeted (ToF)	x
CYTOSINE	IROA MSMLS	Non-targeted (ToF)	x
D-(-)-3-PHOSPHO-GLYCERIC	IROA	Non-targeted (ToF)	x



ACID	MSMLS		
D-(+)-GALACTOSAMINE	IROA MSMLS	Non-targeted (ToF)	x
D(+)-RAFFINOSE	IROA MSMLS	Non-targeted (ToF)	x
D-(+)-TREHALOSE	IROA MSMLS	Non-targeted (ToF)	x
DECANOATE	IROA MSMLS	Non-targeted (ToF)	x
DECANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
DEHYDROASCORBATE	IROA MSMLS	Non-targeted (ToF)	x
DEHYDRO-L-(+)-ASCORBIC ACID	IROA MSMLS	Non-targeted (ToF)	x
DEOXYADENOSINE MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
DEOXYCARNITINE	IROA MSMLS	Non-targeted (ToF)	x
DEOXYCHOLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
DEOXYCHOLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
DEOXYCORTICOSTERONE	IROA MSMLS	Non-targeted (ToF)	x
DEOXYCYTIDINE	IROA MSMLS	Non-targeted (ToF)	x
DEOXYRIBOSE	IROA MSMLS	Non-targeted (ToF)	x
DEOXYURIDINE	IROA MSMLS	Non-targeted (ToF)	x
DESMOSTEROL	IROA MSMLS	Non-targeted (ToF)	x
DETHIOBIOTIN	IROA MSMLS	Non-targeted (ToF)	x
D-FRUCTOSE 6-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
D-GLUCONO-1,5-LACTONE	IROA MSMLS	Non-targeted (ToF)	x

D-GLUCOSAMINE 6-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
D-GLUCOSAMINE 6-SULFATE	IROA MSMLS	Non-targeted (ToF)	x
D-GLUCOSE 6-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
D-GLUCOSE-6-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
DIACETYL	IROA MSMLS	Non-targeted (ToF)	x
DIETHYL-2-METHYL-3-OXOSUCCINATE	IROA MSMLS	Non-targeted (ToF)	x
DIHYDROFOLATE	IROA MSMLS	Non-targeted (ToF)	x
DIHYDROXYACETONE PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
DIHYDROXYFUMARIC ACID	IROA MSMLS	Non-targeted (ToF)	x
DIHYDROXYMANDELIC ACID	IROA MSMLS	Non-targeted (ToF)	x
DIMETHYL SULFIDE	IROA MSMLS	Non-targeted (ToF)	x
DIMETHYLALLYL PYROPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
DL-5-HYDROXYLYSINE	IROA MSMLS	Non-targeted (ToF)	x
D-LACTOSE	IROA MSMLS	Non-targeted (ToF)	x
D-LYXOSE	IROA MSMLS	Non-targeted (ToF)	x
D-MANNOSAMINE	IROA MSMLS	Non-targeted (ToF)	x
D-MANNOSE 6-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
DOCOSANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
DODECANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
DOPA	Sigma-Aldrich	Targeted (QqQ)	x
DOPAMINE	Sigma-Aldrich	Targeted (QqQ)	x

DOPAMINE	IROA MSMLS	Non-targeted (ToF)	x
D-ORNITHINE	IROA MSMLS	Non-targeted (ToF)	x
D-PANTOTHENIC ACID	IROA MSMLS	Non-targeted (ToF)	x
D-RIBOSE 5-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
DTMP	IROA MSMLS	Non-targeted (ToF)	x
EPINEPHRINE	IROA MSMLS	Non-targeted (ToF)	x
EPINEPRHINE	Sigma-Aldrich	Targeted (QqQ)	x
ERUCIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
ERUCIC ACID	IROA MSMLS	Non-targeted (ToF)	x
ERYTHRITOL	IROA MSMLS	Non-targeted (ToF)	x
ESTRADIOL-17ALPHA	IROA MSMLS	Non-targeted (ToF)	x
ETHANOLAMINE	IROA MSMLS	Non-targeted (ToF)	x
ETHANOLAMINE PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ETHYL-3-INDOLE-ACETATE	IROA MSMLS	Non-targeted (ToF)	x
ETHYL-3- UREIDOPROPIONATE	IROA MSMLS	Non-targeted (ToF)	x
ETHYLMALONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
FARNESYL DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
FERULATE	IROA MSMLS	Non-targeted (ToF)	x
FLAVIN ADENINE DINUCLEOTIDE	IROA MSMLS	Non-targeted (ToF)	x
FOLIC ACID	IROA MSMLS	Non-targeted (ToF)	x

FORMAMIDE	IROA MSMLS	Non-targeted (ToF)	x
FORMATE	IROA MSMLS	Non-targeted (ToF)	x
FORMYL-L-METHIONYL	IROA MSMLS	Non-targeted (ToF)	x
FRUCTOSE	IROA MSMLS	Non-targeted (ToF)	x
FRUCTOSE 1,6-BIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
FUMARATE	IROA MSMLS	Non-targeted (ToF)	x
GALACTARATE	IROA MSMLS	Non-targeted (ToF)	x
GALACTITOL	IROA MSMLS	Non-targeted (ToF)	x
GALACTOSE	IROA MSMLS	Non-targeted (ToF)	x
GALACTURONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GERANYL PYROPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GERANYLGERANYL PYROPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GLUCONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GLUCOSAMINATE	IROA MSMLS	Non-targeted (ToF)	x
GLUCOSAMINE	IROA MSMLS	Non-targeted (ToF)	x
GLUCOSE	IROA MSMLS	Non-targeted (ToF)	x
GLUCURONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GLUCURONOLACTONE	IROA MSMLS	Non-targeted (ToF)	x
GLUTAMIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GLUTAMINE	IROA	Non-targeted (ToF)	x

	MSMLS		
GLUTARATE	IROA MSMLS	Non-targeted (ToF)	x
GLUTARIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GLUTATHIONE	IROA MSMLS	Non-targeted (ToF)	x
GLYCERALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
GLYCERALDEHYDE 3- PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GLYCERATE	IROA MSMLS	Non-targeted (ToF)	x
GLYCERIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GLYCEROL	IROA MSMLS	Non-targeted (ToF)	x
GLYCEROL 2-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GLYCERYL TRIMYRISTATE	IROA MSMLS	Non-targeted (ToF)	x
GLYCERYL TRIPALMITATE	IROA MSMLS	Non-targeted (ToF)	x
GLYCINE	IROA MSMLS	Non-targeted (ToF)	x
GLYCOCHOLATE	IROA MSMLS	Non-targeted (ToF)	x
GLYCOLALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
GLYCOLATE	IROA MSMLS	Non-targeted (ToF)	x
GLYOXYLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
GUAIACOL	IROA MSMLS	Non-targeted (ToF)	x
GUANIDINOACETATE	IROA MSMLS	Non-targeted (ToF)	x
GUANOSINE 3',5'-CYCLIC	IROA MSMLS	Non-targeted (ToF)	x

GUANOSINE 5'-DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GUANOSINE 5'-DIPHOSPHO-D-MANNOSE	IROA MSMLS	Non-targeted (ToF)	x
GUANOSINE 5'-DIPHOSPHOGLUCOSE	IROA MSMLS	Non-targeted (ToF)	x
GUANOSINE 5'-MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GUANOSINE 5'-TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
GULONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
HEPTANOIC ACID	IROA MSMLS	Non-targeted (ToF)	x
HEXADECANOL	IROA MSMLS	Non-targeted (ToF)	x
HEXANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
HIPPURATE	IROA MSMLS	Non-targeted (ToF)	x
HISTAMINE	IROA MSMLS	Non-targeted (ToF)	x
HISTIDINE	IROA MSMLS	Non-targeted (ToF)	x
HISTIDINE	IROA MSMLS	Non-targeted (ToF)	x
HISTIDINOL	IROA MSMLS	Non-targeted (ToF)	x
HOMOCYSTEINE	IROA MSMLS	Non-targeted (ToF)	x
HOMOCYSTEINE THIOLACTONE	IROA MSMLS	Non-targeted (ToF)	x
HOMOCYSTINE	IROA MSMLS	Non-targeted (ToF)	x
HOMOGENTISATE	IROA MSMLS	Non-targeted (ToF)	x
HOMOSERINE	IROA MSMLS	Non-targeted (ToF)	x
HOMOVANILLATE	IROA MSMLS	Non-targeted (ToF)	x

HYDROQUINONE	IROA MSMLS	Non-targeted (ToF)	x
HYDROXYISOBUTYRIC ACID	IROA MSMLS	Non-targeted (ToF)	x
HYPOTAURINE	IROA MSMLS	Non-targeted (ToF)	x
INDOLE	IROA MSMLS	Non-targeted (ToF)	x
INDOLE-3-ACETAMIDE	IROA MSMLS	Non-targeted (ToF)	x
INDOLE-3-ACETATE	IROA MSMLS	Non-targeted (ToF)	x
INDOLE-3-ACETIC ACID	IROA MSMLS	Non-targeted (ToF)	x
INDOLE-3-ETHANOL	IROA MSMLS	Non-targeted (ToF)	x
INDOLE-3-PYRUVIC ACID	IROA MSMLS	Non-targeted (ToF)	x
INDOXYL SULFATE	IROA MSMLS	Non-targeted (ToF)	x
INOSINE 5'-DIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
INOSINE 5'-MONOPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
INOSINE 5'-PHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
INOSINE 5'-TRIPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ISOCITRIC ACID	IROA MSMLS	Non-targeted (ToF)	x
ISOLEUCINE	IROA MSMLS	Non-targeted (ToF)	x
ISOPENTENYL PYROPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ITACONATE	IROA MSMLS	Non-targeted (ToF)	x
JASMONATE	IROA MSMLS	Non-targeted (ToF)	x
KETOGLUTARIC ACID	IROA	Non-targeted (ToF)	x

	MSMLS		
KYNURENIC ACID	IROA	Non-targeted (ToF)	x
	MSMLS		
KYNURENINE	IROA	Non-targeted (ToF)	x
	MSMLS		
KYNURENINE	IROA	Non-targeted (ToF)	x
	MSMLS		
L-2,3-DIAMINOPROPIONIC ACID	IROA	Non-targeted (ToF)	x
	MSMLS		
L-2-PHOSPHOGLYCERIC ACID	IROA	Non-targeted (ToF)	x
	MSMLS		
L-AMINOCYCLOPROPANE-1-CARBOXYLATE	IROA	Non-targeted (ToF)	x
	MSMLS		
LANOSTEROL	IROA	Non-targeted (ToF)	x
	MSMLS		
L-ANSERINE	IROA	Non-targeted (ToF)	x
	MSMLS		
L-ARABITOL	IROA	Non-targeted (ToF)	x
	MSMLS		
LAURIC ACID	IROA	Non-targeted (ToF)	x
	MSMLS		
LAUROYL CARNITINE	IROA	Non-targeted (ToF)	x
	MSMLS		
LEUKOTRIENE B4	IROA	Non-targeted (ToF)	x
	MSMLS		
LIPOAMIDE	IROA	Non-targeted (ToF)	x
	MSMLS		
LITHIUM ACETOACETATE	IROA	Non-targeted (ToF)	x
	MSMLS		
LITHIUM CARBAMOYLPHOSPHATE	IROA	Non-targeted (ToF)	x
	MSMLS		
LITHIUM POTASSIUM ACETYL PHOSPHATE	IROA	Non-targeted (ToF)	x
	MSMLS		
LL-2,6-DIAMINOHEPTANEDIOATE	IROA	Non-targeted (ToF)	x
	MSMLS		
L-METHIONINE	IROA	Non-targeted (ToF)	x
	MSMLS		
L-METHYLADENOSINE	IROA	Non-targeted (ToF)	x
	MSMLS		



L-METHYLNICOTINAMIDE	IROA MSMLS	Non-targeted (ToF)	x
L-OLEOYL-RAC-GLYCEROL	IROA MSMLS	Non-targeted (ToF)	x
LUMICHROME	IROA MSMLS	Non-targeted (ToF)	x
LYSINE	IROA MSMLS	Non-targeted (ToF)	x
LYSINE	IROA MSMLS	Non-targeted (ToF)	x
MALATE	IROA MSMLS	Non-targeted (ToF)	x
MALEAMATE	IROA MSMLS	Non-targeted (ToF)	x
MALEIC ACID	IROA MSMLS	Non-targeted (ToF)	x
MALEIMIDE	IROA MSMLS	Non-targeted (ToF)	x
MALONATE	IROA MSMLS	Non-targeted (ToF)	x
MALTOSE	IROA MSMLS	Non-targeted (ToF)	x
MANDELIC ACID	IROA MSMLS	Non-targeted (ToF)	x
MANNITOL	IROA MSMLS	Non-targeted (ToF)	x
MANNOSE	IROA MSMLS	Non-targeted (ToF)	x
MELANIN	IROA MSMLS	Non-targeted (ToF)	x
MELATONIN	IROA MSMLS	Non-targeted (ToF)	x
MELIBIOSE	IROA MSMLS	Non-targeted (ToF)	x
MENAQUINONE	IROA MSMLS	Non-targeted (ToF)	x
MERCAPTOPYRUVATE	IROA MSMLS	Non-targeted (ToF)	x
MESO-TARTARIC ACID	IROA	Non-targeted (ToF)	x

	MSMLS		
MESOXALATE	IROA MSMLS	Non-targeted (ToF)	x
METHIONINE	IROA MSMLS	Non-targeted (ToF)	x
METHYL ACETOACETATE	IROA MSMLS	Non-targeted (ToF)	x
METHYL BETA-D- GALACTOSIDE	IROA MSMLS	Non-targeted (ToF)	x
METHYL INDOLE-3-ACETATE	IROA MSMLS	Non-targeted (ToF)	x
METHYL VANILLATE	IROA MSMLS	Non-targeted (ToF)	x
METHYLGUANDINE	IROA MSMLS	Non-targeted (ToF)	x
METHYLMALONATE	IROA MSMLS	Non-targeted (ToF)	x
MEVALOLACTONE	IROA MSMLS	Non-targeted (ToF)	x
MONO-ETHYL MALONATE	IROA MSMLS	Non-targeted (ToF)	x
MONO-METHYL GLUTARATE	IROA MSMLS	Non-targeted (ToF)	x
MYO-INOSITOL	IROA MSMLS	Non-targeted (ToF)	x
MYRISTIC ACID	Sigma-Aldrich IROA	Non-targeted (ToF)	x
MYRISTIC ACID	MSMLS	Non-targeted (ToF)	x
MYRISTOLEIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
N ALPHA-ACETYL-L-LYSINE	IROA MSMLS	Non-targeted (ToF)	x
N(PAI)-METHYL-L-HISTIDINE	IROA MSMLS	Non-targeted (ToF)	x
N,N-DIMETHYL-1,4- PHENYLENEDIAMINE	IROA MSMLS	Non-targeted (ToF)	x
N,W-METHYLTRYPTAMINE	IROA MSMLS	Non-targeted (ToF)	x
N1-ACETYLSPERMINE	IROA	Non-targeted (ToF)	x

	MSMLS		
N-ACETYL-D-GALACTOSAMINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-D-GLUCOSAMINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-DL-GLUTAMIC ACID	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-DL-METHIONINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-DL-SERINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-D-MANNOSAMINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-D-TRYPTOPHAN	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYLGLYCINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-L-ALANINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-L-ASPARTIC ACID	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-L-CYSTEINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYL-L-PHENYLALANINE	IROA MSMLS	Non-targeted (ToF)	x
N-ACETYLNEURAMINATE	IROA MSMLS	Non-targeted (ToF)	x
NAD	IROA MSMLS	Non-targeted (ToF)	x
N-ALPHA-ACETYL-L-ASPARAGINE	IROA MSMLS	Non-targeted (ToF)	x
N-AMIDINO-ASPARTATE	IROA MSMLS	Non-targeted (ToF)	x
NERVONIC ACID	IROA MSMLS	Non-targeted (ToF)	x
N-FORMYLGLYCINE	IROA MSMLS	Non-targeted (ToF)	x
NICOTINAMIDE	IROA		
HYPOXANTHINE	MSMLS	Non-targeted (ToF)	x

DINUCLEOTIDE			
NICOTINAMIDE	IROA		
MONONUCLEOTIDE	MSMLS	Non-targeted (ToF)	x
NICOTINATE	IROA		
	MSMLS	Non-targeted (ToF)	x
NICOTINE	IROA		
	MSMLS	Non-targeted (ToF)	x
NICOTINIC ACID ADENINE	IROA		
DINUCLEOTIDE PHOSPHATE	MSMLS	Non-targeted (ToF)	x
NITRO-L-TYROSINE	IROA		
	MSMLS	Non-targeted (ToF)	x
N-METHYL-D-ASPARTIC ACID	IROA		
	MSMLS	Non-targeted (ToF)	x
N-METHYL-L-GLUTARATE	IROA		
	MSMLS	Non-targeted (ToF)	x
NONANOATE	IROA		
	MSMLS	Non-targeted (ToF)	x
NORADRENALINE	IROA		
	MSMLS	Non-targeted (ToF)	x
NOREPINEPRHINE	Sigma-Aldrich	Targeted (QqQ)	x
NORLEUCINE	IROA		
	MSMLS	Non-targeted (ToF)	x
NORMETANEPHRINE	IROA		
	MSMLS	Non-targeted (ToF)	x
NORMETANEPRHINE	Sigma-Aldrich	Targeted (QqQ)	x
NORVALINE	IROA		
	MSMLS	Non-targeted (ToF)	x
O-ACETYL-L-SERINE	IROA		
	MSMLS	Non-targeted (ToF)	x
OCTANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
OCTOPAMINE	IROA		
	MSMLS	Non-targeted (ToF)	x
O-PHOSPHO-DL-SERINE	IROA		
	MSMLS	Non-targeted (ToF)	x
O-PHOSPHO-L-SERINE	IROA		
	MSMLS	Non-targeted (ToF)	x
OPHTHALMIC ACID	IROA		
	MSMLS	Non-targeted (ToF)	x

ORNITHINE	IROA MSMLS	Non-targeted (ToF)	x
OROTATE	IROA MSMLS	Non-targeted (ToF)	x
OROTIC ACID	IROA MSMLS	Non-targeted (ToF)	x
O-SUCCINYL-L-HOMOSERINE	IROA MSMLS	Non-targeted (ToF)	x
OXALIC ACID	IROA MSMLS	Non-targeted (ToF)	x
OXALOACETATE	IROA MSMLS	Non-targeted (ToF)	x
OXALOMALIC ACID	IROA MSMLS	Non-targeted (ToF)	x
PALATINOSE	IROA MSMLS	Non-targeted (ToF)	x
PALMITIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
PANTOLACTONE	IROA MSMLS	Non-targeted (ToF)	x
PARAXANTHINE	IROA MSMLS	Non-targeted (ToF)	x
PENTADECANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
PENTANOATE	IROA MSMLS	Non-targeted (ToF)	x
PETROSELINIC ACID	IROA MSMLS	Non-targeted (ToF)	x
PHENETHYLAMINE	IROA MSMLS	Non-targeted (ToF)	x
PHENOL	IROA MSMLS	Non-targeted (ToF)	x
PHENYL ACETATE	IROA MSMLS	Non-targeted (ToF)	x
PHENYLACETALDEHYDE	IROA MSMLS	Non-targeted (ToF)	x
PHENYLACETIC ACID	IROA MSMLS	Non-targeted (ToF)	x
PHENYLALANINE	IROA MSMLS	Non-targeted (ToF)	x

PHENYLETHANOLAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x
PHOSPHO(ENOL)PYRUVIC	IROA	Non-targeted (ToF)	
ACID	MSMLS		x
PHOSPHOCHOLINE	IROA	Non-targeted (ToF)	
CHLORIDE	MSMLS		x
PHOSPHOCREATINE	IROA	Non-targeted (ToF)	
	MSMLS		x
PHOSPHONOACETATE	IROA	Non-targeted (ToF)	
	MSMLS		x
PHOSPO(ENOL)PYRUVIC	IROA	Non-targeted (ToF)	
ACID	MSMLS		x
PHYLLQUINONE	IROA	Non-targeted (ToF)	
	MSMLS		x
PHYTIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
PIMELIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
PIPECOLIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
POTASSIUM CITRAMALATE	IROA	Non-targeted (ToF)	
	MSMLS		x
POTASSIUM SORBATE	IROA	Non-targeted (ToF)	
	MSMLS		x
PRENOL	IROA	Non-targeted (ToF)	
	MSMLS		x
PROPANAL	IROA	Non-targeted (ToF)	
	MSMLS		x
PROPANOATE	IROA	Non-targeted (ToF)	
	MSMLS		x
PROPENOATE	IROA	Non-targeted (ToF)	
	MSMLS		x
PROPYNOATE	IROA	Non-targeted (ToF)	
	MSMLS		x
PROTOPORPHYRIN	IROA	Non-targeted (ToF)	
	MSMLS		x
PSICOSE	IROA	Non-targeted (ToF)	
	MSMLS		x
PTERINE	IROA	Non-targeted (ToF)	
			x

	MSMLS		
PURINE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRAZOLE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRIDINE-2,3-DICARBOXYLATE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRIDOXAL	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRIDOXAL 5'-PHOSPHATE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRIDOXAMINE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRIDOXINE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRIMIDINE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRROLE-2-CARBOXYLATE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRUVATE	IROA	Non-targeted (ToF)	x
	MSMLS		
PYRUVIC ALDEHYDE	IROA	Non-targeted (ToF)	x
	MSMLS		
QUINATE	IROA	Non-targeted (ToF)	x
	MSMLS		
QUINOLINE	IROA	Non-targeted (ToF)	x
	MSMLS		
RAC-GLYCEROL-L-MYRISTATE	IROA	Non-targeted (ToF)	x
	MSMLS		
RESORCINOL	IROA	Non-targeted (ToF)	x
	MSMLS		
RETINOATE	IROA	Non-targeted (ToF)	x
	MSMLS		
RETINOL	IROA	Non-targeted (ToF)	x
	MSMLS		
RETINYL PALMITATE	IROA	Non-targeted (ToF)	x
	MSMLS		
RHAMNOSE	IROA	Non-targeted (ToF)	x
	MSMLS		

RIBITOL	IROA MSMLS	Non-targeted (ToF)	x
RIBOFLAVIN	IROA MSMLS	Non-targeted (ToF)	x
RIBOSE	IROA MSMLS	Non-targeted (ToF)	x
RIBULOSE 1,5-BISPHOSPHATE	IROA MSMLS	Non-targeted (ToF)	x
ROSMARINIC ACID	IROA MSMLS	Non-targeted (ToF)	x
S-(5'-ADENOSYL)-L-HOMOCYSTEINE	IROA MSMLS	Non-targeted (ToF)	x
S-(5'-ADENOSYL)-L-METHIONINE	IROA MSMLS	Non-targeted (ToF)	x
SACCHARIC ACID	IROA MSMLS	Non-targeted (ToF)	x
SALICYLAMIDE	IROA MSMLS	Non-targeted (ToF)	x
SALICYLIC ACID	IROA MSMLS	Non-targeted (ToF)	x
SARCOSINE	IROA MSMLS	Non-targeted (ToF)	x
S-CARBOXYMETHYL-L-CYSTEINE	IROA MSMLS	Non-targeted (ToF)	x
SELENOCYSTAMINE	IROA MSMLS	Non-targeted (ToF)	x
SELENOMETHIONINE	IROA MSMLS	Non-targeted (ToF)	x
SERINE	IROA MSMLS	Non-targeted (ToF)	x
SEROTONIN CREATININE COMPLEX	IROA MSMLS	Non-targeted (ToF)	x
SEROTONIN HYDROCHLORIDE	IROA MSMLS	Non-targeted (ToF)	x
S-HEXYL-GLUTATHIONE	IROA MSMLS	Non-targeted (ToF)	x
SHIKIMATE	IROA MSMLS	Non-targeted (ToF)	x
SN-GLYCEROL 3-PHOSPHATE	IROA	Non-targeted (ToF)	x



BIS (CYCLOHEXYLAMMONIUM)	MSMLS		
SN-GLYCEROL-3- PHOSPHOCHOLINE	IROA MSMLS	Non-targeted (ToF)	x
SODIUM BENZOATE	IROA MSMLS	Non-targeted (ToF)	x
SODIUM D-GLUCONATE	IROA MSMLS	Non-targeted (ToF)	x
SODIUM PHENYLPYRUVATE	IROA MSMLS	Non-targeted (ToF)	x
SODIUM PROPIONATE	IROA MSMLS	Non-targeted (ToF)	x
SODIUM TAUROLITHOCHOLATE	IROA MSMLS	Non-targeted (ToF)	x
SORBITOL	IROA MSMLS	Non-targeted (ToF)	x
SORBOSE	IROA MSMLS	Non-targeted (ToF)	x
SPERMIDINE	IROA MSMLS	Non-targeted (ToF)	x
SPERMINE	IROA MSMLS	Non-targeted (ToF)	x
SPHINGANINE	IROA MSMLS	Non-targeted (ToF)	x
SPHINGOMYELIN	IROA MSMLS	Non-targeted (ToF)	x
SQUALENE	IROA MSMLS	Non-targeted (ToF)	x
STACHYOSE HYDRATE	IROA MSMLS	Non-targeted (ToF)	x
SUBERIC ACID	IROA MSMLS	Non-targeted (ToF)	x
SUCCINATE	IROA MSMLS	Non-targeted (ToF)	x
SUCCINATE	IROA MSMLS	Non-targeted (ToF)	x
SUCROSE	IROA MSMLS	Non-targeted (ToF)	x
TAGATOSE	IROA	Non-targeted (ToF)	x

	MSMLS		
TARTARIC ACID	IROA	Non-targeted (ToF)	x
	MSMLS		
TARTARIC ACID	IROA	Non-targeted (ToF)	x
	MSMLS		
TAURINE	IROA	Non-targeted (ToF)	x
	MSMLS		
TETRAHYDROFOLATE	IROA	Non-targeted (ToF)	x
	MSMLS		
THEOBROMINE	IROA	Non-targeted (ToF)	x
	MSMLS		
THEOPHYLLINE	IROA	Non-targeted (ToF)	x
	MSMLS		
THIAMINE	IROA	Non-targeted (ToF)	x
	MSMLS		
THIAMINE MONOPHOSPHATE	IROA	Non-targeted (ToF)	x
	MSMLS		
THIAMINE PYROPHOSPHATE	IROA	Non-targeted (ToF)	x
	MSMLS		
THIOACETATE	IROA	Non-targeted (ToF)	x
	MSMLS		
THIOUREA	IROA	Non-targeted (ToF)	x
	MSMLS		
THREONINE	IROA	Non-targeted (ToF)	x
	MSMLS		
THYMIDINE	IROA	Non-targeted (ToF)	x
	MSMLS		
THYMIDINE 5'- MONOPHOSPHATE	IROA	Non-targeted (ToF)	x
	MSMLS		
THYMIDINE-5'-DIPHOSPHO- ALPHA-D-GLUCOSE	IROA	Non-targeted (ToF)	x
	MSMLS		
THYMINE	IROA	Non-targeted (ToF)	x
	MSMLS		
THYROTROPIN RELEASING HORMONE	IROA	Non-targeted (ToF)	x
	MSMLS		
THYROXINE	IROA	Non-targeted (ToF)	x
	MSMLS		
TOCOPHEROL	IROA	Non-targeted (ToF)	x
	MSMLS		

TRANS-4-HYDROXYPROLINE	IROA	Non-targeted (ToF)	
	MSMLS		x
TRANS-CYCLOHEXANE-1,2-DIOL	IROA	Non-targeted (ToF)	
	MSMLS		x
TRIDECANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
TRIGONELLINE	IROA	Non-targeted (ToF)	
	MSMLS		x
TRIIODOTHYRONINE	IROA	Non-targeted (ToF)	
	MSMLS		x
TRIMETHYLAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x
TRYPTAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x
TRYPTOPHAN	IROA	Non-targeted (ToF)	
	MSMLS		x
TRYPTOPHAN	IROA	Non-targeted (ToF)	
	MSMLS		x
TYRAMINE	Sigma-Aldrich	Targeted (QqQ)	x
TYRAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x
TYROSINE	IROA	Non-targeted (ToF)	
	MSMLS		x
UNDECANOIC ACID	Sigma-Aldrich	Non-targeted (ToF)	x
URATE	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-DIPHOSPHATE	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-DIPHOSPHOGALACTOSE	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-DIPHOSPHOGLUCOSE	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-DIPHOSPHOGLUCURONIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-DIPHOSPHO-N-ACETYLGLACTOSAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-DIPHOSPHO-N-ACETYLGLUCOSAMINE	IROA	Non-targeted (ToF)	
	MSMLS		x

URIDINE 5'-TRIPHOSPHATE	IROA	Non-targeted (ToF)	
	MSMLS		x
URIDINE 5'-TRIPHOSPHATE	IROA	Non-targeted (ToF)	
	MSMLS		x
VITAMIN B12	IROA	Non-targeted (ToF)	
	MSMLS		x
VITAMIN D2	IROA	Non-targeted (ToF)	
	MSMLS		x
XANTHOSINE	IROA	Non-targeted (ToF)	
	MSMLS		x
XANTHOSINE 5'- MONOPHOSPHATE	IROA	Non-targeted (ToF)	
	MSMLS		x
XANTHURENIC ACID	IROA	Non-targeted (ToF)	
	MSMLS		x
XYLITOL	IROA	Non-targeted (ToF)	
	MSMLS		x
XYLOSE	IROA	Non-targeted (ToF)	
	MSMLS		x

**Table S2** Metabolite identified in the different exposure groups. Fold change and *p*-values corrected by false discovery rate (FDR) are reported. Marked in red the metabolites significantly different for more than three exposure concentrations and in green QC LC-ToF and Targeted QqQ analysis in the *p*-values below 0.05 are marked.

METABOLITE	Fold change ctrl vs 0.1 µg/L	<i>p</i> -value (FDR)	Fold change Ctrl vs 1.0 µg/L	<i>p</i> -value (FDR)	Fold change ctrl vs 10 µg/L	<i>p</i> -value (FDR)	Fold change ctrl vs 100 µg/L	<i>p</i> -value (FDR)
3-methyl-2-oxovaleric acid	-1.81	0.028	-2.85	0.001	-3.31	0.000	-2.70	0.000
4-guanidino-butanoate	1.44	0.320	4.08	0.002	2.92	0.012	4.06	0.002
4-methyl-2-oxovaleric acid	2.86	0.074	3.09	0.049	4.91	0.022	2.09	0.127
5-HIAA	1.19	0.651	1.29	0.755	1.00	0.620	1.33	0.552
5-methylthioadenosine	-1.57	0.044	1.45	0.193	1.18	0.529	2.44	0.008
Acetylcholine	-1.66	0.026	-2.24	0.013	-1.75	0.043	-1.58	0.008
Adenine	1.11	0.807	1.39	0.259	1.15	0.572	2.07	0.012
Arachidic acid	-2.83	0.382	nd	nd	nd	nd	-6.04	0.063
Arachidonic acid	1.32	0.491	nd	nd	-1.40	0.216	-1.35	0.113
Betaine	1.42	0.009	1.18	0.136	1.18	0.114	1.45	0.002
Carnitine	2.10	0.000	1.47	0.002	1.76	0.000	1.61	0.003
Choline	-1.19	0.026	2.24	0.005	2.01	0.022	1.36	0.008
cis-10-heptadecenoic acid	-30.73	0.019	-25.19	0.007	-1.78	0.559	-14.95	0.099
cis-11,14-eicosadienoic acid	-1.43	0.138	nd	nd	-1.00	0.000	-1.34	0.262
cis-11,17-eicosatrienoic acid	-1.27	0.195	nd	nd	nd	nd	-1.02	0.988
cis-11-eicosenoic acid	-12.12	0.000	nd	nd	-1.00	0.000	-5.26	0.079
cis-13,16-docosadienoic acid	1.00	0.998	nd	nd	nd	nd	-1.07	0.926
cis-15-tetracosenoic acid	-1.03	0.983	nd	nd	nd	nd	1.32	0.429
cis-5,17-eicosapentaenoic acid	1.16	0.664	nd	nd	-1.00	0.000	-1.01	0.988
cis-8,14-eicosatrienoic acid	-2.76	0.071	nd	nd	nd	nd	-2.51	0.260
Creatinine	1.17	0.418	1.70	0.014	1.74	0.013	1.80	0.003

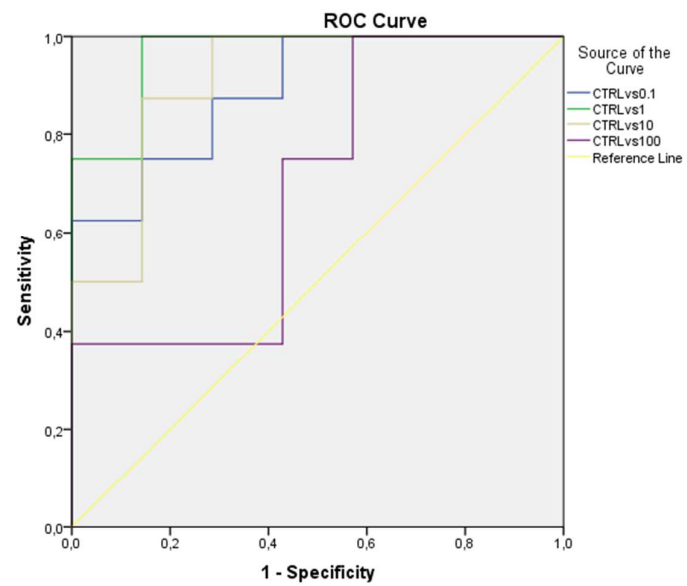
Diethanolamine	-1.89	0.053	-1.24	0.261	1.07	0.775	1.17	0.643
Dimethylbenzimidazole	nd	nd	5.25	0.002	nd	nd	nd	nd
Docosahexanoic acid	-2.39	0.005	nd	nd	nd	nd	1.06	0.843
Elaidic acid	-9.73	0.000	-8.68	0.000	-6.75	0.006	-7.61	0.001
Erucic acid	-1.01	0.998	nd	nd	nd	nd	-1.00	0.988
GABA	1.26	0.262	3.28	0.245	4.44	0.624	5.38	0.036
Glutamate	-2.72	0.041	1.35	0.442	-1.71	0.389	1.95	0.131
Glutamine	-2.06	0.078	8.36	0.023	2.04	0.143	-2.47	0.079
Guanine	1.10	0.807	1.60	0.293	1.16	0.756	-1.05	0.893
Guanosine	-2.92	0.002	-2.46	0.001	-1.94	0.020	-1.46	0.003
Henicosanoic acid	-1.26	0.195	nd	nd	nd	nd	-1.13	0.592
Heptadecanoic acid	-26.11	0.004	-29.01	0.000	-35.44	0.011	-28.48	0.000
Hexadecanol	-1.13	0.962	1.13	0.801	1.13	0.801	1.75	0.503
Histamine	-1.05	0.651	1.03	0.755	-1.09	0.620	-1.07	0.552
Histidine	4.34	0.761	1.37	0.685	-1.07	0.000	-1.19	0.001
Hypoxanthine	-1.90	0.011	-1.05	0.805	-1.73	0.097	-1.10	0.702
Indole-3-acetaldehyde	-1.14	0.807	nd	nd	1.39	0.475	nd	nd
Inosine	-2.33	0.004	-1.95	0.011	-1.93	0.011	-1.46	0.017
Leucine	1.31	0.145	1.52	0.001	1.31	0.174	1.67	0.002
Linoleic acid	-1.32	0.244	-9.13	0.000	-3.18	0.216	-6.89	0.049
Linolelaidic acid	-1.88	0.117	-10.94	0.005	-3.84	0.216	-12.04	0.012
L-proline	1.12	0.540	1.58	0.008	1.14	0.615	1.46	0.024
N6-(delta2-isopentenyl)-adenine	1.09	0.807	1.05	0.911	2.39	0.048	1.05	0.893
N6,N6,N6-trimethyl-L-lysine	1.75	0.222	2.16	0.067	1.89	0.123	1.91	0.090
N-acetyl-L-leucine	1.20	0.778	2.36	0.080	2.19	0.117	2.36	0.090
N-acetylputrescine	1.35	0.156	1.24	0.109	1.31	0.141	1.11	0.680
N-acetylserotonin	1.44	0.666	1.20	0.764	1.06	0.883	1.20	0.716
Nicotinamide	1.53	0.456	-1.04	0.956	5.29	0.048	nd	nd

O-acetyl-L-carnitine	1.27	0.540	1.06	0.911	2.37	0.040	1.20	0.680
<b>Oleic acid</b>	-14.94	0.000	-14.40	0.000	-4.06	0.005	-14.12	0.000
Palmitoleic acid	nd	nd	nd	nd	-1.47	0.028	nd	nd
<b>Phenylalanine</b>	4.17	0.005	4.27	0.002	2.01	0.005	1.93	0.018
Picolinic acid	1.20	0.456	1.21	0.342	1.16	0.484	1.40	0.085
Pipecolinic acid	1.22	0.415	1.25	0.293	1.34	0.114	1.94	0.006
Putrescine	1.43	0.105	1.47	0.067	1.85	0.022	1.84	0.008
Serotonin	-1.63	0.177	-2.29	0.103	-2.58	0.173	-6.28	0.036
Spermidine	1.28	0.136	1.03	0.911	1.55	0.022	1.54	0.024
<b>Stearic acid</b>	-42.80	0.000	-40.42	0.000	-31.92	0.001	-37.25	0.000
Tetracosanoic acid	-1.37	0.094	nd	nd	nd	nd	-1.02	0.988
Thiopurine S-methylester	1.08	0.807	1.03	0.931	1.04	0.846	1.04	0.893
Tricosanoic acid	-1.13	0.558	nd	nd	nd	nd	-1.00	0.000
Tryptophan	-1.18	0.446	-1.62	0.025	-1.81	0.094	-1.75	0.020
Tryptophanamide	1.36	0.412	nd	nd	nd	nd	nd	nd
Tyrosine	1.08	0.761	-1.13	0.521	-1.44	0.303	1.17	0.521
Uracil	-1.37	0.023	-1.20	0.081	1.15	0.550	1.11	0.680
<b>Uridine</b>	-1.78	0.002	-1.98	0.000	-1.42	0.011	-1.25	0.138
Uridine-5-monoposphate	-1.19	0.778	-2.25	0.062	-2.00	0.070	-1.51	0.552
Urocanate	-3.17	0.157	1.13	0.470	-2.63	0.080	1.10	0.684
<b>Valine</b>	1.39	0.016	1.60	0.049	1.18	0.146	1.52	0.002
Xanthine	-1.26	0.462	-1.10	0.291	1.08	0.608	1.15	0.371
$\alpha$ -linolenic acid	-1.97	0.162	nd	nd	-2.50	0.039	-1.84	0.072
<b><math>\gamma</math>-linolenic acid</b>	-8.51	0.015	-13.73	0.005	-9.72	0.033	-14.38	0.000

**Table S3** Area under the ROC curve (AUC  $\pm$  Std. error) for metabolites  $> 0.8$  in more than three exposure concentrations.

Metabolite	Imidacloprid exposure concentration ( $\mu\text{g/L}$ )			
	0.1	1.0	10	100
Carnitine	$0.89 \pm 0.07$	$0.86 \pm 0.09$	$0.84 \pm 0.11$	$0.90 \pm 0.07$
Elaidic acid	$0.93 \pm 0.07$	$1 \pm 0.01$	$1 \pm 0.01$	$0.86 \pm 0.10$
$\gamma$ -linolenic acid	$0.86 \pm 0.10$	$1 \pm 0.01$	$1 \pm 0.01$	$0.83 \pm 0.11$
Linolelaidic acid	$0.8 \pm 0.15$	$0.94 \pm 0.07$	$0.88 \pm 0.12$	$0.9 \pm 0.10$
Stearic acid	$0.93 \pm 0.07$	$0.88 \pm 0.12$	$0.88 \pm 0.12$	$0.86 \pm 0.12$
3-methyl-2-oxovaleric acid	$0.7 \pm 0.12$	$0.97 \pm 0.03$	$0.9 \pm 0.08$	$1 \pm 0.01$
Acetylcholine	$0.86 \pm 0.11$	$0.96 \pm 0.05$	$1 \pm 0.00$	$0.7 \pm 0.19$
Creatinine	$0.65 \pm 0.12$	$0.88 \pm 0.07$	$0.91 \pm 0.06$	$0.95 \pm 0.05$
Guanosine	$0.85 \pm 0.10$	$0.95 \pm 0.04$	$0.83 \pm 0.09$	$0.79 \pm 0.11$
Inosine	$0.81 \pm 0.10$	$0.85 \pm 0.08$	$0.84 \pm 0.09$	$0.77 \pm 0.11$
Phenylalanine	$0.59 \pm 0.14$	$0.88 \pm 0.07$	$0.84 \pm 0.09$	$0.96 \pm 0.04$
Tryptophan	$0.7 \pm 0.16$	$0.93 \pm 0.07$	$0.8 \pm 0.19$	$1 \pm 0.01$





**Figure S8** ROC curves for acetylcholine in the CNS of *L. stagnalis* exposed to increasing concentration of imidacloprid.

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