

**Supplementary Table SIII. Cochran's Q test and MR-Egger regression analysis for human blood metabolites and gastric cancer risk (Data from FinnGen database; The metabolites labeled red show heterogeneity or multivalidity)**

Metabolites	Cochran's Q test		MR-Egger regression analysis	
	Q	P	Intercept	P
X-23654	29.61	0.43	-0.04	0.02
Salicylate	22.00	0.23	-0.04	0.34
Plasma free asparagine	20.60	0.55	-0.02	0.39
Androstenediol (3 $\beta$ ,17 $\beta$ ) disulfate	28.48	0.34	-0.002	0.88
2-hydroxy-3-methylvalerate	25.00	0.52	-0.02	0.37
Pyrraline	17.25	0.51	0.03	0.24
Creatine	27.88	0.11	-0.01	0.77
X-21442	15.47	0.35	0.01	0.79
Gamma-glutamylcitrulline	24.09	0.51	-0.003	0.87
Hexanoylglutamine	17.60	0.67	0.01	0.58
X-17146	13.51	0.56	-0.01	0.88
Isobutyrylglycine	17.65	0.73	-0.05	0.07
3-methylhistidine	14.64	0.88	0.02	0.47
Dihomo-linoleate (20:2n6)	6.57	0.92	0.03	0.51
N-acetyls erine	14.49	0.91	0.01	0.79
Adenosine 5'-monophosphate (AMP) to threonine ratio	14.94	0.83	-0.01	0.74
4-hydroxyhippurate	10.92	0.81	-0.06	0.23
4-acetamidobutanoate	13.456	0.64	-0.04	0.10
X-18345	22.64	0.65	0.02	0.33
4-methyl-2-oxopentanoate to 3-methyl-2-oxobutyrate ratio	11.77	0.86	0.03	0.45
Alpha-ketoglutarate to alanine ratio	17.35	0.24	-0.03	0.51
1-palmitoyl-2-palmitoleoyl-gpc (16:0/16:1)	15.62	0.55	0.01	0.78
Gulonate	11.97	0.75	0.06	0.09
X-12847	12.48	0.49	0.01	0.79
X-11372	21.28	0.50	0.03	0.26
X-23739	20.29	0.68	0.02	0.50
Glycohyocholate	13.33	0.58	-0.04	0.21
Citrate to 4-hydroxyphenylpyruvate ratio	20.58	0.30	0.03	0.42

X-19299	5.91	0.95	-0.01	0.73
Iminodiacetate (IDA)	9.42	0.74	-0.001	0.98
X-10458	14.98	0.82	0.01	0.77
5-methyluridine (ribothymidine)	18.70	0.72	0.01	0.42
1-palmitoyl-2-arachidonoyl-GPI (16:0/20:4)	24.51	0.32	-0.04	0.22
X-13431	20.96	0.58	0.02	0.44
Aspartate to N-acetylglucosamine to N-acetylgalactosamine ratio	18.42	0.62	0.03	0.33
3-hydroxy-2-methylpyridine sulfate	15.39	0.50	0.06	0.14
X-24456	25.56	0.18	0.03	0.36
5alpha-pregnan-3beta,20alpha-diol disulfate	17.76	0.77	0.001	0.98
EDTA	2.66	1.00	0.02	0.63
Tryptophan betaine	38.15	0.25	$5.01 \times 10^{-5}$	1.00
Adenosine 5'-monophosphate (AMP)	10.55	0.57	-0.001	0.98
1-dihomo-linolenylglycerol (20:3)	14.36	0.57	0.003	0.94
Glycine conjugate of C10H12O2	13.30	0.90	-0.03	0.40
Cholic acid glucuronide	17.16	0.44	0.02	0.54
Adenosine 5'-diphosphate (ADP) to glutamate ratio	17.74	0.85	0.02	0.42
Sphingomyelin (d18:1/24:1, d18:2/24:0)	10.11	0.75	-0.01	0.80
Pyruvate to N-acetylneuraminate ratio	22.24	0.39	-0.01	0.84
Cytidine to N-acetylneuraminate ratio	16.47	0.79	-0.01	0.73
Orotidine	13.04	0.93	0.01	0.55
2s,3R-dihydroxybutyrate	18.70	0.48	-0.02	0.52
Threonate	15.96	0.46	-0.04	0.29
Vanillylmandelate (VMA)	22.33	0.81	-0.002	0.94
X-17690	16.93	0.81	-0.02	0.37
N-acetylneuraminate	29.62	0.43	0.004	0.84
5alpha-androstan-3beta,17alpha-diol disulfate	15.62	0.62	-0.01	0.67
Nervonoylcarnitine (C24:1)	22.81	0.30	0.02	0.59
X-11850	14.66	0.80	-0.02	0.59
Succinimide	16.10	0.45	-0.03	0.27

N-acetylneuramate to N-acetylglucosamine to N-acetylgalactosamine ratio	13.73	0.69	0.01	0.72
<b>X-23678</b>	22.39	0.22	0.99	<b>0.02</b>
X-24949	18.34	0.63	0.01	0.76
Phenylacetylglutamate	19.13	0.45	-0.003	0.95