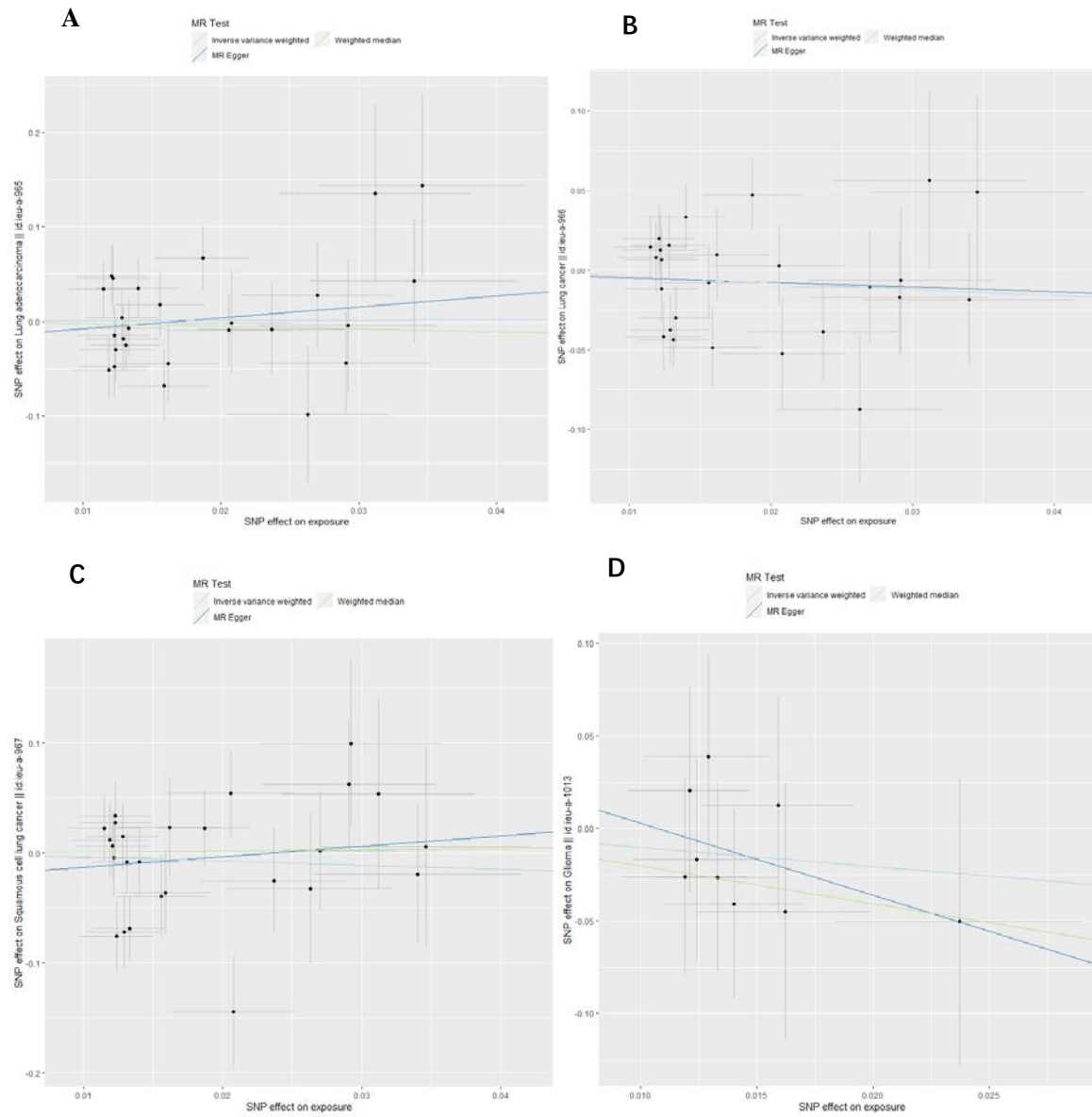


IV assumption 1 represents the instrumental variables (IVs) are strongly associated with the exposure; IV assumption 2 indicates the IVs must influence the outcome only through the exposure; IV assumption 3 shows the IVs must not associate with confounders.

Figure S1 The rationale of Mendelian randomization.



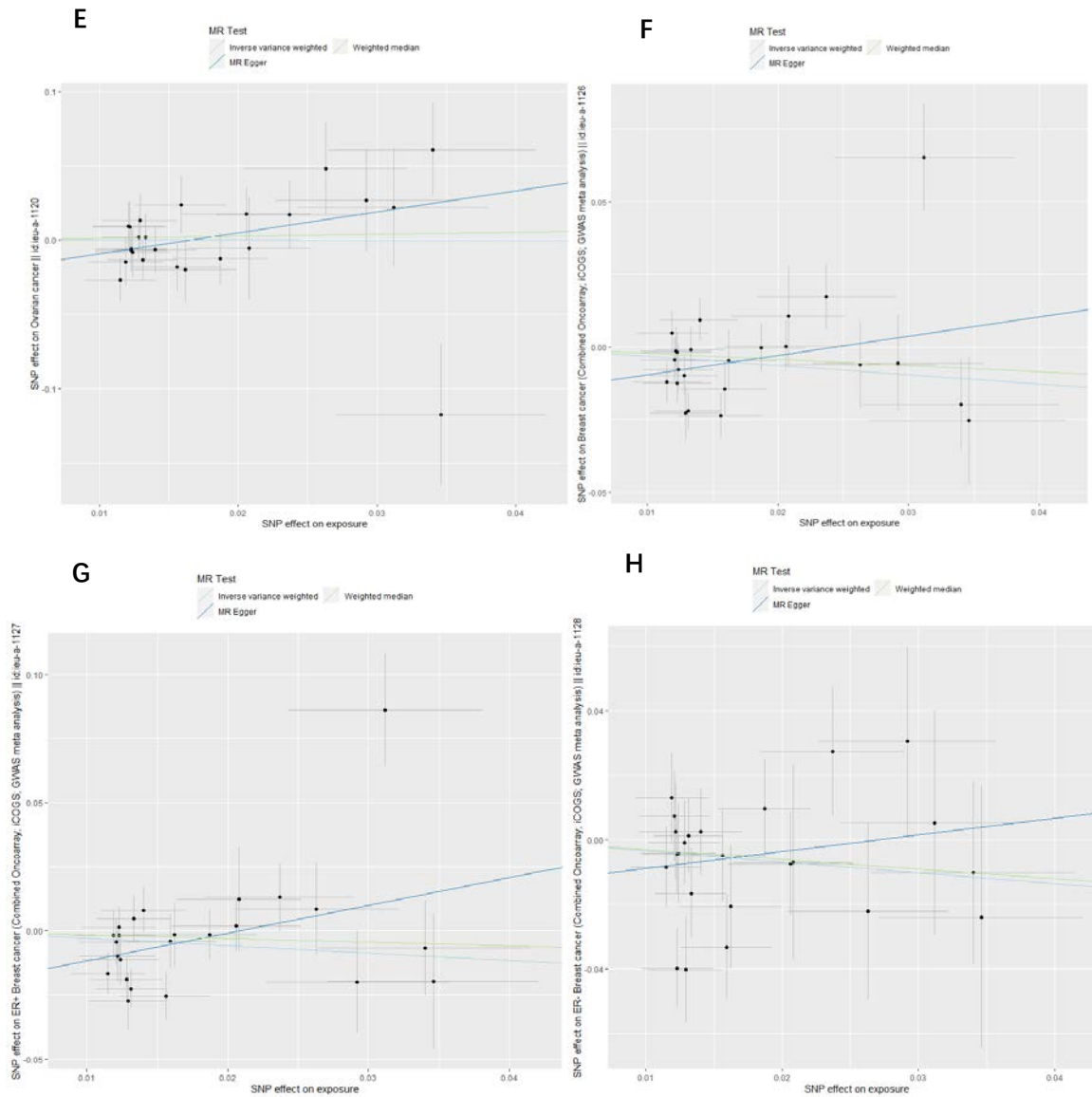
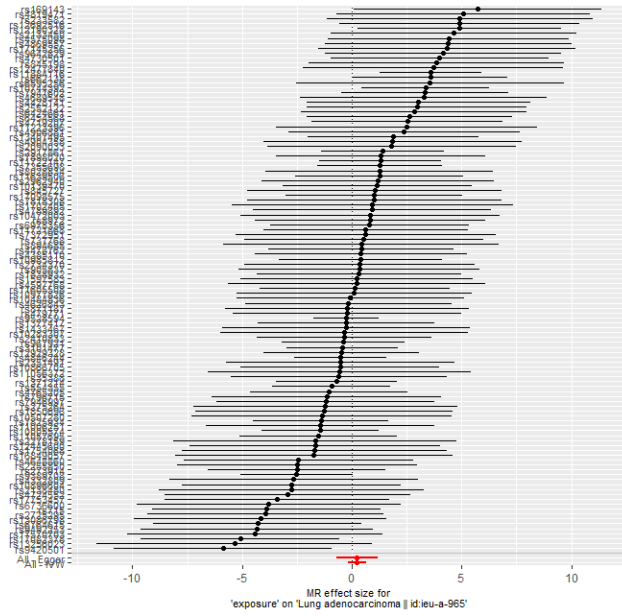
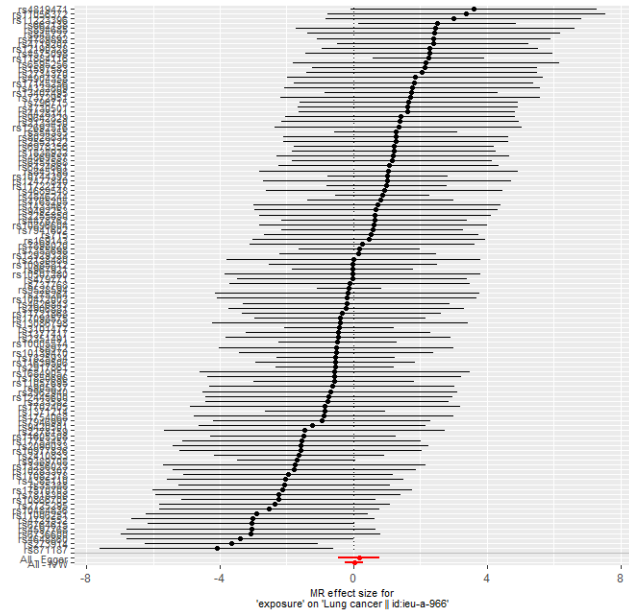


Figure S2 Scatter plots showing the causal association of 2-methylbutyrylcarnitine on the risk of cancers. Lung adenocarcinoma (A), lung cancer (B), squamous cell lung cancer (C), glioma (D), ovarian cancer (E), breast cancer (F), ER+ breast cancer (G), ER- breast cancer (H).

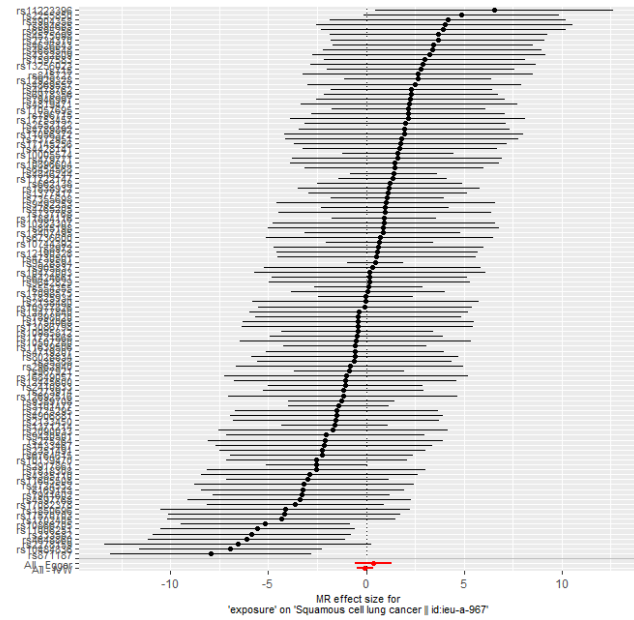
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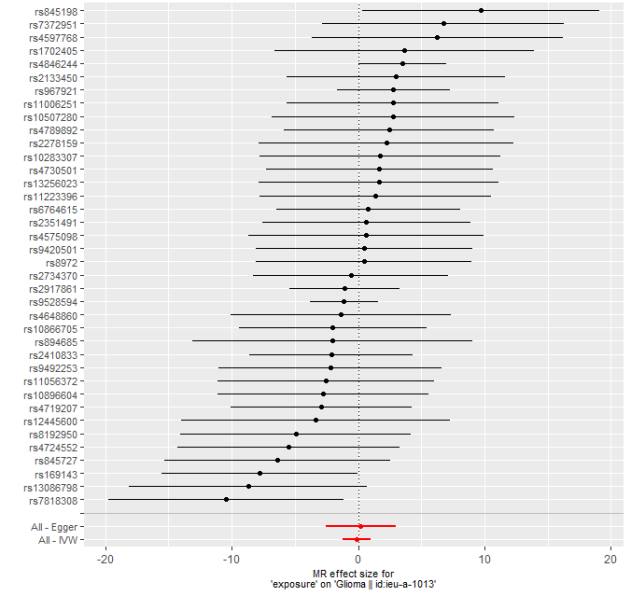
B



C



D



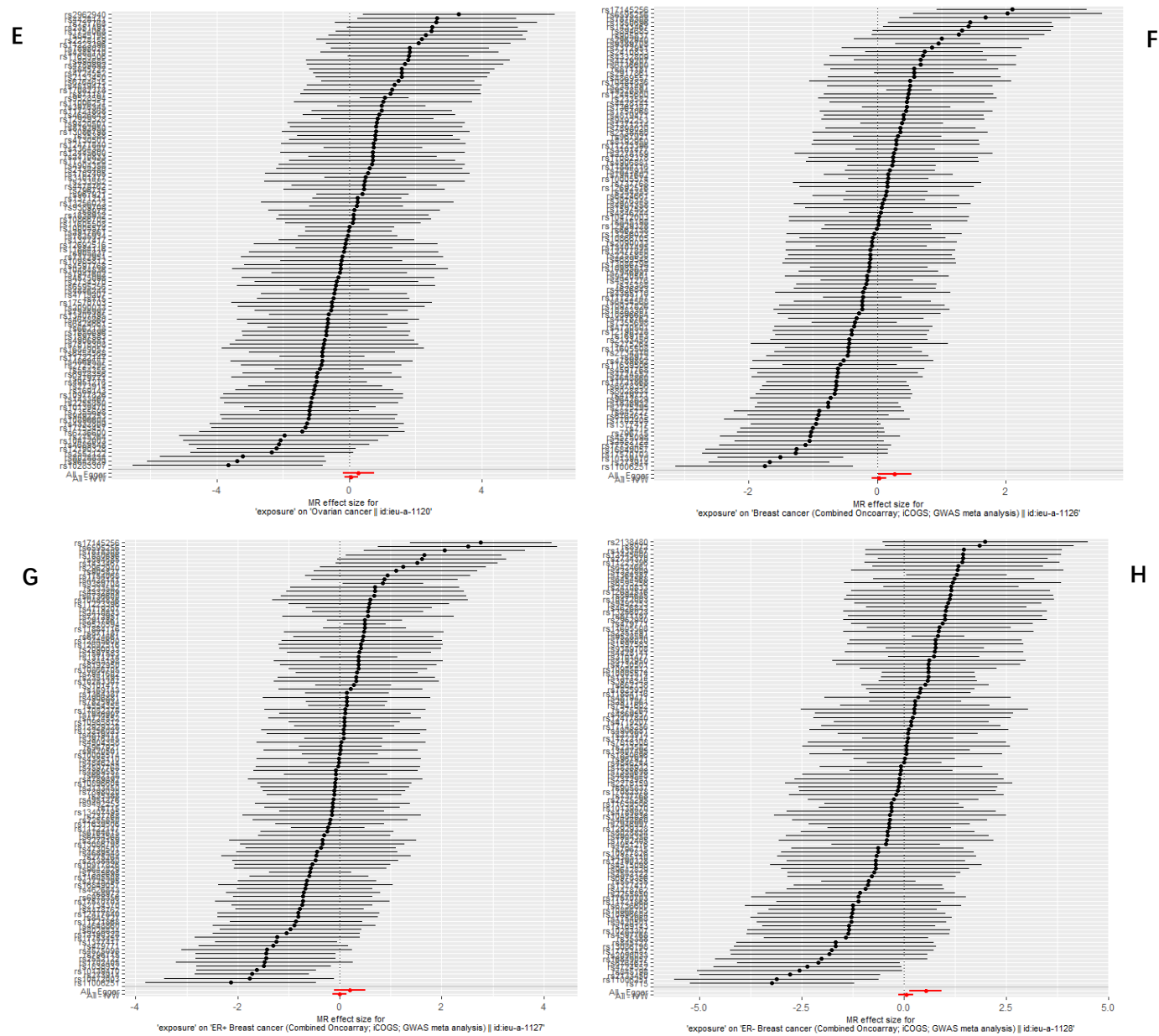
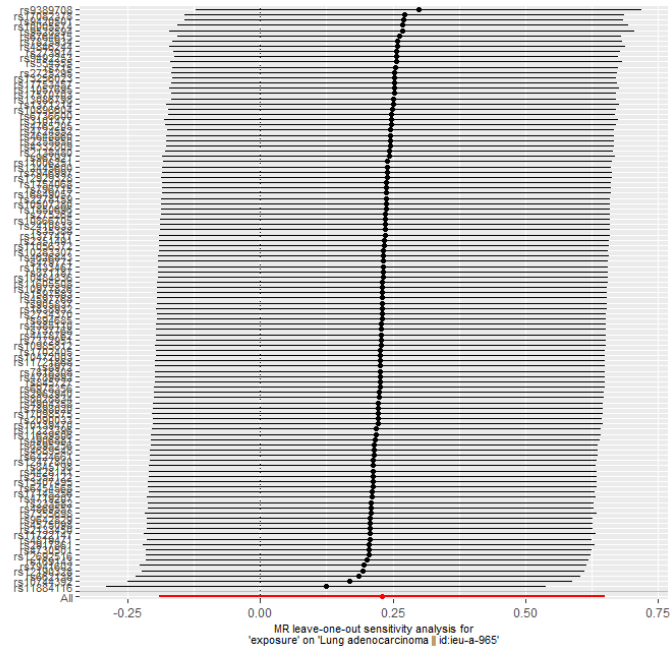
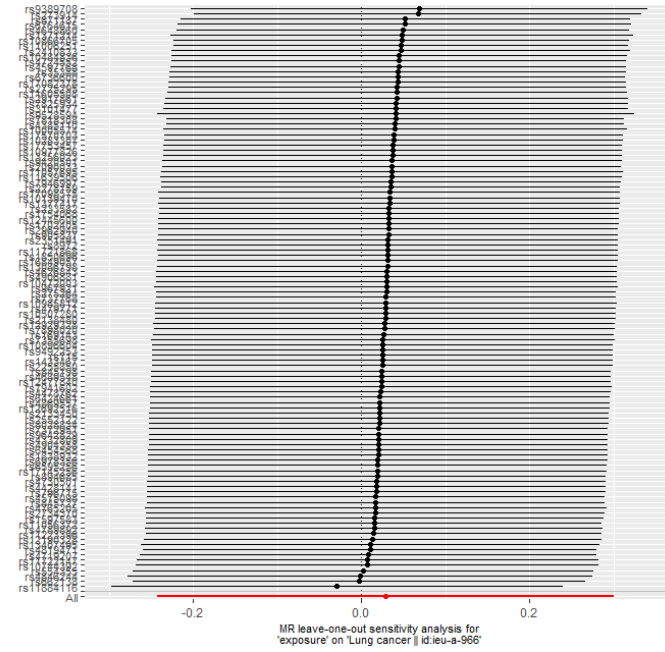
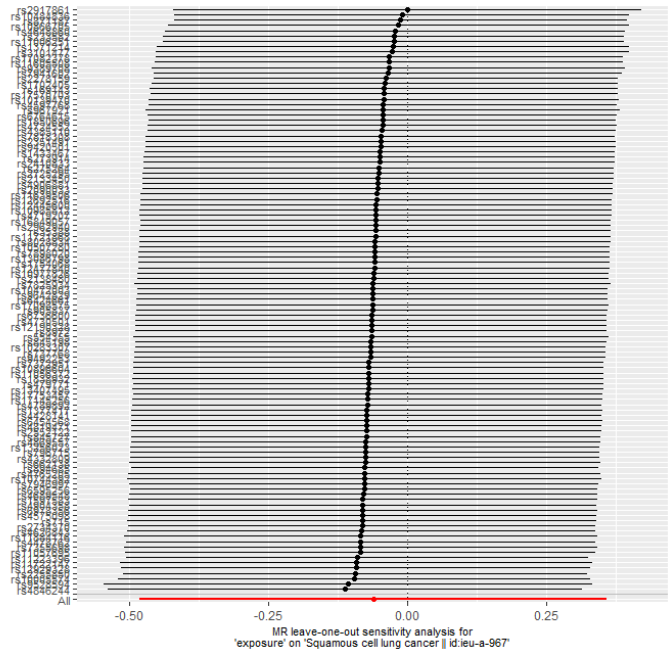
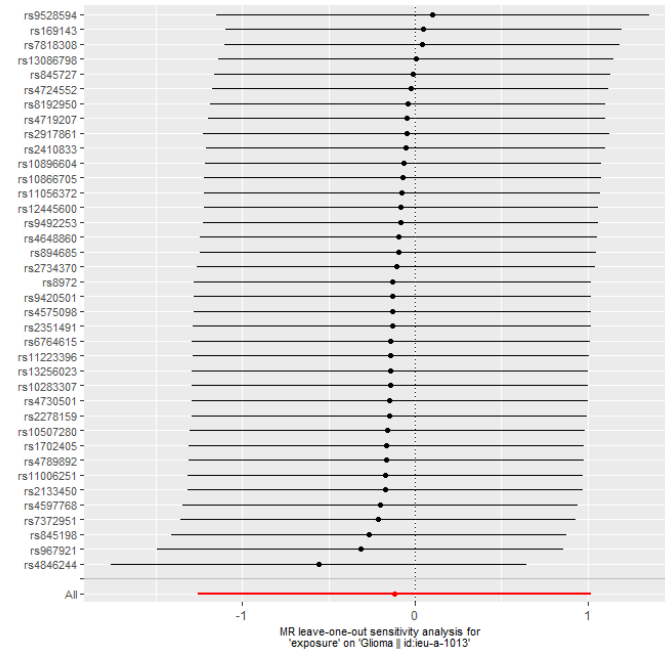


Figure S3 Forest plots for 2-methylbutyrylcarnitine on different cancers. Lung adenocarcinoma (A), lung cancer (B), squamous cell lung cancer (C), glioma (D), ovarian cancer (E), breast cancer (F), ER+ breast cancer (G), ER- breast cancer (H).

A**B****C****D**

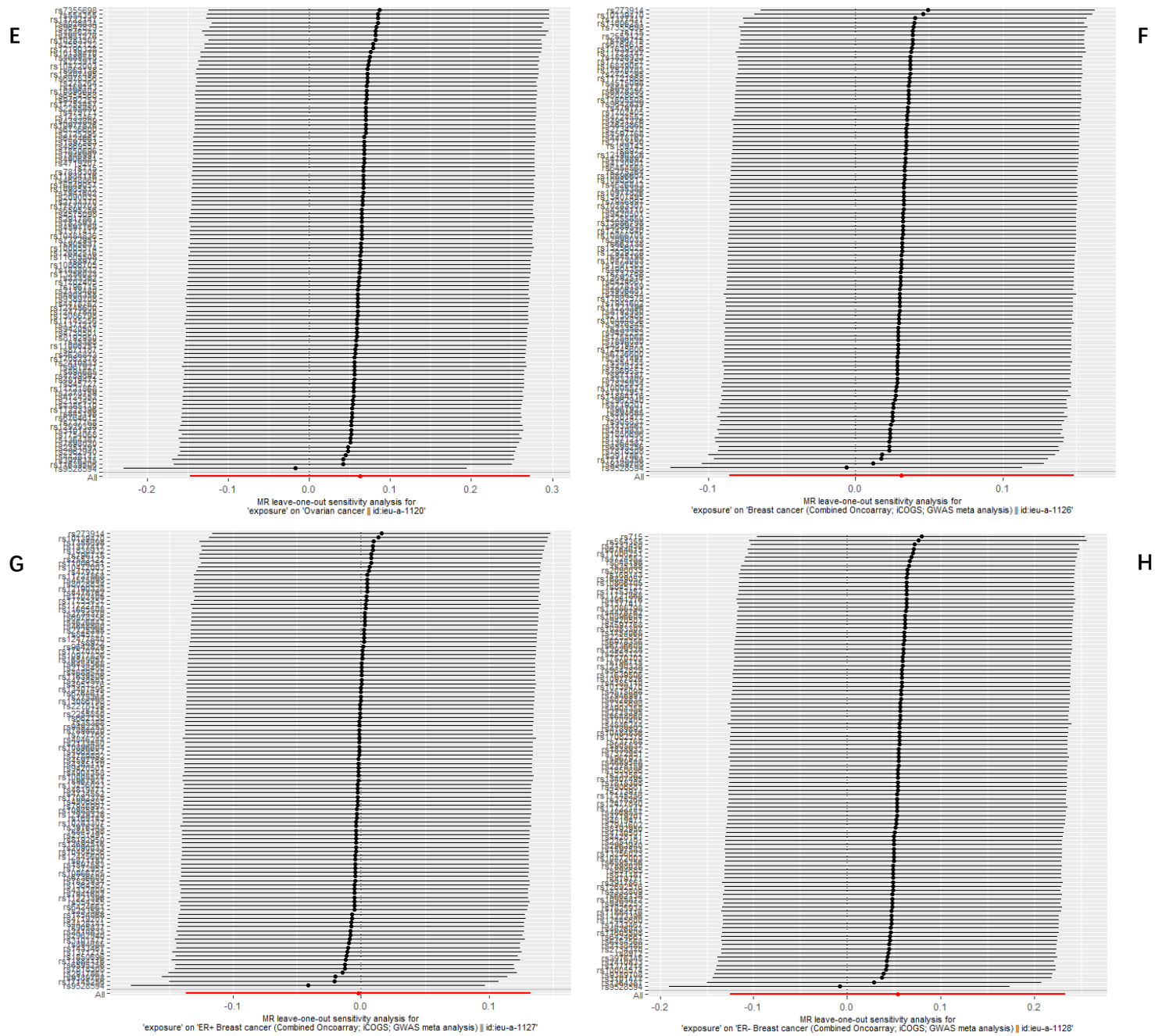
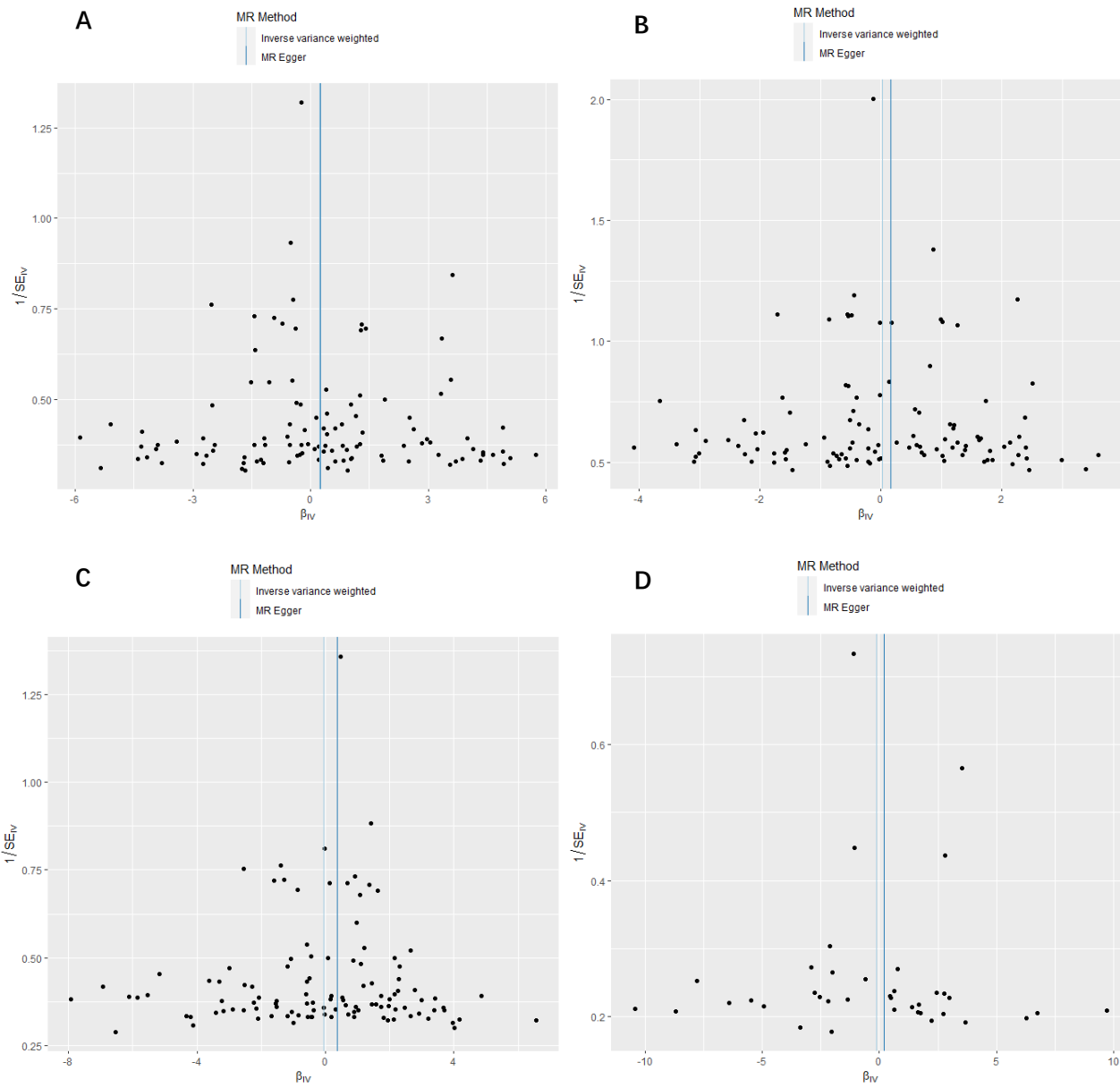


Figure S4 Leave-one-out plots for 2-methylbutyrylcarnitine on different cancers. Lung adenocarcinoma (A), lung cancer (B), squamous cell lung cancer (C), glioma (D), ovarian cancer (E), breast cancer (F), ER+ breast cancer (G), ER- breast cancer (H).



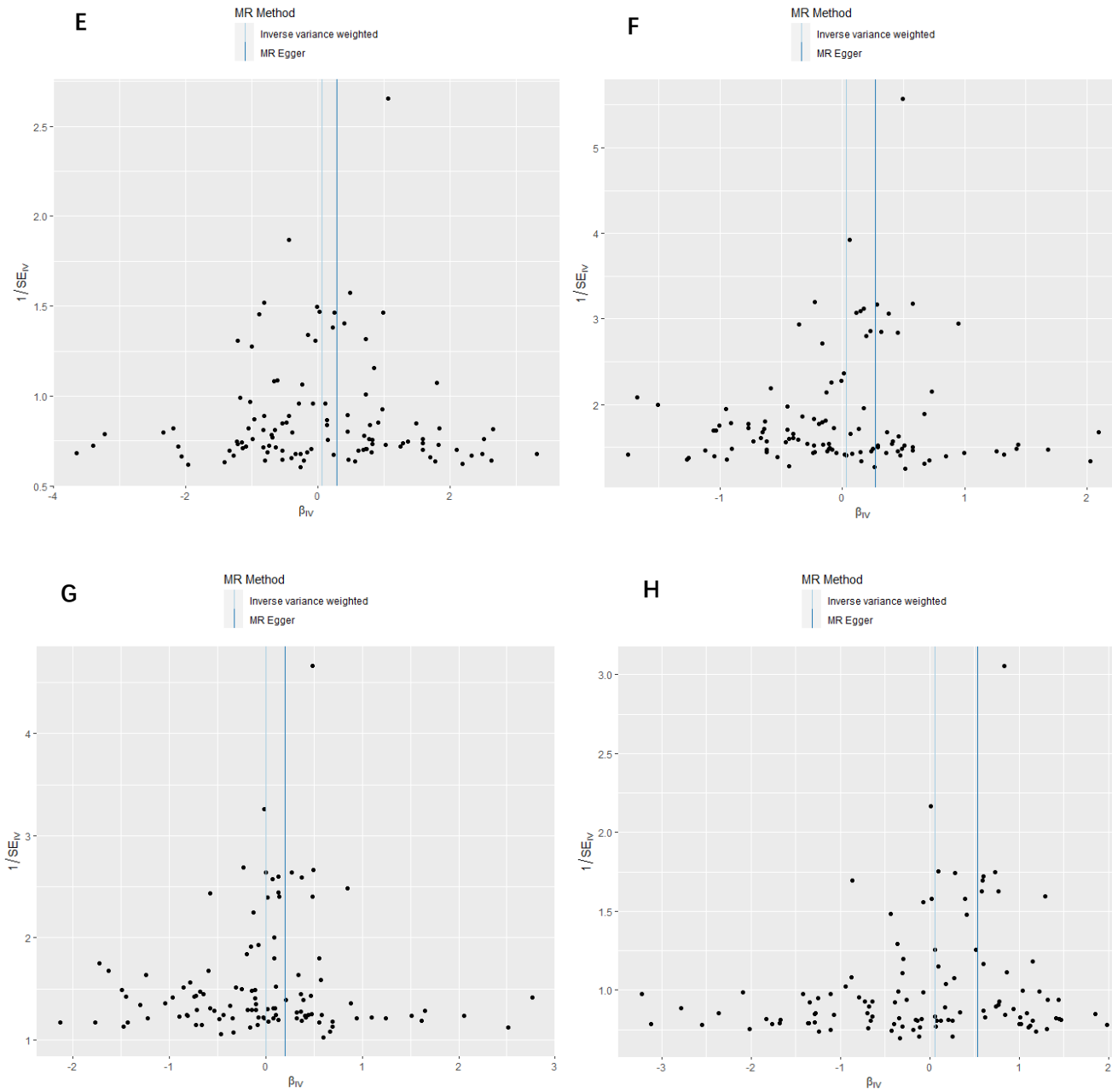
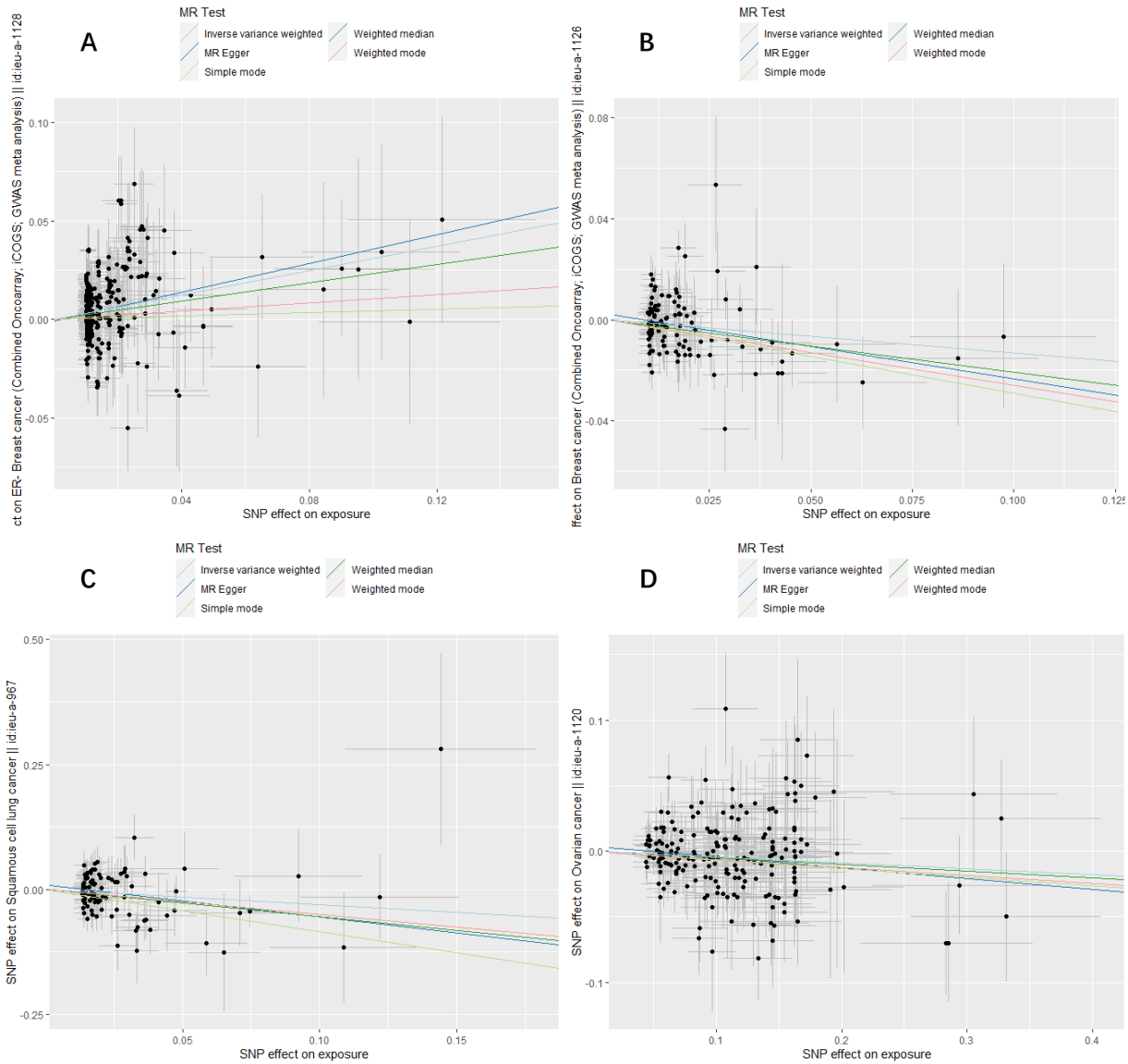


Figure S5 Funnel plots for 2-methylbutyrylcarnitine on different cancers. Lung adenocarcinoma (A), lung cancer (B), squamous cell lung cancer (C), glioma (D), ovarian cancer (E), breast cancer (F), ER+ breast cancer (G), ER- breast cancer (H).



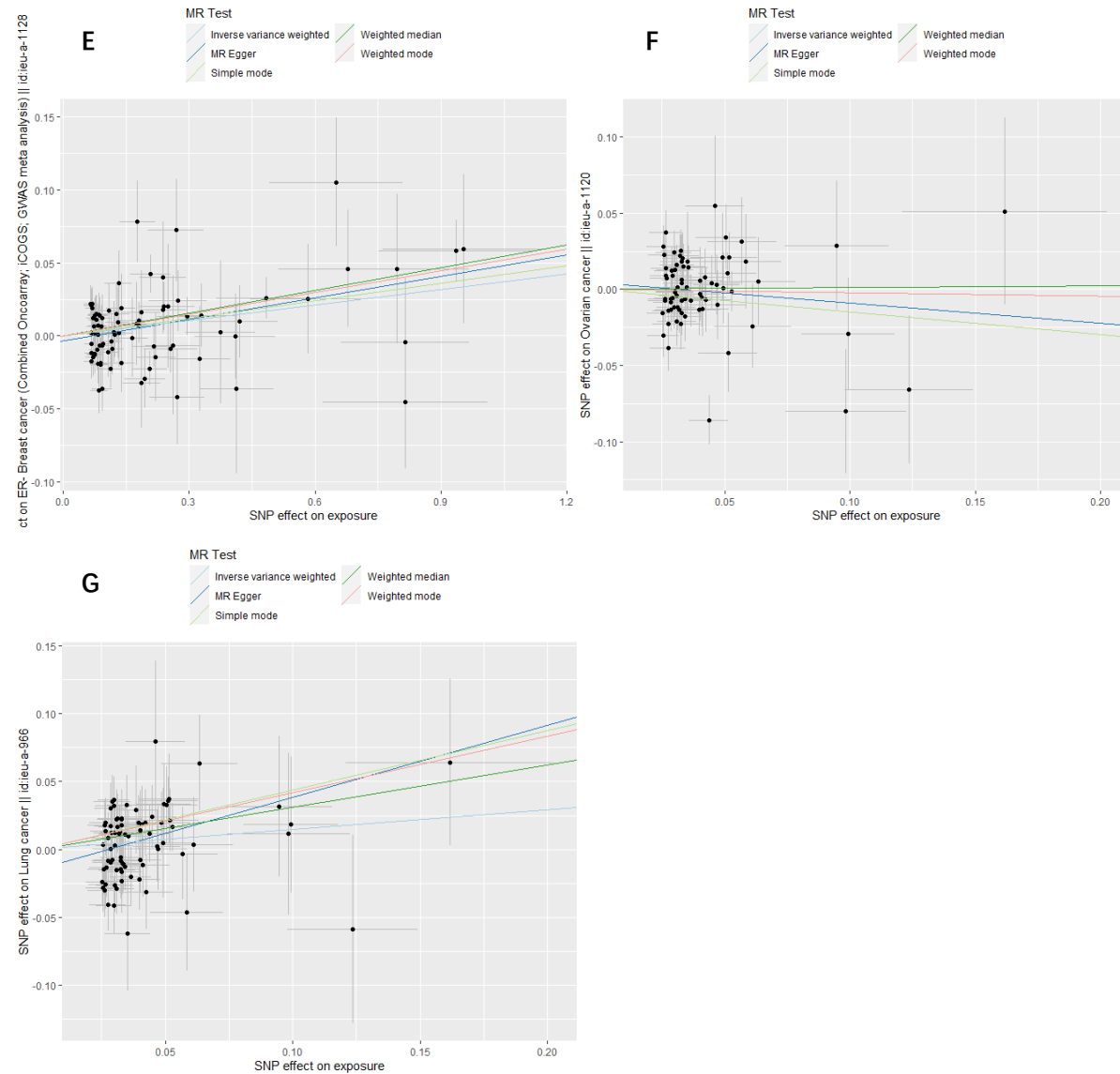
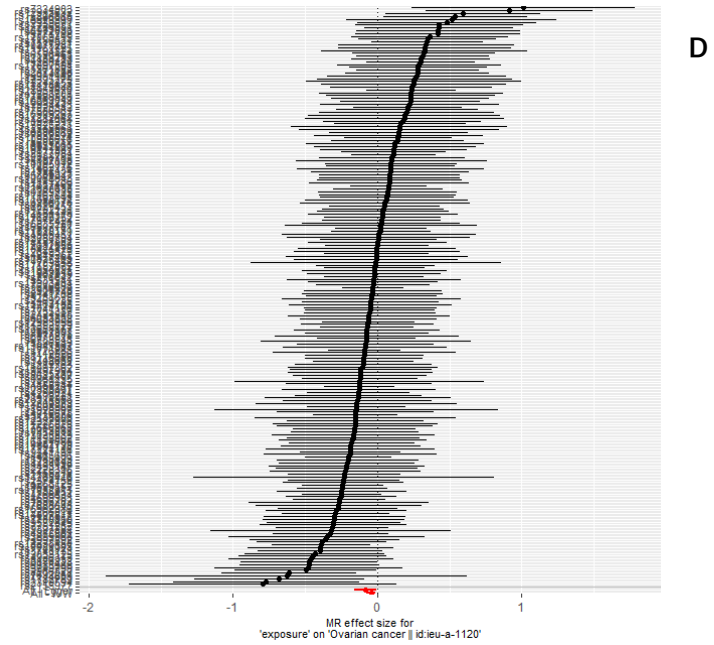
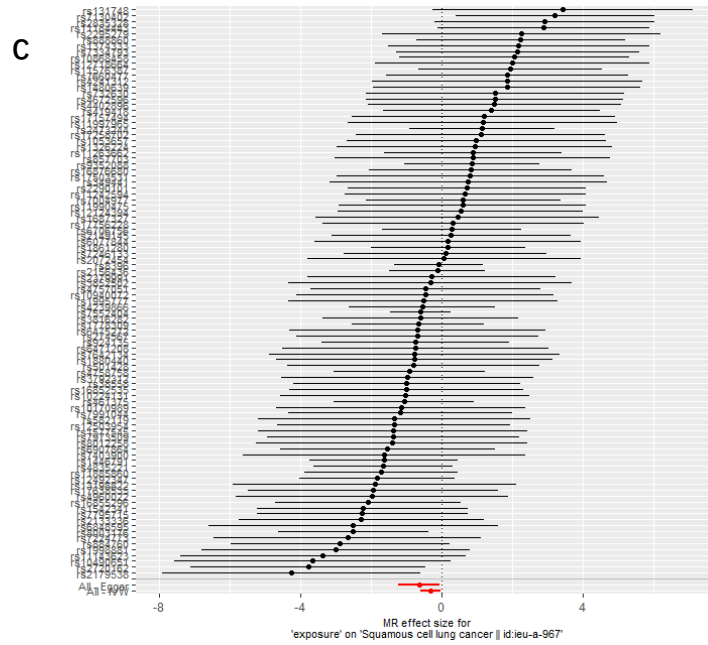
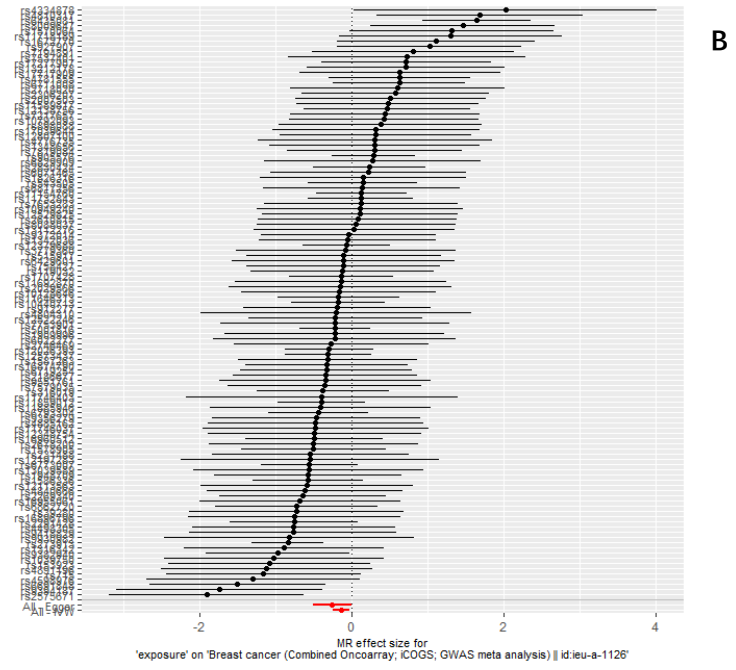
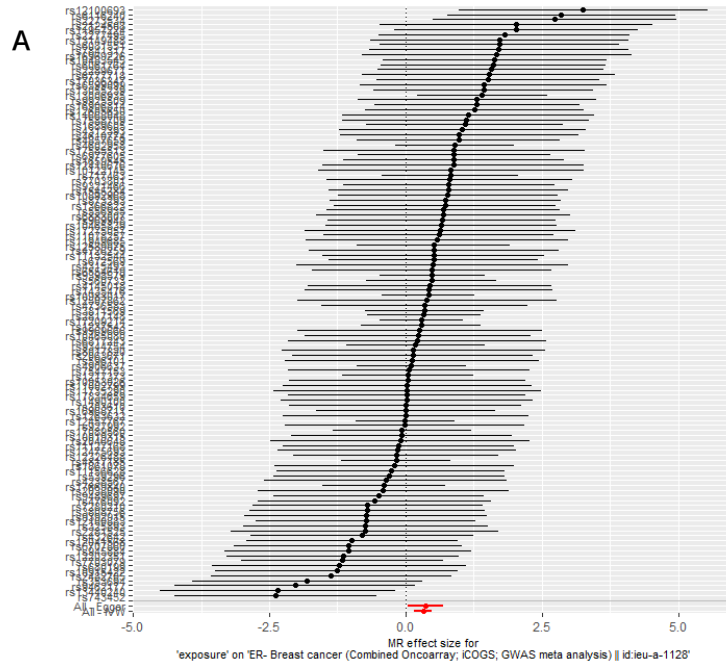


Figure S6 Scatter plots showing the genetic association of seven metabolites on the risk of cancers. 1-oleoylglycerophosphocholine on ER- breast cancer (A), 3-dehydrocarnitine on breast cancer (B), octanoylcarnitine on Squamous cell lung cancer (C), ibuprofen on ovarian cancer (D), salicylate on ER- breast cancer (E), X-14304—leucylalanine on ovarian cancer (F), X-14304—leucylalanine on lung cancer (G).



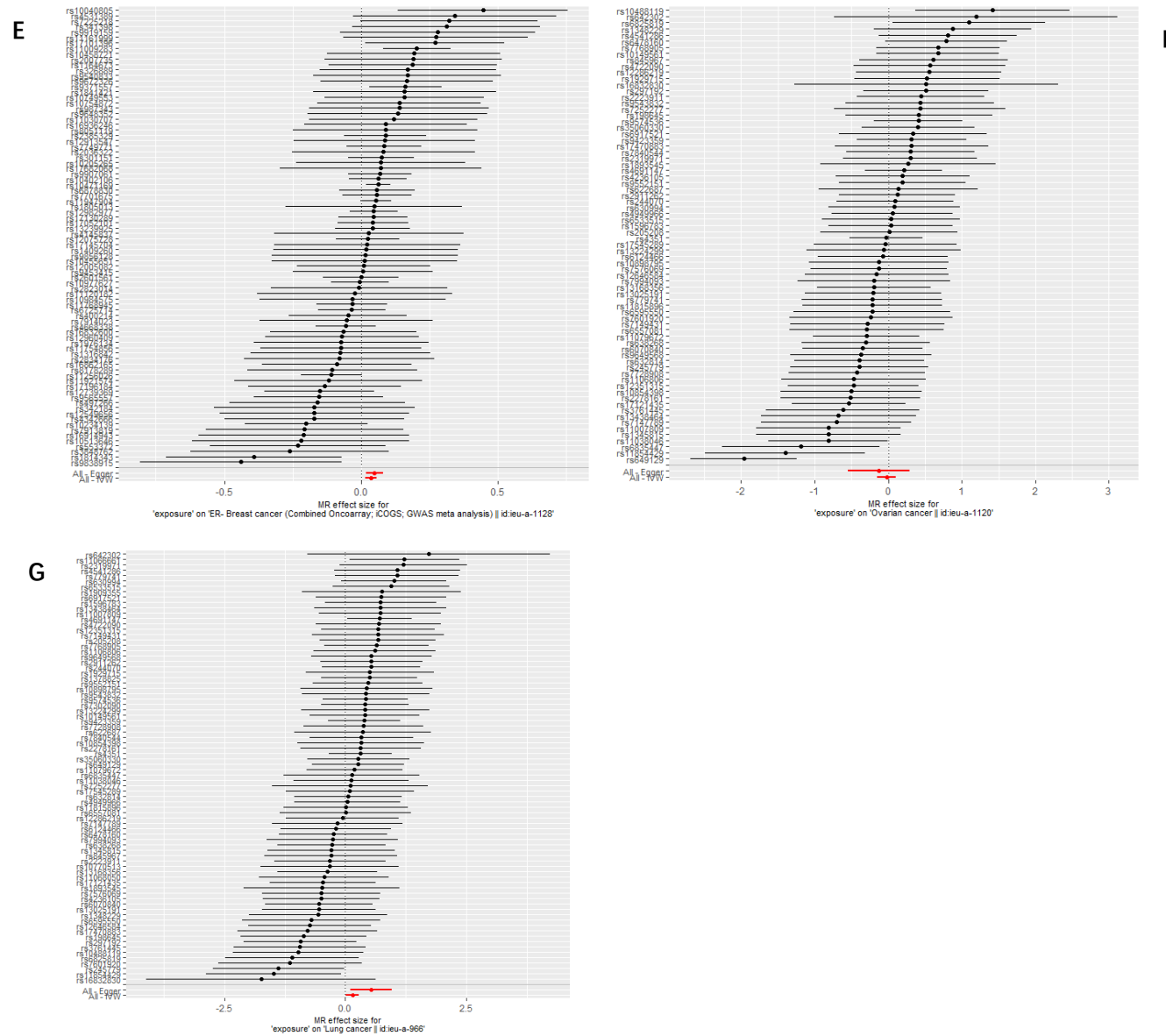
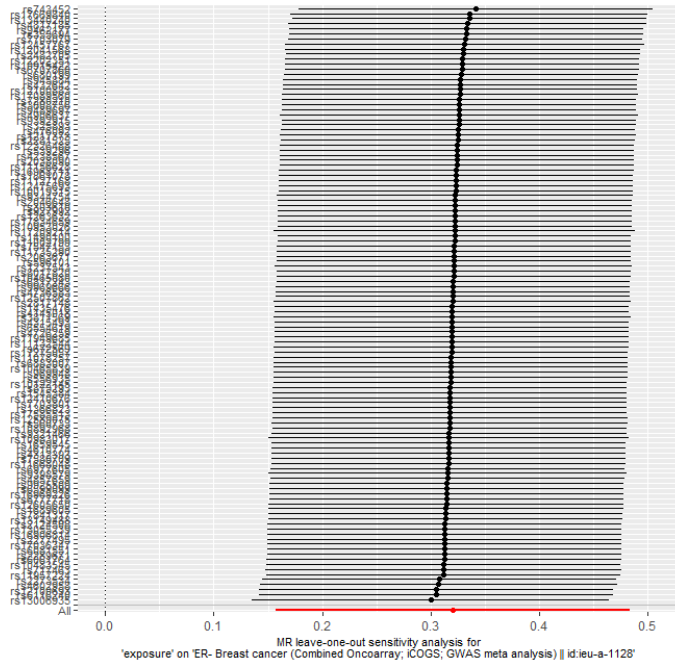
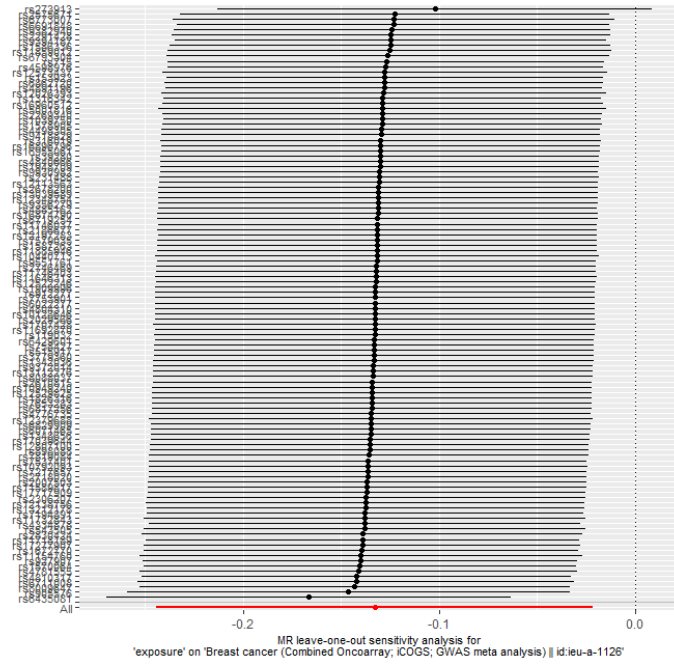


Figure S7 Forest plots for seven potential metabolites on cancers. 1-oleoylglycerophosphocholine on ER- breast cancer (A), 3-dehydrocarnitine on breast cancer (B), octanoylcarnitine on squamous cell lung cancer (C), ibuprofen on ovarian cancer (D), salicylate on ER- breast cancer (E), X-14304—leucylalanine on ovarian cancer (F), X-14304—leucylalanine on lung cancer (G).

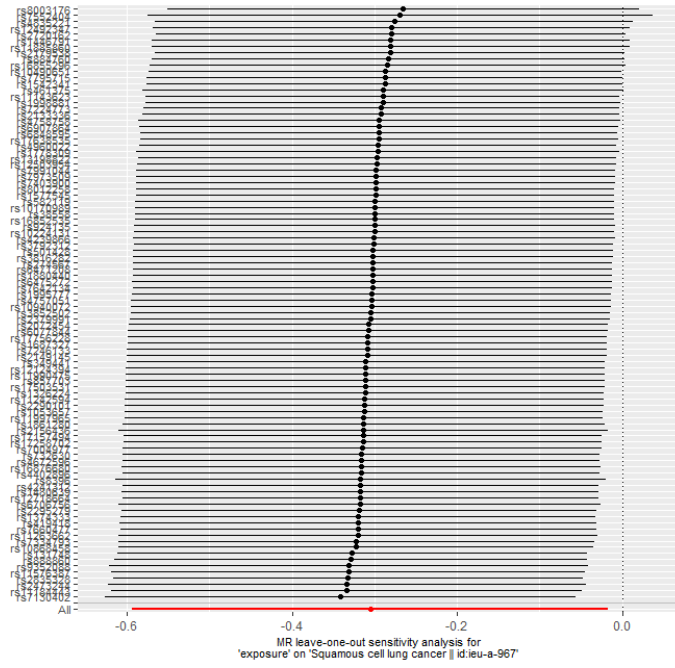
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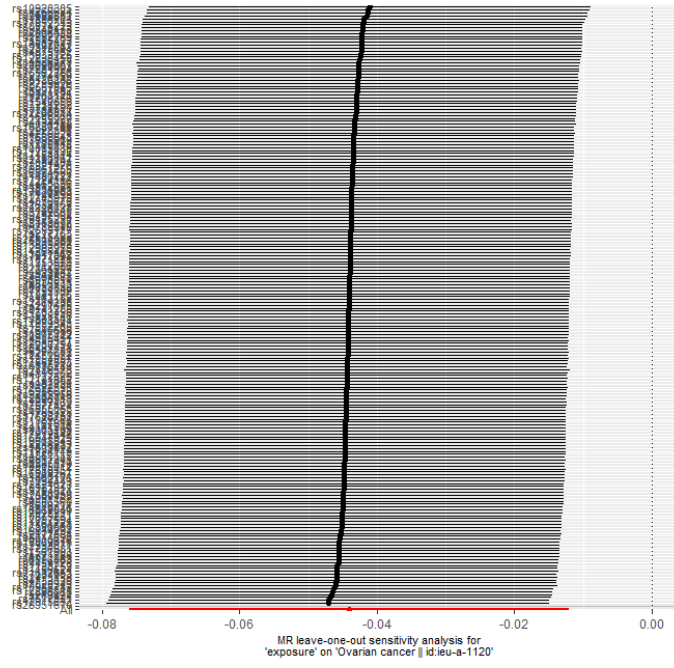
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C



D



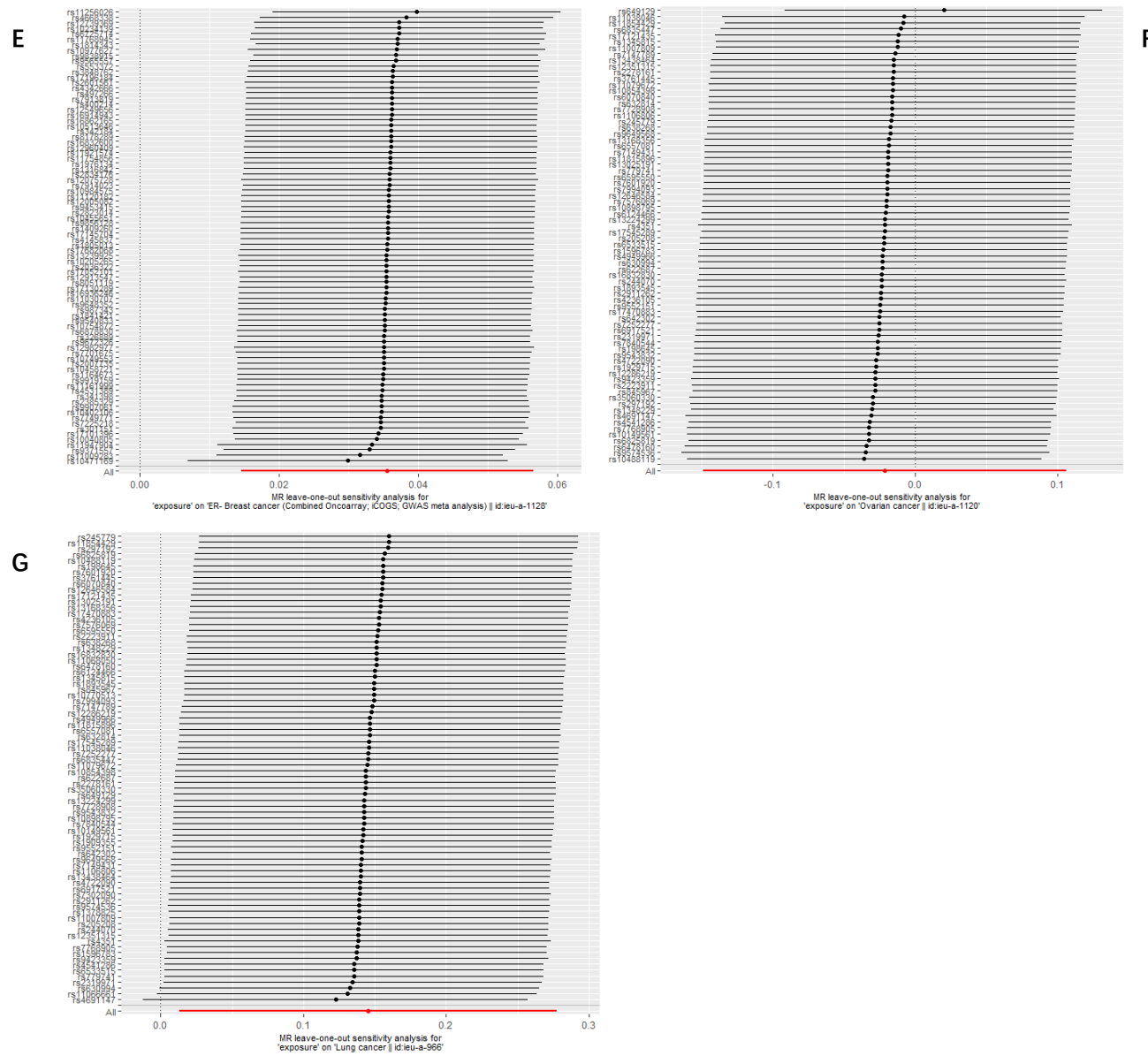
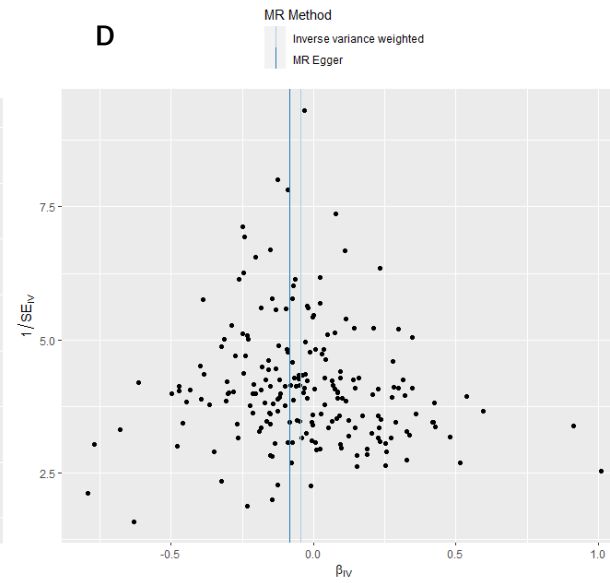
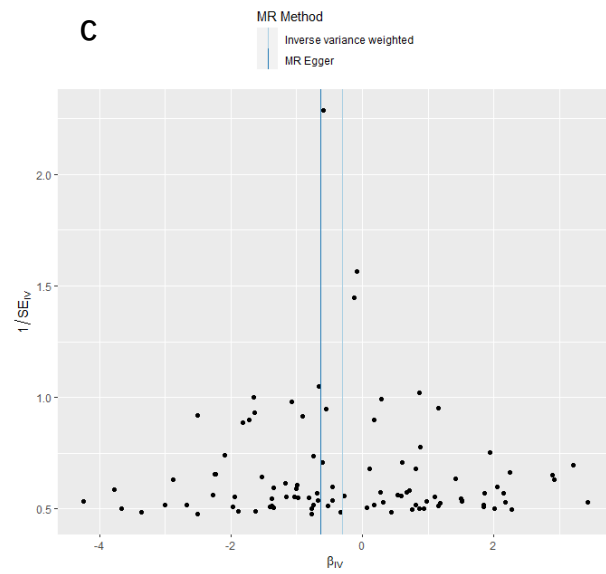
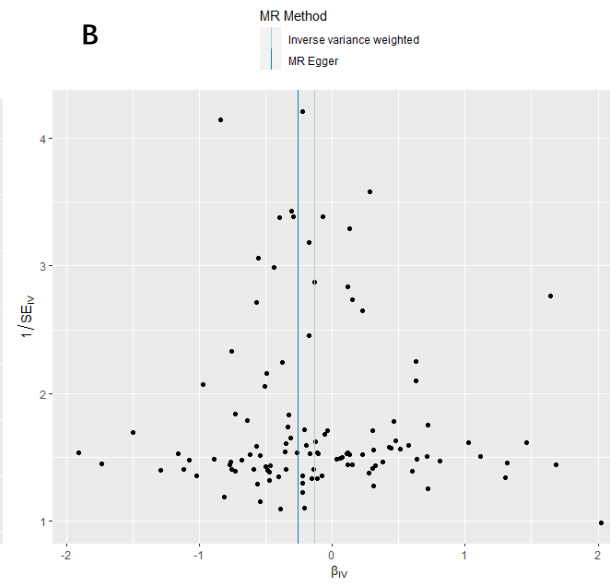
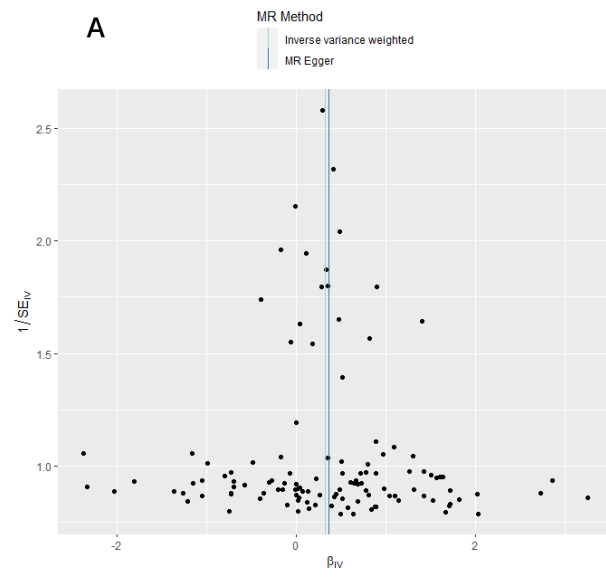


Figure S8 Leave-one-out plots for the seven potential metabolites on cancers. 1-oleoylglycerophosphocholine on ER- breast cancer (A), 3-dehydrocarnitine on breast cancer (B), octanoylcarnitine on squamous cell lung cancer (C), ibuprofen on ovarian cancer (D), salicylate on ER- breast cancer (E), X-14304—leucylalanine on ovarian cancer (F), X-14304—leucylalanine on lung cancer (G)



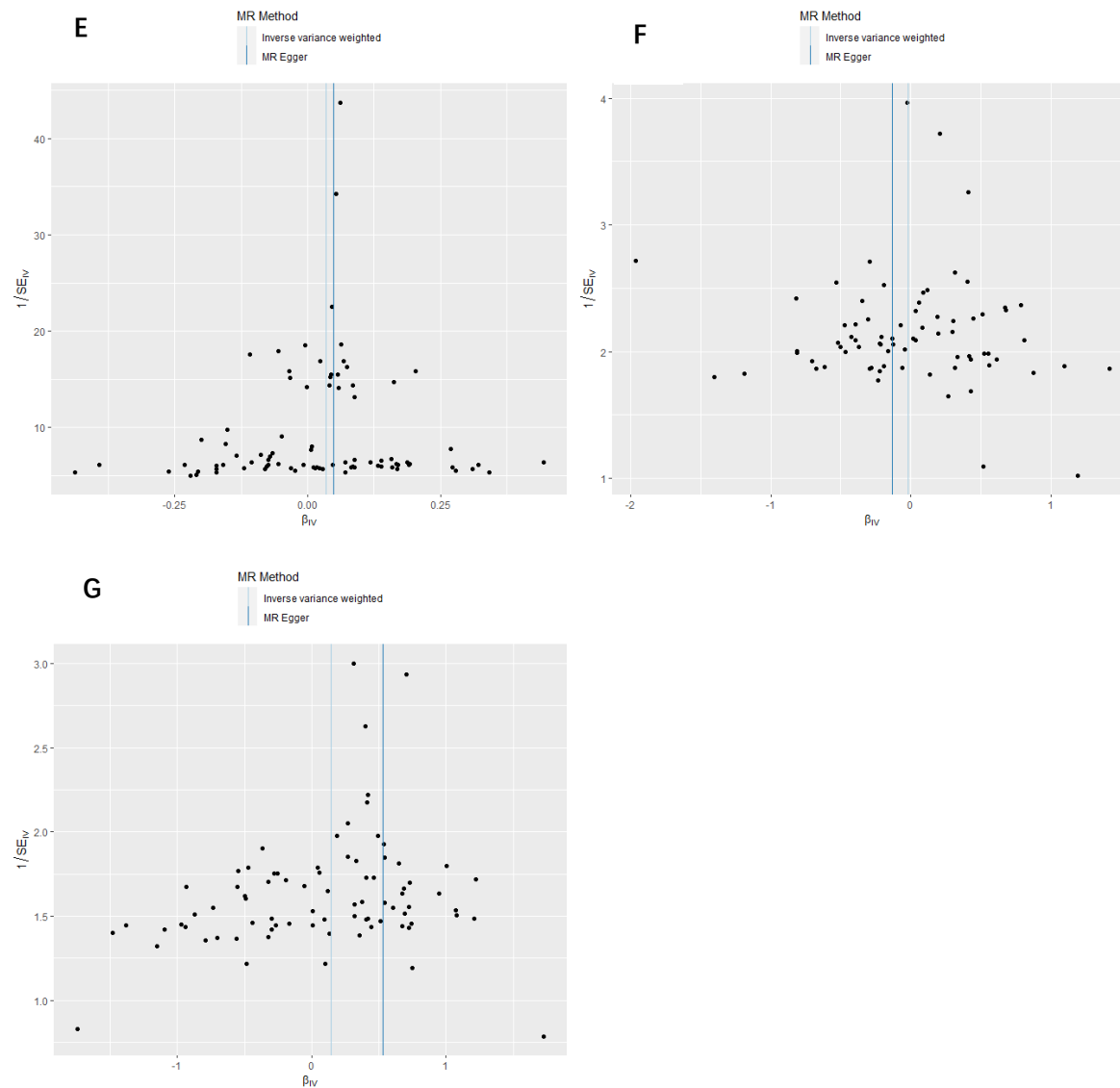


Figure S9 Funnel plots for seven potential metabolites on cancers. 1-oleoylglycerophosphocholine on Er- breast cancer (A), 3-dehydrocarnitine on breast cancer (B), octanoylcarnitine on squamous cell lung cancer (C), ibuprofen on ovarian cancer (D), salicylate on ER- breast cancer (E), X-14304—leucylalanine on ovarian cancer (F), X-14304—leucylalanine on lung cancer (G).

Table S1 The formula used to calculate R² and F statistic between exposure and outcome

description	Formula
F statistic	$F = \frac{N-k-1}{2k} \times \frac{R^2}{1-R^2}$
R ² calculate	$\frac{2 \times \beta^2 \times EAF \times (1 - EAF)}{[2 \times \beta^2 \times EAF \times (1 - EAF) + 2 * se(\beta)^2 * N * EAF * (1 - EAF)]}$

* N: the sample size of the GWASs. k: the number of the SNPs (instrumental variants). R²: the instrumental variable explains the degree of exposure (determinant coefficient of regression equation). EAF: effect allele frequency for the genetic variant of interest. β: the effect size for the genetic variant of interest. Se(β): standard error of effect size for the genetic variant of interest.

Table S2 Summary statistics of the cancers.

Consortium	Phenotype	Note	First author	Year	Sample size	Number of cases	Number of controls	Number of variants	Ancestry
International Lung Cancer Consortium	Lung cancer	ilcco.iarc.fr	Wang Y	2017	27,209	11,348	15,861	8,945,893	European
Ovarian Cancer Association Consortium	Epithelial ovarian cancer	http://ocac.cege.medsci.cam.ac.uk/schl.cam.ac.uk/	Phelan	2017	66,450	25,509	40,941	0	International
Breast Cancer Association Consortium	Breast cancer	http://apps.cege.medschl.cam.ac.uk/	Michailidou K	2017	228,951	122,977	105,974	10680,257	International
GliomaScan	Glioma	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3761216/	Rajaraman P	2012	6,811	1,856	4,955	309,636	International

Table S3 Mendelian Randomization estimation for Amino acid on the risk of cancers.

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median		MR-PRESSO	MR-Egger regression	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value		Intercept	P value
Breast cancer	2-methylbutyrylcarnitine	100	0.012673	11.26	0.77 (0.70-0.85)	3.418E-07	1.59 (1.27-1.99)	6.233E-05	1.004 (0.91-1.11)	9.351E-01	0.682	-0.0045	0.0458
Breast cancer	4-acetamidobutanoate	33	0.0042	14.51	0.93 (0.70-0.98)	3.116E-02	1.01 (0.69-1.48)	9.650E-01	0.87 (0.71-1.06)	1.638E-01	0.709	-0.0022	0.2749
Breast cancer	Isovalerylcarnitine	18	0.03825	20.24	0.87 (0.76-0.99)	3.231E-02	0.81 (0.61-1.1)	1.527E-01	1.008 (0.87-1.16)	9.086E-01	0.97	0.0016	0.5909
Breast cancer	Kynurenine	32	0.006453	12.93	0.85 (0.73-0.99)	3.888E-02	0.95 (0.70-1.29)	7.333E-01	0.91 (0.74-1.10)	3.247E-01	0.888	-0.0013	0.4277
Breast cancer	Serotonin (5HT)	15	0.002162	12.67	1.1 (1.00-1.21)	4.163E-02	1.04 (0.84-1.29)	7.221E-01	1.07 (0.95-1.21)	2.667E-01	0.366	0.0012	0.5650
ER- Breast cancer	4-acetamidobutanoate	33	0.007484	14.56	0.74 (0.57-0.95)	1.946E-02	0.72 (0.40-1.30)	2.791E-01	0.74 (0.51-1.06)	9.982E-02	0.002	0.0002	0.9385
ER- Breast cancer	Kynurenine	32	0.006453	12.93	0.75 (0.58-0.96)	2.381E-02	0.73 (0.44-1.22)	2.317E-01	0.77 (0.55-1.08)	1.287E-01	0.485	0.0003	0.9262
ER+ Breast cancer	2-methylbutyrylcarnitine	100	0.012673	11.26	0.72 (0.64-0.80)	3.552E-09	1.58 (1.23-2.02)	3.061E-04	1.003 (0.90-1.12)	9.451E-01	0.792	-0.0038	0.1506
ER+ Breast cancer	Isovalerylcarnitine	18	0.03825	20.24	0.86 (0.75-0.99)	3.392E-02	0.83 (0.60-1.13)	2.310E-01	0.95 (0.81-1.12)	5.680E-01	0.72	0.0009	0.7771
ER+ Breast cancer	N-acetyllalanine	30	0.002493	10.96	1.36 (1.07-1.74)	1.369E-02	1.36 (0.79-2.33)	2.746E-01	1.45 (1.006-2.07)	4.584E-02	0.005	0.0001	0.9805
ER+ Breast cancer	N-acetylthreonine	12	0.00387	10.76	1.18 (1.01-1.38)	3.456E-02	0.75 (0.52-1.06)	1.088E-01	1.03 (0.83-1.27)	7.919E-01	0.92	0.0081	0.0059
ER+ Breast cancer	p-cresol sulfate	14	0.001784	11.20	1.05 (1.00-1.11)	4.213E-02	1.04 (0.95-1.15)	3.957E-01	1.07 (0.99-1.49)	9.770E-02	0.367	0.0006	0.7738
ER+ Breast cancer	Serotonin (5HT)	15	0.001889	11.07	1.12 (1.02-1.24)	1.956E-02	1.08 (0.86-1.36)	4.959E-01	1.10 (0.95-1.27)	2.136E-01	0.209	0.0008	0.7208
Glioma	2-methylbutyrylcarnitine	57	0.007321	11.35	2.19 (1.17-4.09)	1.455E-02	0.89 (0.16-4.96)	8.954E-01	1.99 (0.75-5.31)	1.673E-01	0.216	-0.0054	0.8026
Glioma	4-acetamidobutanoate	14	0.09351	25.03	0.15 (0.04-0.59)	6.306E-03	0.08 (0.003-2.24)	1.441E-01	0.24 (0.03-1.9)	1.773E-01	0.812	0.0068	0.6802
Glioma	Pyroglutamine	7	0.041396	20.93	3.20 (1.03-9.91)	4.393E-02	18.6 (0.72-479.10)	9.120E-02	2.32 (0.53-10.1)	2.638E-01	0.02	-0.0445	0.2695
Lung adenocarcinoma	2-methylbutyrylcarnitine	100	0.012673	11.26	0.60 (0.48-0.75)	1.144E-05	1.72 (1.005-2.96)	4.821E-02	0.59 (0.41-0.87)	7.209E-03	0.123	-0.0002	0.9826
Lung adenocarcinoma	Asparagine	13	0.015418	11.03	1.42 (1.04-1.94)	2.622E-02	2.30 (1.004-5.28)	5.282E-02	1.43 (0.89-2.30)	1.340E-01	0.313	-0.0136	0.2245
Lung adenocarcinoma	Isoleucine	4	0.006027	13.89	0.19 (0.0059-0.64)	7.193E-03	0.15 (0.013-1.57)	1.196E-01	0.32 (0.047-2.16)	2.427E-01	0.145	-0.0136	0.2245
Lung adenocarcinoma	Isovalerylcarnitine	18	0.03825	20.24	0.67 (0.46-0.99)	4.540E-02	0.25 (0.10-0.62)	3.378E-03	0.73 (0.40-1.33)	3.004E-01	0.33	0.0209	0.0201
Lung adenocarcinoma	Phenol sulfate	13	0.015261	10.92	0.73 (0.57-0.95)	1.622E-02	0.79 (0.40-1.58)	5.080E-01	0.81 (0.55-1.19)	2.796E-01	0.319	-0.0026	0.8191
Lung adenocarcinoma	Phenylacetylglutamine	18	0.022085	11.49	0.73 (0.57-0.93)	1.055E-02	0.62 (0.38-1.01)	6.050E-02	0.74 (0.52-1.06)	9.635E-02	0.071	0.0063	0.4683
Lung adenocarcinoma	Phenylalanine	4	0.006027	13.89	0.19 (0.0059-0.64)	7.193E-03	0.15 (0.013-1.57)	1.196E-01	0.32 (0.048-2.16)	2.427E-01	0.321	0.0028	0.7855
Lung cancer	2-methylbutyrylcarnitine	100	0.012673	11.26	0.59 (0.50-0.70)	1.984E-09	1.60 (1.08-2.36)	1.911E-02	0.85 (0.66-1.09)	2.025E-01	<0.001	-0.0025	0.6381
Lung cancer	Indolelactate	18	0.015325	11.75	0.80 (0.64-0.98)	4.673E-02	0.60 (0.42-0.87)	8.044E-03	0.79 (0.50-1.24)	3.042E-01	0.268	0.0067	0.0629
Ovarian cancer	2-aminobutyrate	41	0.014784	12.15	0.78 (0.61-0.99)	3.827E-02	0.77 (0.47-1.24)	2.838E-01	0.80 (0.54-1.20)	2.821E-01	0.514	0.0002	0.9413
Ovarian cancer	2-methylbutyrylcarnitine	100	0.033459	30.35	0.77 (0.68-0.86)	2.995E-06	1.17 (0.90-1.53)	2.448E-01	0.63 (0.52-0.75)	4.771E-07	0.319	-0.0040	0.3235
Ovarian cancer	3-phenylpropionate (hydrocinnamate)	15	0.005061	11.26	0.92 (0.85-0.99)	3.528E-02	0.92 (0.82-1.04)	1.761E-01	0.94 (0.82-1.07)	3.592E-01	0.342	-0.0040	0.3235
Ovarian cancer	N-acetylthreonine	12	0.00387	10.76	1.28 (1.004-1.64)	4.587E-02	1.49 (0.84-2.65)	1.768E-01	1.62 (1.14-2.32)	7.836E-03	0.16	-0.0027	0.5691
Squamous cell lung cancer	2-methylbutyrylcarnitine	100	0.121301	121.05	0.78 (0.63-0.98)	3.321E-02	1.97 (1.17-3.32)	1.122E-02	1.28 (0.89-1.84)	1.787E-01	0.452	-0.0079	0.3344

Table S4 Mendelian Randomization estimation for Carbohydrate on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median		MR-PRESSO	MR-Egger regression	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value		Intercept	P value
ER- breast cancer	Lactate	12	0.002051	10.91	0.78 (0.62-0.98)	3.446E-02	0.64 (0.39-1.04)	7.778E-02	0.81 (0.58-1.15)	2.416E-01	0.141	0.0034	0.3746
Lung cancer	Arabinose	5	0.004076	11.13	1.2 (1-1.45)	4.965E-02	1.20 (0.88-1.63)	2.653E-01	1.21 (0.90-1.63)	1.988E-01	0.613	0.0003	0.9584
Squamous cell lung cancer	1,5-anhydroglucitol (1,5-AG)	27	0.044294	15.69	1.48 (0.50-2.08)	2.487E-02	1.13 (0.59-2.19)	7.062E-01	1.40 (0.83-2.37)	2.004E-01	0.112	-0.0079	0.3344

Table S5 Mendelian Randomization estimation for Cofactor or vitamin on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median		MR-PRESSO	MR-Egger regression	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value		Intercept	P value
ER+ breast cancer	Pyridoxate	10	0.001192	10.47	1.18 (1.01-1.38)	3.217E-02	1.10 (0.80-1.51)	5.732E-01	1.12 (0.97-1.28)	1.293E-01	0.272	0.0022	0.6014
ER+ breast cancer	Threonate	17	0.002048	10.59	0.88 (0.79-0.99)	3.645E-02	0.91 (0.72-1.14)	3.975E-01	0.85 (0.73-0.98)	2.565E-02	0.018	-0.0007	0.8125
Lung adenocarcinoma	Bilirubin (Z,Z)	10	0.046523	44.71	0.80 (0.66-0.98)	2.671E-02	0.87 (0.61-1.24)	4.428E-01	0.94 (0.70-1.26)	6.646E-01	0.013	-0.0044	0.6048
Lung cancer	Pyridoxate	5	0.008557	10.67	1.30 (1.06-1.60)	1.148E-02	1.46 (0.94-0.28)	9.754E-02	1.16 (0.84-1.59)	3.576E-01	0.479	-0.0033	0.5713
Squamous cell lung cancer	Alpha-tocopherol	11	0.013017	10.97	0.56 (0.36-0.88)	1.152E-02	0.45 (0.17-1.23)	1.255E-01	0.54 (0.28-1.03)	6.165E-02	0.249	0.0048	0.6402

Table S6 Mendelian Randomization estimation for Lipid on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median		MR-PRESS O	MR-Egger regression	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value		Intercept	P value
Breast cancer	1-eicosatrienoylglycerophosphocholine	20	0.011496	31.66	1.1 (1.01-1.20)	2.400E-02	1.18 (1-1.39)	5.184E-02	1.07 (0.95-1.21)	2.693E-01	0.60	-0.0020	0.3412
Breast cancer	1-linoleoylglycerol (1-monolinolein)	13	0.00129	11.39	0.92 (0.87-0.98)	1.164E-02	1.01 (0.88-1.17)	8.427E-01	0.94 (0.86-1.03)	2.110E-01	0.554	-0.0042	0.1630
Breast cancer	1-oleoylglycerophosphocholine	16	0.00150	10.78	1.22 (1.1-1.35)	1.039E-04	1.19 (0.97-1.45)	9.173E-02	1.17 (1.02-1.34)	2.732E-02	0.694	0.0005	0.7595
Breast cancer	3-dehydrocarnitine	22	0.00262	13.71	0.88 (0.78-0.98)	1.937E-02	0.77 (0.60-0.995)	4.762E-02	0.81 (0.70-0.95)	7.900E-03	0.661	0.0023	0.2839
Breast cancer	palmitoylcarnitine	10	0.00100	11.49	1.13 (1.01-1.27)	4.012E-02	0.95 (0.73-1.22)	6.761E-01	1.09 (0.94-1.27)	2.621E-01	0.001	0.0044	0.1296
Breast cancer	tauroolithocholate 3-sulfate	9	0.00082	10.50	0.94 (0.90-0.99)	8.901E-03	1 (0.91-1.1)	9.373E-01	0.95 (0.88-1.02)	1.632E-01	0.441	-0.0035	0.1248
ER- Breast cancer	1-arachidonoylglycerophosphoethanolamine	20	0.01025	32.65	1.21 (1.03-1.41)	1.463E-02	1.08 (0.79-1.48)	6.125E-01	1.12 (0.87-1.44)	3.925E-01	0.415	-0.0015	0.6174
ER- Breast cancer	1-docosahexaenoylglycerophosphocholine	8	0.00133	10.64	1.15 (1.003-1.33)	4.514E-02	1.008 (0.78-1.30)	9.505E-01	0.93 (0.75-1.16)	5.385E-01	0.231	0.0047	0.2147
ER- Breast cancer	1-linoleoylglycerophosphoethanolamine	11	0.00308	17.90	0.83 (0.71-0.98)	2.615E-02	1.07 (0.70-1.63)	7.471E-01	0.76 (0.55-1.05)	1.010E-01	0.152	0.0039	0.4379
ER- Breast cancer	1-oleoylglycerophosphocholine	16	0.0027	10.78	1.38 (1.17-1.62)	1.147E-04	1.44 (1.05-1.99)	2.676E-02	1.36 (1.07-1.73)	1.234E-02	0.513	-0.0009	0.7400
ER- Breast cancer	octadecanedioate	8	0.00281	22.51	0.84 (0.73-0.99)	3.836E-02	1.11 (0.76-1.61)	5.881E-01	0.88 (0.70-1.10)	2.722E-01	0.308	-0.0067	0.1295
ER- Breast cancer	palmitoylcarnitine	10	0.00180	11.50	1.33 (1.11-1.60)	2.316E-03	1.19 (0.79-1.79)	4.006E-01	1.20 (0.93-1.57)	1.662E-01	0.092	0.0027	0.5551
ER- Breast cancer	taurochenodeoxycholate	13	0.00216	10.65	1.08 (1.01-1.15)	1.990E-02	0.92 (0.76-1.12)	4.075E-01	0.97 (0.90-1.07)	6.290E-01	0.244	-0.0032	0.3115
ER+ Breast cancer	1-linoleoylglycerol (1-monolinolein)	13	0.00168	11.40	0.91 (0.85-0.97)	4.365E-03	0.98 (0.84-1.15)	8.463E-01	0.92 (0.83-1.02)	1.234E-01	0.049	-0.0035	0.2644
ER+ Breast cancer	1-oleoylglycerophosphocholine	16	0.00196	10.78	1.19 (1.06-1.33)	2.817E-03	1.50 (0.92-1.44)	2.227E-01	1.19 (1.01-1.41)	3.654E-02	0.058	0.0006	0.7331
ER+ Breast cancer	10-heptadecenoate (17:1n7)	6	0.00071	10.41	0.84 (0.73-0.97)	1.350E-02	0.85 (0.56-1.28)	4.320E-01	0.83 (0.70-0.98)	3.115E-02	0.788	-0.0001	0.9740
ER+ Breast cancer	cortisol	13	0.00158	10.68	1.14 (1.01-1.29)	3.537E-02	1.12 (0.82-1.50)	4.751E-01	1.18 (0.98-1.42)	8.095E-02	0.442	0.0005	0.8655
ER+ Breast cancer	stearidonate (18:4n3)	4	0.01409	11.76	0.88 (0.80-0.98)	2.344E-02	0.85 (0.57-1.08)	1.961E-01	0.92 (0.80-1.06)	2.540E-01	0.608	0.0009	0.7331
ER+ Breast cancer	tauroolithocholate 3-sulfate	9	0.00107	10.50	0.93 (0.88-0.98)	1.579E-02	1.04 (0.93-1.17)	5.197E-01	0.91 (0.84-0.99)	4.951E-01	0.139	-0.0058	0.0365

Glioma	1-oleoylglycerophosphoethanolamine	2	6	11.49	0.34 (0.13-0.91)	2	0.90 (0.04-21.59)	1	0.37 (0.09-1.44)	2	0.504	-0.0253	0.5318
			0.00671			3.219E-0		9.510E-0		1.506E-0			
Glioma	5alpha-androstan-3beta,17beta-diol disulfate	5	6	21.81	0.57 (0.34-0.98)	2	0.65 (0.12-3.3.38)	1	0.63 (0.28-1.43)	1	0.846	-0.0048	0.8769
			0.03106			4.081E-0		6.127E-0		2.677E-0			
Glioma	cis-4-decenoyl carnitine	3	7	60.38	0.39 (0.15-0.98)	2	0.85 (0.11-6.46)	1	0.60 (0.16-2.30)	1	0.887	-0.0205	0.4180
			0.05054			4.630E-0		8.759E-0		4.590E-0			
Glioma	glycerol	5	6	10.94	3.43 (1.08-10.90)	2	0.90 (0.018-44.52)	1	2.45 (0.43-13.83)	1	0.934	0.0193	0.4860
			0.01583			3.721E-0		9.585E-0		3.099E-0			
Glioma	myristoleate (14:1n5)	3	6	18.86	0.20 (0.07-0.57)	3	0.10 (0.003-2.43)	1	0.18 (0.05-0.71)	2	0.019	0.0162	0.6465
			0.01635			2.624E-0		1.673E-0		1.412E-0			
Glioma	taurodeoxycholate	4	2	11.08	0.66 (0.44-0.98)	2	0.95 (0.16-5.70)	1	0.87 (0.51-1.49)	1	0.709	-0.0214	0.6886
			0.01286			3.877E-0		9.523E-0		6.109E-0			
Glioma	ursodeoxycholate	2	2	11.17	0.44 (0.24-0.82)	2	0.30 (0.04-2.00)	1	0.37 (0.15-0.96)	2	0.238	0.0152	0.6725
			0.00653			1.033E-0		2.280E-0		4.000E-0			
Lung adenocarcinoma	1-oleoylglycerol (1-monoolein)	16	9	11.57	0.76 (0.62-0.94)	2	0.85 (0.58-1.24)	1	0.86 (0.61-1.20)	1	0.208	-0.0047	0.5318
			0.01980			1.104E-0		3.906E-0		3.692E-0			
Lung adenocarcinoma	1-palmitoylglycerophosphoethanolamine	27	1	12.76	0.61 (0.40-0.92)	2	0.47 (0.18-1.19)	1	0.75 (0.41-1.35)	1	0.115	0.0045	0.5447
			0.03626			1.795E-0		1.122E-0		3.341E-0			
Lung adenocarcinoma	5-dodecenoate (12:1n7)	18	4	11.85	0.75 (0.57-0.99)	2	0.46 (0.26-0.81)	3	0.78 (0.52-1.18)	1	0.562	0.0166	0.0555
			0.02276			4.115E-0		8.760E-0		2.434E-0			
Lung adenocarcinoma	glycerophosphorylcholine (GPC)	18	2	10.83	0.67 (0.50-0.89)	3	0.66 (0.40-1.10)	1	0.98 (0.57-1.71)	1	0.531	0.0001	0.9882
			0.02084			6.826E-0		1.114E-0		9.559E-0			
Lung adenocarcinoma	oleoylcarnitine	12	7	11.73	1.51 (1.02-2.23)	2	1.59 (0.65-3.90)	1	1.39 (0.83-2.33)	1	0.172	-0.0014	0.8955
			0.01513			4.070E-0		3.132E-0		2.124E-0			
Lung adenocarcinoma	taurochenodeoxycholate	11	2	10.71	0.85 (0.73-0.99)	2	0.77 (0.59-1.01)	2	0.76 (0.60-0.97)	2	0.054	0.0063	0.4122
			0.0127			3.664E-0		6.587E-0		2.799E-0			
Lung adenocarcinoma	taurocholate	17	7	11.16	0.87 (0.77-0.98)	2	0.86 (0.69-1.07)	1	0.97 (0.81-1.16)	1	0.648	0.0008	0.9082
			0.02028			2.643E-0		1.857E-0		7.310E-0			
Lung cancer	1-eicosatrienoylglycerophosphocholine	19	1	12.80	0.74 (0.60-0.93)	3	0.56 (0.35-0.89)	2	0.79 (0.57-1.10)	1	0.506	0.0082	0.1783
			0.01758			8.063E-0		1.692E-0		1.718E-0			
Lung cancer	2-hydroxyglutarate	11	4	10.54	1.34 (1.01-1.77)	2	1.20 (0.59-2.44)	1	1.34 (0.89-2.01)	1	0.48	0.0026	0.7358
			0.00845			4.152E-0		6.256E-0		1.558E-0			
Lung cancer	7-alpha-hydroxy-3-oxo-4-cholestenoate (7-Hoca)	14	2	10.91	1.45 (1.06-1.97)	2	1.30 (0.74-2.26)	1	1.45 (1.06-2.00)	2	0.489	0.0068	0.1554
			0.011105			1.835E-0		3.625E-0		1.835E-0			
Lung cancer	androsterone sulfate	19	8	26.46	1.11 (1.00-1.23)	2	1.10 (0.92-1.30)	1	1.18 (1.01-1.36)	2	0.512	0.0007	0.8875
			0.03565			4.173E-0		2.893E-0		3.120E-0			
Lung cancer	heptanoate (7:0)	34	7	11.70	0.68 (0.49-0.94)	2	0.46 (0.18-1.17)	1	0.55 (0.33-0.91)	2	0.494	0.0042	0.3841
			0.02845			2.070E-0		1.057E-0		1.895E-0			
Ovarian cancer	butyrylcarnitine	20	4	12.64	1.14 (1.002-1.29)	2	1.28 (0.99-1.65)	2	1.23 (1.03-1.48)	2	0.171	-0.0037	0.2966
			0.00755			4.540E-0		5.884E-0		2.619E-0			
Ovarian cancer	hexanoylcarnitine	16	6	26.62	1.20 (1.02-1.41)	2	1.12 (0.79-1.58)	1	1.27 (0.95-1.70)	1	0.713	0.0017	0.6613
			0.01266			2.922E-0		5.300E-0		1.090E-0			

Squamous cancer	cell	lung	1-arachidonoylglycerophosphoethanolamine	21	0.03752 8	119.37	1.56 (1.07-2.29)	2.128E-0 2	1.73 (0.74-4.06)	2.105E-0 1	1.36 (0.72-2.57)	3.398E-0 1	0.058	-0.0018	0.7963
Squamous cancer	cell	lung	1-eicosatrienoylglycerophosphocholine	19	0.01758 1	12.80	0.62 (0.44-0.87)	5.381E-0 3	0.41 (0.20-0.93)	1.629E-0 2	0.50 (0.30-0.84)	9.062E-0 3	0.063	0.0121	0.1961
Squamous cancer	cell	lung	1-palmitoylglycerophosphocholine	32	0.03897 4	11.58	0.53 (0.29-0.97)	3.999E-0 2	1.61 (0.24-10.8)	6.231E-0 1	0.60 (0.24-1.53)	2.877E-0 1	0.196	-0.0110	0.2264
Squamous cancer	cell	lung	octanoylcarnitine	16	0.04273	25.52	0.74 (0.55-0.98)	3.797E-0 2	0.53 (0.29-0.95)	3.636E-0 2	0.58 (0.36-0.92)	2.046E-0 2	0.327	0.0088	0.2089

Table S7 Mendelian Randomization estimation for Nucleotide on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median		MR-PRESSO	MR-Egger regression	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value		Intercept	P value
Glioma	Allantoin	6	0.027743	16.17	0.46 (0.23-0.91)	2.577E-02	0.61 (0.16-2.25)	4.614E-01	0.74 (0.26-2.09)	5.709E-01	0.111	-0.0099	0.6202
Lung adenocarcinoma	7-methylguanine	11	0.012357	10.42	1.73 (1.11-2.71)	1.589E-02	1.95 (0.65-5.89)	2.392E-01	1.62 (0.83-3.34)	1.544E-01	0.209	-0.0028	0.8157
Lung adenocarcinoma	Pseudouridine	24	0.029751	11.70	0.40 (0.19-0.85)	1.738E-02	0.29 (0.03-2.45)	2.553E-01	0.41 (0.14-1.26)	1.194E-01	0.396	0.0032	0.7402
Lung adenocarcinoma	Uridine	20	0.028013	13.20	2.34 (1.14-4.82)	2.104E-02	1.48 (0.28-7.82)	6.424E-01	3.38 (1.04-10.97)	4.283E-02	0.234	0.0052	0.5515
Lung cancer	Pseudouridine	24	0.029751	17.37	0.50 (0.30-0.83)	7.024E-03	0.72 (0.17-3.06)	6.536E-01	0.65 (0.31-1.34)	2.394E-01	0.269	-0.0033	0.6090
Squamous cell lung cancer	Pseudouridine	24	0.029751	11.68	0.46 (0.22-0.97)	4.233E-02	0.71 (0.08-5.96)	7.513E-01	0.33 (0.11-1.009)	5.195E-02	0.686	-0.0041	0.6730
Squamous cell lung cancer	Xanthine	8	0.009208	10.63	0.56 (0.33-0.94)	2.998E-02	0.56 (0.13-2.38)	4.377E-01	0.54 (0.25-1.17)	1.176E-01	0.71	-0.0003	0.9855

Table S8 Mendelian Randomization estimation for Peptide on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median		MR-PRESSO	MR-Egger regression	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value		Intercept	P value
Breast cancer	Gamma-glutamylglutamate	17	0.001883	12.70	0.99 (0.98-0.997)	6.492E-03	0.99 (0.98-1.01)	2.187E-01	0.99 (0.98-1)	6.162E-02	0.026	-0.0084	0.1516
Breast cancer	Leucylleucine	9	0.000904	11.51	0.91 (0.83-0.997)	4.353E-02	0.96 (0.91-1.14)	6.586E-01	0.97 (0.86-1.10)	6.718E-01	0.759	-0.0007	0.7348
Breast cancer	Leucylalanine	11	0.001062	11.06	0.90 (0.82-0.99)	3.812E-02	1.13 (0.82-1.54)	4.601E-01	0.97 (0.90-1.05)	5.060E-01	0.24	0.0008	0.7273
ER- Breast cancer	Gamma-glutamylglutamate	19	0.003307	11.13	0.99 (0.98-0.999)	3.438E-02	0.995 (0.97-1.02)	7.256E-01	0.99 (0.97-1.01)	4.211E-01	0.049	0.0048	0.2304
ER- Breast cancer	Gamma-glutamylmethionine	17	0.003382	12.72	0.92 (0.85-0.99)	2.787E-02	0.87 (0.74-1.03)	1.021E-01	0.91 (0.82-1.01)	9.168E-02	0.218	-0.0092	0.1102
ER- Breast cancer	Pro-hydroxy-pro	5	0.000889	11.34	1.23 (1.02-1.49)	3.347E-02	0.93 (0.57-1.52)	7.814E-01	1.12 (0.85-1.47)	4.184E-01	0.432	0.0027	0.5959
ER- Breast cancer	Leucylalanine	9	0.001624	11.51	0.89 (0.81-0.98)	2.035E-02	1.14 (0.84-1.55)	4.106E-01	0.91 (0.79-1.04)	1.693E-01	0.55	-0.0004	0.9006
ER- Breast cancer	Phenylalanylleucine	9	0.001559	11.05	1.10 (1.001-1.21)	4.633E-02	1.04 (0.83-1.30)	7.377E-01	1.06 (0.93-1.21)	3.703E-01	0.019	-0.0061	0.2637
ER+ Breast cancer	Leucylalanine	17	0.002457	12.71	0.89 (0.80-0.997)	4.323E-02	1.06 (0.73-1.52)	7.733E-01	0.98 (0.89-1.08)	6.888E-01	0.013	-0.0064	0.3433
Glioma	Gamma-glutamylleucine	12	0.0170	4.88	4.74 (1.18-18.93)	2.783E-02	3.18 (0.03-296.7)	6.193E-01	7.93 (1.03-61.02)	4.661E-02	0.523	0.0037	0.8568
Glioma	Gamma-glutamylthreonine	2	0.006356	10.88	3.71 (1.30-10.56)	1.394E-02	2.70 (0.07-105.85)	6.002E-01	2.21 (0.48-10.04)	3.064E-01	0.403	0.0061	0.8601
Glioma	Glycylvaline	9	0.045717	18.05	0.13 (0.02-0.75)	2.171E-02	0.12 (0.0002-87.65)	5.347E-01	0.09 (0.0071-1.20)	6.830E-02	0.293	-0.0303	0.2130
Glioma	N-acetylcarnosine	3	0.0100	11.44	0.22 (0.07-0.76)	1.624E-02	1.41 (0.06-31.12)	8.308E-01	0.40 (0.06-2.56)	3.313E-01	0.218	0.0387	0.3354
Glioma	Leucylalanine	2	0.022158	38.54	0.55 (0.32-0.94)	2.952E-02	0.20 (0.03-1.57)	1.393E-01	0.62 (0.29-1.30)	2.050E-01	0.18	0.0377	0.6003
Lung adenocarcinoma	Gamma-glutamylglutamate	10	0.011894	11.03	1.03 (0-1.06)	4.409E-02	1.06 (1.001-1.13)	4.551E-02	1.02 (0.97-1.06)	4.717E-01	0.456	0.0003	0.9654
Lung adenocarcinoma	Gamma-glutamylisoleucine	19	0.025777	12.75	0.82 (0.68-0.98)	2.695E-02	1.04 (0.74-1.48)	8.076E-01	0.86 (0.59-1.26)	4.389E-01	0.132	-0.0151	0.2494
Lung adenocarcinoma	Leucylleucine	6	0.012536	19.39	1.31 (1.04-1.66)	2.291E-02	1.30 (0.83-2.03)	2.481E-01	1.35 (0.92-1.97)	1.267E-01	0.015	0.0032	0.7163
Lung adenocarcinoma	Leucylalanine	27	0.031246	10.94	1.27 (1.02-1.57)	3.233E-02	1.87 (0.93-3.76)	8.145E-02	1.31 (0.96-1.79)	8.758E-02	0.404	-0.0019	0.7872
Lung cancer	Phenylalanylphenylalanine	4	0.003264	11.13	0.73 (0.54-0.99)	4.231E-02	0.52 (0.25-1.11)	9.903E-02	0.80 (0.51-1.25)	3.256E-01	0.369	0.0084	0.3476
Lung cancer	Leucylalanine	19	0.01738	12.66	1.16 (1.01-1.32)	3.103E-02	1.70 (1.11-2.61)	1.759E-02	1.37 (1.12-1.66)	1.971E-03	0.447	-0.0147	0.0680
Ovarian cancer	Bradykinin, des-arg (9)	26	0.008317	10.71	0.83 (0.71-0.96)	1.571E-02	0.82 (0.64-1.05)	1.218E-01	0.80 (0.62-1.03)	8.016E-02	0.271	0.0033	0.3176
Ovarian cancer	Gamma-glutamylisoleucine	19	0.006342	11.16	1.40 (1.16-1.69)	4.092E-04	1.18 (0.80-1.74)	4.098E-01	1.33 (0.99-1.79)	5.697E-02	0.73	-0.0008	0.8608
Ovarian cancer	Pro-hydroxy-pro	19	0.010736	18.97	1.23 (1.002-1.50)	4.678E-02	1.28 (0.76-2.15)	3.501E-01	1.20 (0.89-1.61)	2.345E-01	0.823	-0.0035	0.4334
Ovarian cancer	Leucylalanine	17	0.006485	12.75	0.96 (0.93-0.99)	6.982E-03	0.92 (0.85-0.99)	3.346E-02	0.95 (0.91-0.995)	3.206E-02	0.725	0.0042	0.5906
Squamous cell lung cancer	Gamma-glutamylisoleucine	27	0.031285	10.94	1.59 (1.08-2.35)	1.879E-02	3.41 (1.51-7.70)	3.897E-03	1.66 (0.95-2.89)	7.485E-02	0.086	-0.0143	0.0405
Squamous cell lung cancer	Gamma-glutamylglutamate	10	0.012551	11.63	1.04 (1.005-1.07)	1.912E-02	1.13 (1.06-1.20)	1.172E-04	1.04 (0.99-1.08)	1.009E-01	0.02	0.0019	0.8194

Table S9 Mendelian Randomization estimation for Xenobiotic on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW	MR-Egger		Weighted median		MR-PRESSO	MR-Egger regression		
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)		P value	Intercept	P value
Breast cancer	1,7-dimethylurate	11	0.001022	10.65	1.09 (1.01-1.18)	2.193E-02	1.12 (0.96-1.32)	1.529E-01	1.09 (0.99-1.21)	7.648E-02	<0.001	-0.0009	0.7068
Breast cancer	2-methoxyacetaminophen sulfate	285	0.026495	10.92	0.99 (0.98-0.997)	6.492E-03	0.99 (0.98-1.01)	2.187E-01	0.99 (0.98-1.0004)	6.162E-02	0.47	-0.0001	0.9390
Breast cancer	catechol sulfate	12	0.001101	10.52	0.91 (0.83-0.997)	4.353E-02	0.96 (0.81-1.14)	6.586E-01	0.97 (0.86-1.10)	6.718E-01	0.01	-0.0019	0.4398
ER- Breast cancer	1,3,7-trimethylurate	11	0.001964	11.40	0.95 (0.91-0.995)	3.177E-02	0.97 (0.89-1.05)	4.397E-01	0.96 (0.92-1.001)	6.007E-02	0.223	-0.0026	0.5330
ER- Breast cancer	2-methoxyacetaminophen sulfate	285	0.047595	11.15	0.99 (0.98-0.999)	3.438E-02	0.995 (0.97-1.02)	7.256E-01	0.99 (0.97-1.01)	4.211E-01	0.028	-0.0022	0.4519
ER- Breast cancer	4-acetaminophen sulfate	7	0.001186	10.81	0.92 (0.85-0.99)	2.787E-02	0.87 (0.74-1.03)	1.021E-01	0.91 (0.82-1.01)	9.168E-02	0.095	-0.0009	0.8263
ER- Breast cancer	ibuprofen	102	0.02032	12.95	0.96 (0.93-0.98)	2.570E-03	0.99 (0.92-1.06)	7.003E-01	0.96 (0.92-1.004)	8.377E-02	0.027	-0.0033	0.3312
ER- Breast cancer	salicylate	18	0.00308	10.93	1.04 (1.01-1.06)	8.786E-04	1.05 (1.02-1.08)	2.736E-03	1.05 (1.02-1.09)	1.030E-03	0.73	-0.0034	0.2560
ER+ Breast cancer	1,7-dimethylurate	11	0.002457	19.64	1.12 (1.02-1.23)	1.607E-02	1.18 (0.98-1.44)	8.147E-02	1.06 (0.94-1.08)	3.350E-01	0.951	-0.0020	0.4988
Glioma	benzoate	9	0.030186	11.75	0.13 (0.02-0.75)	2.171E-02	0.12 (0.0001-87.64)	5.347E-01	0.09 (0.007-1.20)	6.830E-02	0.376	0.0008	0.9780
Lung adenocarcinoma	2-methoxyacetaminophen sulfate	256	0.297739	14.97	1.03 (1-1.06)	4.409E-02	1.06 (1.001-1.13)	4.551E-02	1.02 (0.97-1.06)	4.717E-01	0.727	-0.0082	0.2351
Lung adenocarcinoma	3-methylxanthine	13	0.016745	12.00	0.82 (0.68-0.98)	2.695E-02	1.04 (0.74-1.18)	8.076E-01	0.86 (0.59-1.26)	4.389E-01	0.4	-0.0120	0.1059
Lung adenocarcinoma	stachydrine	7	0.007843	10.35	1.12 (1.01-1.24)	2.845E-02	1.30 (1.02-1.64)	3.614E-02	1.08 (0.92-1.26)	3.612E-01	0.583	-0.0130	0.1854
Lung adenocarcinoma	vanillin	9	0.009974	10.26	1.43 (1.04-1.98)	2.971E-02	1.16 (0.43-3.10)	7.706E-01	1.61 (1.02-2.54)	3.889E-02	0.67	0.0064	0.6537
Ovarian cancer	ibuprofen	102	0.038964	13.19	0.96 (0.93-0.99)	6.982E-03	0.92 (0.85-0.99)	3.346E-02	0.95 (0.91-0.995)	3.206E-02	0.682	0.0040	0.2714
Ovarian cancer	quinate	6	0.001946	10.80	0.90 (0.82-0.998)	4.608E-02	0.98 (0.75-1.27)	8.645E-01	0.89 (0.79-1.002)	5.552E-02	0.714	-0.0043	0.5255
Ovarian cancer	stachydrine	6	0.003506	19.48	0.96 (0.93-0.99)	5.721E-03	0.93 (0.81-1.06)	2.742E-01	0.91 (0.84-0.98)	1.340E-02	0.339	0.0003	0.9532
Squamous cell lung cancer	2-methoxyacetaminophen sulfate	256	0.298112	14.98	1.04 (1.005-1.07)	1.912E-02	1.13 (1.06-1.20)	1.172E-04	1.04 (0.99-1.08)	1.009E-01	0.087	-0.0226	0.0018
Squamous cell lung cancer	N- (2-furoyl)glycine	23	0.028154	11.52	0.92 (0.86-0.995)	3.829E-02	0.83 (0.71-0.96)	1.358E-02	0.97 (0.87-1.08)	5.427E-01	0.079	0.0139	0.0965

Table S10 Mendelian Randomization estimation for X (unknown metabolites) on the risk of cancers

Trait	Exposure	SNPs	R ²	F statistics	IVW		MR-Egger		Weighted median	
					OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Breast cancer	X-04500	67	0.0366	304.48	1.03 (1-1.06)	4.251E-02	1.02 (0.96-1.08)	5.988E-01	1.02 (0.97-1.06)	4.661E-01
Breast cancer	X-09026	106	0.0776	387.90	0.88 (0.78-0.99)	3.253E-02	0.74 (0.54-1.02)	6.797E-02	0.88 (0.75-1.03)	1.131E-01
Breast cancer	X-11247	72	0.0573	345.97	0.91 (0.87-0.96)	6.483E-04	0.88 (0.79-0.99)	3.149E-02	0.91 (0.86-0.97)	3.883E-03
Breast cancer	X-11381	85	0.0963	480.84	0.86 (0.74-1)	4.959E-02	0.996 (0.64-1.56)	9.872E-01	0.83 (0.68-1.01)	6.887E-02
Breast cancer	X-11529	67	0.0412	302.20	0.92 (0.88-0.97)	1.532E-03	0.996 (0.90-1.10)	9.438E-01	0.93 (0.87-1.004)	6.502E-02
Breast cancer	X-11538	67	0.0613	426.58	0.95 (0.80-0.995)	3.168E-02	1.02 (0.92-1.13)	7.219E-01	0.98 (0.88-1.08)	6.199E-01
Breast cancer	X-11540	67	0.0613	426.58	0.95 (0.80-0.996)	3.168E-02	1.02 (0.92-1.14)	7.219E-01	0.98 (0.89-1.08)	6.105E-01
Breast cancer	X-11787	103	0.0498	278.90	1.2 (1.01-1.42)	3.986E-02	1.42 (0.997-2.02)	5.505E-02	1.28 (0.97-1.69)	8.534E-02
Breast cancer	X-11850	71	0.0428	297.00	1.03 (1-1.06)	4.005E-02	1.02 (0.96-1.09)	4.734E-01	1.007 (0.97-1.05)	7.152E-01
Breast cancer	X-12231	82	0.0599	342.07	0.92 (0.85-0.99)	2.567E-02	1.01 (0.88-1.15)	9.071E-01	0.91 (0.84+0.99)	2.239E-02
Breast cancer	X-12627	74	0.0455	300.37	1.08 (1-1.17)	3.996E-02	1.01 (0.87-1.18)	8.988E-01	1.06 (0.96-1.17)	2.830E-01
Breast cancer	X-13435	122	0.0902	421.21	1.12 (1.02-1.24)	2.243E-02	1.02 (0.83-1.25)	8.447E-01	1.15 (1.008-1.31)	3.768E-02
Breast cancer	X-14473	77	0.0523	352.08	9.00 (0.84-0.96)	1.272E-03	0.97 (0.80-1.18)	7.644E-01	0.88 (0.80-0.96)	4.427E-03
ER- Breast cancer	X-04498	97	0.0683	238.93	0.81 (0.68-0.97)	2.344E-02	0.85 (0.59-1.21)	3.685E-01	0.87 (0.67-1.12)	2.793E-01
ER- Breast cancer	X-11538	67	0.0778	321.81	0.87 (0.78-0.96)	7.425E-03	0.94 (0.74-1.18)	5.888E-01	0.92 (0.76-1.11)	3.744E-01
ER- Breast cancer	X-11540	67	0.0822	332.31	0.87 (0.78-0.96)	7.425E-03	0.94 (0.74-1.18)	5.888E-01	0.92 (0.77-1.09)	3.315E-01
ER- Breast cancer	X-11843	60	0.0656	278.16	1.05 (1.009-1.09)	1.438E-02	1.09 (1.03-1.16)	2.807E-03	1.09 (1.02-1.17)	1.208E-02
ER- Breast cancer	X-12627	74	0.0609	231.70	1.12 (1.003-1.27)	4.334E-02	1.26 (0.996-1.59)	5.757E-02	1.09 (0.92-1.32)	3.152E-01
ER- Breast cancer	X-12798	55	0.0782	314.35	0.86 (0.76-0.98)	2.789E-02	0.75 (0.62-0.90)	3.302E-03	0.89 (0.74-1.08)	2.302E-01
ER- Breast cancer	X-13435	122	0.1209	340.12	1.20 (1.02-1.41)	2.447E-02	1.14 (0.82-1.58)	4.468E-01	1.23 (0.99-1.53)	5.933E-02
ER- Breast cancer	X-14745	78	0.0810	288.99	1.26 (1.08-1.48)	2.993E-03	1.26 (0.85-1.88)	2.537E-01	1.19 (0.96-1.49)	1.120E-01
ER+ Breast cancer	X-03003	86	0.0781	331.97	0.86 (0.74-0.98)	2.772E-02	1.04 (0.74-1.47)	8.089E-01	0.98 (0.80-1.22)	8.825E-01
ER+ Breast cancer	X-09026	106	0.0886	348.45	0.82 (0.72-0.94)	5.558E-03	0.66 (0.46-0.95)	2.929E-02	0.78 (0.65-0.94)	1.042E-02
ER+ Breast cancer	X-11247	72	0.0668	314.94	0.90 (0.84-0.95)	3.582E-04	0.84 (0.73-0.96)	1.039E-02	0.88 (0.82-0.94)	2.811E-04
ER+ Breast cancer	X-11529	67	0.0499	276.63	0.90 (0.85-0.96)	6.831E-04	0.98 (0.87-1.11)	7.506E-01	0.91 (0.84-0.99)	2.511E-02
ER+ Breast cancer	X-11850	71	0.0489	263.44	1.04 (1.01-1.08)	1.615E-02	1.04 (0.97-1.13)	2.179E-01	1.04 (0.99-1.09)	1.307E-01
ER+ Breast cancer	X-12524	113	0.0841	270.69	1.25 (1-1.57)	4.719E-02	0.99 (0.599-1.70)	9.690E-01	1.26 (0.91-1.73)	1.639E-01
ER+ Breast cancer	X-13435	122	0.1030	380.86	1.14 (1.02-1.27)	2.293E-02	1.02 (0.81-1.28)	8.811E-01	1.15 (0.99-1.73)	6.569E-02
ER+ Breast cancer	X-13549	116	0.0969	348.53	0.79 (0.65-0.95)	1.403E-02	0.84 (0.51-1.38)	4.841E-01	0.85 (0.64-1.13)	2.631E-01
ER+ Breast cancer	X-14473	77	0.0597	313.48	0.87 (0.81-0.95)	1.111E-03	1.03 (0.80-1.32)	8.152E-01	0.90 (0.81-1.01)	7.470E-02
Glioma	X-10395	62	0.3378	251.59	5.72 (2.04-16.01)	8.947E-04	3.50 (0.57-21.46)	1.815E-01	4.34 (0.66-28.71)	1.277E-01
Glioma	X-11843	15	0.1087	88.18	2.34 (1.20-4.55)	1.224E-02	1.71 (0.189-15.56)	6.402E-01	2.12 (0.92-4.91)	7.869E-02

Glioma	X-12063	40	0.2089	111.84	0.57 (0.37-0.86)	8.128E-03	0.47 (0.23-0.95)	4.106E-02	0.43 (0.22-0.85)	1.482E-02
Glioma	X-12188	16	0.0431	40.07	0.67 (0.45-0.99)	4.318E-02	1.12 (0.49-2.58)	7.948E-01	0.63 (0.36-1.10)	1.024E-01
Glioma	X-12696	42	0.1116	61.32	3.57 (1.26-10.16)	1.693E-02	2.83 (0.35-23.07)	3.374E-01	3.60 (0.73-17.65)	1.144E-01
Lung adenocarcinoma	X-04494	101	0.1784	130.18	1.56 (1.03-2.36)	3.537E-02	3.07 (1.42-6.64)	5.315E-03	1.74 (0.98-3.09)	5.985E-02
Lung adenocarcinoma	X-10395	161	0.4893	2761.80	0.68 (0.47-0.995)	4.711E-02	0.79 (0.44-1.44)	4.460E-01	0.68 (0.36-1.26)	2.173E-01
Lung adenocarcinoma	X-12013	75	0.1974	137.63	0.90 (0.82-0.996)	4.127E-02	1.03 (0.89-1.20)	6.785E-01	0.95 (0.80-1.14)	5.949E-01
Lung adenocarcinoma	X-12094	60	0.0767	85.44	0.61 (0.43-0.88)	7.427E-03	0.51 (0.26-0.99)	5.296E-02	0.46 (0.27-0.77)	3.307E-03
Lung adenocarcinoma	X-12189	104	0.2157	110.59	0.90 (0.84-0.97)	7.832E-03	0.90 (0.81-1.01)	7.772E-02	0.96 (0.87-1.07)	4.710E-01
Lung adenocarcinoma	X-12524	120	0.2681	140.21	0.40 (0.18-0.88)	2.351E-02	1.6 (0.23-11.03)	6.337E-01	0.64 (0.20-1.98)	4.348E-01
Lung adenocarcinoma	X-12627	71	0.1523	106.23	0.70 (0.53-0.92)	1.026E-02	0.64 (0.37-1.10)	1.102E-01	0.69 (0.45-1.06)	9.186E-02
Lung adenocarcinoma	X-12680	69	0.1410	115.63	1.42 (1.04-1.94)	2.622E-02	2.3 (1.004-5.28)	5.282E-02	1.43 (0.90-2.27)	1.254E-01
Lung adenocarcinoma	X-12776	32	0.0372	57.69	3.7 (1.07-12.8)	3.869E-02	2.98 (0.29-31.04)	3.676E-01	3.997 (0.59-27.11)	1.561E-01
Lung adenocarcinoma	X-12786	82	0.2664	193.37	0.69 (0.51-0.92)	1.052E-02	0.81 (0.41-1.60)	5.405E-01	0.83 (0.54-1.28)	3.900E-01
Lung adenocarcinoma	X-12833	91	0.1837	114.41	0.92 (0.88-0.97)	1.030E-03	0.91 (0.83-1.009)	7.953E-02	0.91 (0.85-0.99)	2.090E-02
Lung adenocarcinoma	X-12851	66	0.1665	116.98	0.90 (0.93-0.98)	1.732E-02	0.87 (0.78-0.98)	1.978E-02	0.88 (0.76-1.007)	6.355E-02
Lung cancer	X-04494	101	0.1464	140.70	1.37 (1.06-1.78)	1.535E-02	2.28 (1.40-3.68)	1.142E-03	1.51 (1.05-2.17)	2.447E-02
Lung cancer	X-11469	86	0.2586	235.63	0.86 (0.77-0.96)	9.033E-03	0.90 (0.67-1.21)	4.761E-01	0.90 (0.76-1.07)	2.308E-01
Lung cancer	X-12092	83	0.2933	351.09	0.85 (0.77-0.94)	2.277E-03	0.94 (0.82-1.10)	4.584E-01	0.95 (0.83-1.08)	4.156E-01
Lung cancer	X-12189	104	0.1771	121.27	0.95 (0.90-0.993)	2.344E-02	0.95 (0.89-1.03)	2.121E-01	0.98 (0.92-1.05)	5.753E-01
Lung cancer	X-12712	140	0.1766	101.12	0.96 (0.93-0.998)	3.960E-02	0.97 (0.91-1.03)	2.971E-01	0.96 (0.91-1.03)	2.595E-01
Lung cancer	X-12786	82	0.2187	204.14	0.83 (0.68-0.997)	4.617E-02	1.09 (0.70-1.70)	6.926E-01	0.98 (0.73-1.30)	8.657E-01
Lung cancer	X-12851	66	0.1367	132.63	0.93 (0.88-0.99)	1.262E-02	0.90 (0.84-0.97)	7.272E-03	0.91 (0.83-1)	5.082E-02
Lung cancer	X-13549	120	0.2665	225.38	0.63 (0.41-0.97)	3.565E-02	0.45 (0.15-1.36)	1.572E-01	0.56 (0.29-1.09)	8.973E-02
Lung cancer	X-14662	87	0.1981	174.68	0.87 (0.79-0.96)	7.798E-03	0.83 (0.69-0.997)	5.061E-02	0.95 (0.82-1.10)	4.594E-01
Ovarian cancer	X-12013	72	0.1113	217.45	0.94 (0.89-0.998)	4.511E-02	0.97 (0.88-1.06)	4.675E-01	0.97 (0.89-1.05)	4.720E-01
Ovarian cancer	X-12116	86	0.0807	167.15	0.90 (0.83-0.98)	1.829E-02	0.89 (0.75-1.05)	1.750E-01	0.93 (0.81-1.05)	2.423E-01
Ovarian cancer	X-12544	85	0.0823	170.70	0.93 (0.87-0.99)	2.728E-02	0.95 (0.96-1.05)	3.372E-01	0.96 (0.86-1.08)	5.037E-01
Ovarian cancer	X-12556	111	0.1769	258.67	1.25 (1.02-1.52)	2.818E-02	0.99 (0.65-1.51)	9.545E-01	1.25 (0.93-1.67)	1.432E-01
Ovarian cancer	X-12740	70	0.0881	210.17	1.07 (1.008-1.13)	2.466E-02	1.10 (0.99-1.23)	8.778E-02	1.10 (1.005-1.19)	3.829E-02
Ovarian cancer	X-12844	75	0.0817	175.66	0.79 (0.64-0.98)	3.417E-02	1.07 (0.66-1.76)	7.761E-01	0.76 (0.56-1.03)	8.029E-02
Ovarian cancer	X-12847	65	0.1442	254.37	1.13 (1.05-1.21)	1.010E-03	1.15 (1.03-1.30)	2.093E-02	1.12 (0.99-1.26)	6.553E-02
Squamous cell lung cancer	X-07765	89	0.1625	111.57	0.88 (0.78-0.99)	3.102E-02	0.83 (0.67-1.03)	9.640E-02	0.88 (0.74-1.04)	1.369E-01
Squamous cell lung cancer	X-11299	78	0.2447	165.80	0.85 (0.74-0.98)	2.365E-02	0.83 (0.58-1.19)	3.183E-01	0.86 (0.71-1.05)	1.513E-01
Squamous cell lung cancer	X-11440	102	0.3662	308.08	1.21 (1.004-1.46)	4.424E-02	1.04 (0.73-1.48)	8.465E-01	1.06 (0.79-1.42)	6.891E-01
Squamous cell lung cancer	X-12063	92	0.2282	166.27	0.7 (0.58-0.85)	2.484E-04	0.83 (0.58-1.17)	2.932E-01	0.81 (0.61-1.09)	1.644E-01
Squamous cell lung cancer	X-12729	95	0.2067	109.58	1.11 (1.008-1.21)	3.286E-02	1.10 (0.93-1.30)	2.463E-01	1.09 (0.92-1.30)	3.273E-01
Squamous cell lung cancer	X-12786	82	0.2666	193.35	0.66 (0.49-0.89)	6.432E-03	0.89 (0.45-1.77)	7.355E-01	0.77 (0.50-1.19)	2.394E-01

Squamous cell lung cancer	X-12830	82	0.2235	142.06	0.82 (0.69-0.98)	3.155E-02	0.97 (0.68-1.38)	8.507E-01	0.77 (0.59-1.01)	6.222E-02
Squamous cell lung cancer	X-12851	66	0.1666	116.94	0.89 (0.82-0.97)	7.188E-03	0.87 (0.78-0.97)	1.515E-02	0.91 (0.79-1.04)	1.520E-01
Squamous cell lung cancer	X-13553	70	0.1953	140.68	0.59 (0.36-0.99)	4.675E-02	0.76 (0.26-2.21)	6.151E-01	0.57 (0.30-1.10)	9.383E-02

Table S11 Mendelian Randomization estimates for known metabolites on the risk of cancers

Trait	Exposure	SNPs	IVW		MR-Egger		Weighted median	
			OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Breast cancer	2-methylbutyrylcarnitine	100	0.77 (0.70-0.85)	3.418E-07	1.59 (1.27-1.99)	6.233E-05	1.004 (0.91-1.11)	9.351E-01
Breast cancer	4-acetamidobutanoate	33	0.93 (0.70-0.98)	3.116E-02	1.01 (0.69-1.48)	9.650E-01	0.87 (0.71-1.06)	1.638E-01
Breast cancer	isovalerylcarnitine	18	0.87 (0.76-0.99)	3.231E-02	0.81 (0.61-1.1)	1.527E-01	1.008 (0.87-1.16)	9.086E-01
Breast cancer	kynurenine	32	0.85 (0.73-0.99)	3.888E-02	0.95 (0.70-1.29)	7.333E-01	0.91 (0.74-1.10)	3.247E-01
Breast cancer	serotonin (5HT)	15	1.1 (1.00-1.21)	4.163E-02	1.04 (0.84-1.29)	7.221E-01	1.07 (0.95-1.21)	2.667E-01
Breast cancer	1-eicosatrienoylglycerophosphocholine	20	1.1 (1.01-1.20)	2.400E-02	1.18 (1-1.39)	5.184E-02	1.07 (0.95-1.21)	2.693E-01
Breast cancer	1-linoleoylglycerol (1-monolinolein)	13	0.92 (0.87-0.98)	1.164E-02	1.01 (0.88-1.17)	8.427E-01	0.94 (0.86-1.03)	2.110E-01
Breast cancer	1-oleoylglycerophosphocholine	16	1.22 (1.1-1.35)	1.039E-04	1.19 (0.97-1.45)	9.173E-02	1.17 (1.02-1.34)	2.732E-02
Breast cancer	3-dehydrocarnitine	22	0.88 (0.78-0.98)	1.937E-02	0.77 (0.60-0.995)	4.762E-02	0.81 (0.70-0.95)	7.900E-03
Breast cancer	palmitoylcarnitine	10	1.13 (1.01-1.27)	4.012E-02	0.95 (0.73-1.22)	6.761E-01	1.09 (0.94-1.27)	2.621E-01
Breast cancer	tauroolithocholate 3-sulfate	9	0.94 (0.90-0.99)	8.901E-03	1 (0.91-1.1)	9.373E-01	0.95 (0.88-1.02)	1.632E-01
Breast cancer	gamma-glutamylglutamate	17	0.99 (0.98-0.997)	6.492E-03	0.99 (0.98-1.01)	2.187E-01	0.99 (0.98-1)	6.162E-02
Breast cancer	leucylleucine	9	0.91 (0.83-0.997)	4.353E-02	0.96 (0.91-1.14)	6.586E-01	0.97 (0.86-1.10)	6.718E-01
Breast cancer	leucylalanine	11	0.90 (0.82-0.99)	3.812E-02	1.13 (0.82-1.54)	4.601E-01	0.97 (0.90-1.05)	5.060E-01
Breast cancer	1,7-dimethylurate	11	1.09 (1.01-1.18)	2.193E-02	1.12 (0.96-1.32)	1.529E-01	1.09 (0.99-1.21)	7.648E-02
Breast cancer	2-methoxyacetaminophen sulfate	285	0.99 (0.98-0.997)	6.492E-03	0.99 (0.98-1.01)	2.187E-01	0.99 (0.98-1.0004)	6.162E-02
Breast cancer	catechol sulfate	12	0.91 (0.83-0.997)	4.353E-02	0.96 (0.81-1.14)	6.586E-01	0.97 (0.86-1.10)	6.718E-01
ER- Breast cancer	4-acetamidobutanoate	33	0.74 (0.57-0.95)	1.946E-02	0.72 (0.40-1.30)	2.791E-01	0.74 (0.51-1.06)	9.982E-02
ER- Breast cancer	kynurenine	32	0.75 (0.58-0.96)	2.381E-02	0.73 (0.44-1.22)	2.317E-01	0.77 (0.55-1.08)	1.287E-01
ER- Breast cancer	lactate	12	0.78 (0.62-0.98)	3.446E-02	0.64 (0.39-1.04)	7.778E-02	0.81 (0.58-1.15)	2.416E-01
ER- Breast cancer	1-arachidonoylglycerophosphoethanolamine	20	1.21 (1.03-1.41)	1.463E-02	1.08 (0.79-1.48)	6.125E-01	1.12 (0.87-1.44)	3.925E-01
ER- Breast cancer	1-docosaehaenoylglycerophosphocholine	8	1.15 (1.003-1.33)	4.514E-02	1.008 (0.78-1.30)	9.505E-01	0.93 (0.75-1.16)	5.385E-01
ER- Breast cancer	1-linoleoylglycerophosphoethanolamine	11	0.83 (0.71-0.98)	2.615E-02	1.07 (0.70-1.63)	7.471E-01	0.76 (0.55-1.05)	1.010E-01
ER- Breast cancer	1-oleoylglycerophosphocholine	16	1.38 (1.17-1.62)	1.147E-04	1.44 (1.05-1.99)	2.676E-02	1.36 (1.07-1.73)	1.234E-02
ER- Breast cancer	octadecanedioate	8	0.84 (0.73-0.99)	3.836E-02	1.11 (0.76-1.61)	5.881E-01	0.88 (0.70-1.10)	2.722E-01
ER- Breast cancer	palmitoylcarnitine	10	1.33 (1.11-1.60)	2.316E-03	1.19 (0.79-1.79)	4.006E-01	1.20 (0.93-1.57)	1.662E-01
ER- Breast cancer	taurochenodeoxycholate	13	1.08 (1.01-1.15)	1.990E-02	0.92 (0.76-1.12)	4.075E-01	0.97 (0.90-1.07)	6.290E-01
ER- Breast cancer	gamma-glutamylglutamate	19	0.99 (0.98-0.999)	3.438E-02	0.995 (0.97-1.02)	7.256E-01	0.99 (0.97-1.01)	4.211E-01

ER- Breast cancer	gamma-glutamylmethionine	17	0.92 (0.85-0.99)	2.787E-02	0.87 (0.74-1.03)	1.021E-01	0.91 (0.82-1.01)	9.168E-02
ER- Breast cancer	pro-hydroxy-pro	5	1.23 (1.02-1.49)	3.347E-02	0.93 (0.57-1.52)	7.814E-01	1.12 (0.85-1.47)	4.184E-01
ER- Breast cancer	leucylalanine	9	0.89 (0.81-0.98)	2.035E-02	1.14 (0.84-1.55)	4.106E-01	0.91 (0.79-1.04)	1.693E-01
ER- Breast cancer	phenylalanylleucine	9	1.10 (1.001-1.21)	4.633E-02	1.04 (0.83-1.30)	7.377E-01	1.06 (0.93-1.21)	3.703E-01
ER- Breast cancer	1,3,7-trimethylurate	11	0.95 (0.91-0.995)	3.177E-02	0.97 (0.89-1.05)	4.397E-01	0.96 (0.92-1.001)	6.007E-02
ER- Breast cancer	2-methoxyacetaminophen sulfate	285	0.99 (0.98-0.999)	3.438E-02	0.995 (0.97-1.02)	7.256E-01	0.99 (0.97-1.01)	4.211E-01
ER- Breast cancer	4-acetaminophen sulfate	7	0.92 (0.85-0.99)	2.787E-02	0.87 (0.74-1.03)	1.021E-01	0.91 (0.82-1.01)	9.168E-02
ER- Breast cancer	ibuprofen	102	0.96 (0.93-0.98)	2.570E-03	0.99 (0.92-1.06)	7.003E-01	0.96 (0.92-1.004)	8.377E-02
ER- Breast cancer	salicylate	18	1.04 (1.01-1.06)	8.786E-04	1.05 (1.02-1.08)	2.736E-03	1.05 (1.02-1.09)	1.030E-03
ER+ Breast cancer	2-methylbutyroylcarnitine	100	0.72 (0.64-0.80)	3.552E-09	1.58 (1.23-2.02)	3.061E-04	1.003 (0.90-1.12)	9.451E-01
ER+ Breast cancer	isovalerylcarnitine	18	0.86 (0.75-0.99)	3.392E-02	0.83 (0.60-1.13)	2.310E-01	0.95 (0.81-1.12)	5.680E-01
ER+ Breast cancer	N-acetylalanine	30	1.36 (1.07-1.74)	1.369E-02	1.36 (0.79-2.33)	2.746E-01	1.45 (1.006-2.07)	4.584E-02
ER+ Breast cancer	N-acetylthreonine	12	1.18 (1.01-1.38)	3.456E-02	0.75 (0.52-1.06)	1.088E-01	1.03 (0.83-1.27)	7.919E-01
ER+ Breast cancer	p-cresol sulfate	14	1.05 (1.00-1.11)	4.213E-02	1.04 (0.95-1.15)	3.957E-01	1.07 (0.99-1.49)	9.770E-02
ER+ Breast cancer	serotonin (5HT)	15	1.12 (1.02-1.24)	1.956E-02	1.08 (0.86-1.36)	4.959E-01	1.10 (0.95-1.27)	2.136E-01
ER+ Breast cancer	pyridoxate	10	1.18 (1.01-1.38)	3.217E-02	1.10 (0.80-1.51)	5.732E-01	1.12 (0.97-1.28)	1.293E-01
ER+ Breast cancer	threonate	17	0.88 (0.79-0.99)	3.645E-02	0.91 (0.72-1.14)	3.975E-01	0.85 (0.73-0.98)	2.565E-02
ER+ Breast cancer	1-linoleoylglycerol (1-monolinolein)	13	0.91 (0.85-0.97)	4.365E-03	0.98 (0.84-1.15)	8.463E-01	0.92 (0.83-1.02)	1.234E-01
ER+ Breast cancer	1-oleoylglycerophosphocholine	16	1.19 (1.06-1.33)	2.817E-03	1.50 (0.92-1.44)	2.227E-01	1.19 (1.01-1.41)	3.654E-02
ER+ Breast cancer	10-heptadecenoate (17:1n7)	6	0.84 (0.73-0.97)	1.350E-02	0.85 (0.56-1.28)	4.320E-01	0.83 (0.70-0.98)	3.115E-02
ER+ Breast cancer	cortisol	13	1.14 (1.01-1.29)	3.537E-02	1.12 (0.82-1.50)	4.751E-01	1.18 (0.98-1.42)	8.095E-02
ER+ Breast cancer	stearidonate (18:4n3)	4	0.88 (0.80-0.98)	2.344E-02	0.85 (0.57-1.08)	1.961E-01	0.92 (0.80-1.06)	2.540E-01
ER+ Breast cancer	taurolithocholate 3-sulfate	9	0.93 (0.88-0.98)	1.579E-02	1.04 (0.93-1.17)	5.197E-01	0.91 (0.84-0.99)	4.951E-02
ER+ Breast cancer	leucylalanine	17	0.89 (0.80-0.997)	4.323E-02	1.06 (0.73-1.52)	7.733E-01	0.98 (0.89-1.08)	6.888E-01
ER+ Breast cancer	1,7-dimethylurate	11	1.12 (1.02-1.23)	1.607E-02	1.18 (0.98-1.44)	8.147E-02	1.06 (0.94-1.08)	3.350E-01
Glioma	2-methylbutyroylcarnitine	57	2.19 (1.17-4.09)	1.455E-02	0.89 (0.16-4.96)	8.954E-01	1.99 (0.75-5.31)	1.673E-01
Glioma	4-acetamidobutanoate	14	0.15 (0.04-0.59)	6.306E-03	0.08 (0.003-2.24)	1.441E-01	0.24 (0.03-1.9)	1.773E-01
Glioma	pyroglutamine	7	3.20 (1.03-9.91)	4.393E-02	18.6 (0.72-479.10)	9.120E-02	2.32 (0.53-10.1)	2.638E-01
Glioma	1-oleoylglycerophosphoethanolamine	2	0.34 (0.13-0.91)	3.219E-02	0.90 (0.04-21.59)	9.510E-01	0.37 (0.09-1.44)	1.506E-01
Glioma	5alpha-androstan-3beta,17beta-diol disulfate	5	0.57 (0.34-0.98)	4.081E-02	0.65 (0.12-3.3.38)	6.127E-01	0.63 (0.28-1.43)	2.677E-01
Glioma	cis-4-decenoyl carnitine	3	0.39 (0.15-0.98)	4.630E-02	0.85 (0.11-6.46)	8.759E-01	0.60 (0.16-2.30)	4.590E-01
Glioma	glycerol	5	3.43 (1.08-10.90)	3.721E-02	0.90 (0.018-44.52)	9.585E-01	2.45 (0.43-13.83)	3.099E-01
Glioma	myristoleate (14:1n5)	3	0.20 (0.07-0.57)	2.624E-03	0.10 (0.003-2.43)	1.673E-01	0.18 (0.05-0.71)	1.412E-02
Glioma	taurodeoxycholate	4	0.66 (0.44-0.98)	3.877E-02	0.95 (0.16-5.70)	9.523E-01	0.87 (0.51-1.49)	6.109E-01
Glioma	ursodeoxycholate	2	0.44 (0.24-0.82)	1.033E-02	0.30 (0.04-2.00)	2.280E-01	0.37 (0.15-0.96)	4.000E-02
Glioma	gamma-glutamylleucine	12	4.74 (1.18-18.93)	2.783E-02	3.18 (0.03-296.7)	6.193E-01	7.93 (1.03-61.02)	4.661E-02
Glioma	gamma-glutamylthreonine	2	3.71 (1.30-10.56)	1.394E-02	2.70 (0.07-105.85)	6.002E-01	2.21 (0.48-10.04)	3.064E-01
Glioma	glycylvaline	9	0.13 (0.02-0.75)	2.171E-02	0.12 (0.0002-87.65)	5.347E-01	0.09 (0.0071-1.20)	6.830E-02

Glioma	N-acetylcarnosine	3	0.22 (0.07-0.76)	1.624E-02	1.41 (0.06-31.12)	8.308E-01	0.40 (0.06-2.56)	3.313E-01
Glioma	leucylalanine	2	0.55 (0.32-0.94)	2.952E-02	0.20 (0.03-1.57)	1.393E-01	0.62 (0.29-1.30)	2.050E-01
Glioma	benzoate	9	0.13 (0.02-0.75)	2.171E-02	0.12 (0.0001-87.64)	5.347E-01	0.09 (0.007-1.20)	6.830E-02
Lung adenocarcinoma	2-methylbutyroylcarnitine	100	0.60 (0.48-0.75)	1.144E-05	1.72 (1.005-2.96)	4.821E-02	0.59 (0.41-0.87)	7.209E-03
Lung adenocarcinoma	asparagine	13	1.42 (1.04-1.94)	2.622E-02	2.30 (1.004-5.28)	5.282E-02	1.43 (0.89-2.30)	1.340E-01
Lung adenocarcinoma	isoleucine	4	0.19 (0.0059-0.64)	7.193E-03	0.15 (0.013-1.57)	1.196E-01	0.32 (0.047-2.16)	2.427E-01
Lung adenocarcinoma	isovalerylcarnitine	18	0.67 (0.46-0.99)	4.540E-02	0.25 (0.10-0.62)	3.378E-03	0.73 (0.40-1.33)	3.004E-01
Lung adenocarcinoma	phenol sulfate	13	0.73 (0.57-0.95)	1.622E-02	0.79 (0.40-1.58)	5.080E-01	0.81 (0.55-1.19)	2.796E-01
Lung adenocarcinoma	phenylacetylglutamine	18	0.73 (0.57-0.93)	1.055E-02	0.62 (0.38-1.01)	6.050E-02	0.74 (0.52-1.06)	9.635E-02
Lung adenocarcinoma	phenylalanine	4	0.19 (0.0059-0.64)	7.193E-03	0.15 (0.013-1.57)	1.196E-01	0.32 (0.048-2.16)	2.427E-01
Lung adenocarcinoma	bilirubin (Z,Z)	10	0.80 (0.66-0.98)	2.671E-02	0.87 (0.61-1.24)	4.428E-01	0.94 (0.70-1.26)	6.646E-01
Lung adenocarcinoma	1-oleoylglycerol (1-monoolein)	16	0.76 (0.62-0.94)	1.104E-02	0.85 (0.58-1.24)	3.906E-01	0.86 (0.61-1.20)	3.692E-01
Lung adenocarcinoma	1-palmitoylglycerophosphoethanolamine	27	0.61 (0.40-0.92)	1.795E-02	0.47 (0.18-1.19)	1.122E-01	0.75 (0.41-1.35)	3.341E-01
Lung adenocarcinoma	5-dodecenoate (12:1n7)	18	0.75 (0.57-0.99)	4.115E-02	0.46 (0.26-0.81)	8.760E-03	0.78 (0.52-1.18)	2.434E-01
Lung adenocarcinoma	glycerophosphorylcholine (GPC)	18	0.67 (0.50-0.89)	6.826E-03	0.66 (0.40-1.10)	1.114E-01	0.98 (0.57-1.71)	9.559E-01
Lung adenocarcinoma	oleoylcarnitine	12	1.51 (1.02-2.23)	4.070E-02	1.59 (0.65-3.90)	3.132E-01	1.39 (0.83-2.33)	2.124E-01
Lung adenocarcinoma	taurochenodeoxycholate	11	0.85 (0.73-0.99)	3.664E-02	0.77 (0.59-1.01)	6.587E-02	0.76 (0.60-0.97)	2.799E-02
Lung adenocarcinoma	taurocholate	17	0.87 (0.77-0.98)	2.643E-02	0.86 (0.69-1.07)	1.857E-01	0.97 (0.81-1.16)	7.310E-01
Lung adenocarcinoma	7-methylguanine	11	1.73 (1.11-2.71)	1.589E-02	1.95 (0.65-5.89)	2.392E-01	1.62 (0.83-3.34)	1.544E-01
Lung adenocarcinoma	pseudouridine	24	0.40 (0.19-0.85)	1.738E-02	0.29 (0.03-2.45)	2.553E-01	0.41 (0.14-1.26)	1.194E-01
Lung adenocarcinoma	uridine	20	2.34 (1.14-4.82)	2.104E-02	1.48 (0.28-7.82)	6.424E-01	3.38 (1.04-10.97)	4.283E-02
Lung adenocarcinoma	gamma-glutamylglutamate	10	1.03 (0-1.06)	4.409E-02	1.06 (1.001-1.13)	4.551E-02	1.02 (0.97-1.06)	4.717E-01
Lung adenocarcinoma	gamma-glutamylisoleucine	19	0.82 (0.68-0.98)	2.695E-02	1.04 (0.74-1.48)	8.076E-01	0.86 (0.59-1.26)	4.389E-01
Lung adenocarcinoma	leucylleucine	6	1.31 (1.04-1.66)	2.291E-02	1.30 (0.83-2.03)	2.481E-01	1.35 (0.92-1.97)	1.267E-01
Lung adenocarcinoma	leucylalanine	27	1.27 (1.02-1.57)	3.233E-02	1.87 (0.93-3.76)	8.145E-02	1.31 (0.96-1.79)	8.758E-02
Lung adenocarcinoma	2-methoxyacetaminophen sulfate	256	1.03 (1-1.06)	4.409E-02	1.06 (1.001-1.13)	4.551E-02	1.02 (0.97-1.06)	4.717E-01
Lung adenocarcinoma	3-methylxanthine	13	0.82 (0.68-0.98)	2.695E-02	1.04 (0.74-1.18)	8.076E-01	0.86 (0.59-1.26)	4.389E-01
Lung adenocarcinoma	stachydrine	7	1.12 (1.01-1.24)	2.845E-02	1.30 (1.02-1.64)	3.614E-02	1.08 (0.92-1.26)	3.612E-01
Lung adenocarcinoma	vanillin	9	1.43 (1.04-1.98)	2.971E-02	1.16 (0.43-3.10)	7.706E-01	1.61 (1.02-2.54)	3.889E-02
Lung cancer	2-methylbutyroylcarnitine	100	0.59 (0.50-0.70)	1.984E-09	1.60 (1.08-2.36)	1.911E-02	0.85 (0.66-1.09)	2.025E-01
Lung cancer	indolelactate	18	0.80 (0.64-0.98)	4.673E-02	0.60 (0.42-0.87)	8.044E-03	0.79 (0.50-1.24)	3.042E-01
Lung cancer	arabinose	5	1.2 (1-1.45)	4.965E-02	1.20 (0.88-1.63)	2.653E-01	1.21 (0.90-1.63)	1.988E-01
Lung cancer	pyridoxate	5	1.30 (1.06-1.60)	1.148E-02	1.46 (0.94-0.28)	9.754E-02	1.16 (0.84-1.59)	3.576E-01
Lung cancer	1-icosatrienoylglycerophosphocholine	19	0.74 (0.60-0.93)	8.063E-03	0.56 (0.35-0.89)	1.692E-02	0.79 (0.57-1.10)	1.718E-01
Lung cancer	2-hydroxyglutarate	11	1.34 (1.01-1.77)	4.152E-02	1.20 (0.59-2.44)	6.256E-01	1.34 (0.89-2.01)	1.558E-01
Lung cancer	7-alpha-hydroxy-3-oxo-4-cholestenoate (7-Hoca)	14	1.45 (1.06-1.97)	1.835E-02	1.30 (0.74-2.26)	3.625E-01	1.45 (1.06-2.00)	1.835E-02
Lung cancer	androsterone sulfate	19	1.11 (1.00-1.23)	4.173E-02	1.10 (0.92-1.30)	2.893E-01	1.18 (1.01-1.36)	3.120E-02
Lung cancer	heptanoate (7:0)	34	0.68 (0.49-0.94)	2.070E-02	0.46 (0.18-1.17)	1.057E-01	0.55 (0.33-0.91)	1.895E-02

Lung cancer	pseudouridine	24	0.50 (0.30-0.83)	7.024E-03	0.72 (0.17-3.06)	6.536E-01	0.65 (0.31-1.34)	2.394E-01
Lung cancer	phenylalanylphenylalanine	4	0.73 (0.54-0.99)	4.231E-02	0.52 (0.25-1.11)	9.903E-02	0.80 (0.51-1.25)	3.256E-01
Lung cancer	leucylalanine	19	1.16 (1.01-1.32)	3.103E-02	1.70 (1.11-2.61)	1.759E-02	1.37 (1.12-1.66)	1.971E-03
Ovarian cancer	2-aminobutyrate	41	0.78 (0.61-0.99)	3.827E-02	0.77 (0.47-1.24)	2.838E-01	0.80 (0.54-1.20)	2.821E-01
Ovarian cancer	2-methylbutyrylcarnitine	100	0.77 (0.68-0.86)	2.995E-06	1.17 (0.90-1.53)	2.448E-01	0.63 (0.52-0.75)	4.771E-07
Ovarian cancer	3-phenylpropionate (hydrocinnamate)	15	0.92 (0.85-0.99)	3.528E-02	0.92 (0.82-1.04)	1.761E-01	0.94 (0.82-1.07)	3.592E-01
Ovarian cancer	N-acetylthreonine	12	1.28 (1.004-1.64)	4.587E-02	1.49 (0.84-2.65)	1.768E-01	1.62 (1.14-2.32)	7.836E-03
Ovarian cancer	butyrylcarnitine	20	1.14 (1.002-1.29)	4.540E-02	1.28 (0.99-1.65)	5.884E-02	1.23 (1.03-1.48)	2.619E-02
Ovarian cancer	hexanoylcarnitine	16	1.20 (1.02-1.41)	2.922E-02	1.12 (0.79-1.58)	5.300E-01	1.27 (0.95-1.70)	1.090E-01
Ovarian cancer	bradykinin, des-arg (9)	26	0.83 (0.71-0.96)	1.571E-02	0.82 (0.64-1.05)	1.218E-01	0.80 (0.62-1.03)	8.016E-02
Ovarian cancer	gamma-glutamylisoleucine	19	1.40 (1.16-1.69)	4.092E-04	1.18 (0.80-1.74)	4.098E-01	1.33 (0.99-1.79)	5.697E-02
Ovarian cancer	pro-hydroxy-pro	19	1.23 (1.002-1.50)	4.678E-02	1.28 (0.76-2.15)	3.501E-01	1.20 (0.89-1.61)	2.345E-01
Ovarian cancer	leucylalanine	17	0.96 (0.93-0.99)	6.982E-03	0.92 (0.85-0.99)	3.346E-02	0.95 (0.91-0.995)	3.206E-02
Ovarian cancer	ibuprofen	102	0.96 (0.93-0.99)	6.982E-03	0.92 (0.85-0.99)	3.346E-02	0.95 (0.91-0.995)	3.206E-02
Ovarian cancer	quininate	6	0.90 (0.82-0.998)	4.608E-02	0.98 (0.75-1.27)	8.645E-01	0.89 (0.79-1.002)	5.552E-02
Ovarian cancer	stachydrine	6	0.96 (0.93-0.99)	5.721E-03	0.93 (0.81-1.06)	2.742E-01	0.91 (0.84-0.98)	1.340E-02
Squamous cell lung cancer	2-methylbutyrylcarnitine	100	0.78 (0.63-0.98)	3.321E-02	1.97 (1.17-3.32)	1.122E-02	1.28 (0.89-1.84)	1.787E-01
Squamous cell lung cancer	1,5-anhydroglucitol (1,5-AG)	27	1.48 (0.50-2.08)	2.487E-02	1.13 (0.59-2.19)	7.062E-01	1.40 (0.83-2.37)	2.004E-01
Squamous cell lung cancer	alpha-tocopherol	11	0.56 (0.36-0.88)	1.152E-02	0.45 (0.17-1.23)	1.255E-01	0.54 (0.28-1.03)	6.165E-02
Squamous cell lung cancer	1-arachidonoylglycerophosphoethanolamine	21	1.56 (1.07-2.29)	2.128E-02	1.73 (0.74-4.06)	2.105E-01	1.36 (0.72-2.57)	3.398E-01
Squamous cell lung cancer	1-eicosatrienoylglycerophosphocholine	19	0.62 (0.44-0.87)	5.381E-03	0.41 (0.20-0.93)	1.629E-02	0.50 (0.30-0.84)	9.062E-03
Squamous cell lung cancer	1-palmitoylglycerophosphocholine	32	0.53 (0.29-0.97)	3.999E-02	1.61 (0.24-10.8)	6.231E-01	0.60 (0.24-1.53)	2.877E-01
Squamous cell lung cancer	octanoylcarnitine	16	0.74 (0.55-0.98)	3.797E-02	0.53 (0.29-0.95)	3.636E-02	0.58 (0.36-0.92)	2.046E-02
Squamous cell lung cancer	pseudouridine	24	0.46 (0.22-0.97)	4.233E-02	0.71 (0.08-5.96)	7.513E-01	0.33 (0.11-1.009)	5.195E-02
Squamous cell lung cancer	xanthine	8	0.56 (0.33-0.94)	2.998E-02	0.56 (0.13-2.38)	4.377E-01	0.54 (0.25-1.17)	1.176E-01
Squamous cell lung cancer	gamma-glutamylisoleucine	27	1.59 (1.08-2.35)	1.879E-02	3.41 (1.51-7.70)	3.897E-03	1.66 (0.95-2.89)	7.485E-02
Squamous cell lung cancer	gamma-glutamylglutamate	10	1.04 (1.005-1.07)	1.912E-02	1.13 (1.06-1.20)	1.172E-04	1.04 (0.99-1.08)	1.009E-01
Squamous cell lung cancer	2-methoxyacetaminophen sulfate	256	1.04 (1.005-1.07)	1.912E-02	1.13 (1.06-1.20)	1.172E-04	1.04 (0.99-1.08)	1.009E-01
Squamous cell lung cancer	N- (2-furoyl)glycine	23	0.92 (0.86-0.995)	3.829E-02	0.83 (0.71-0.96)	1.358E-02	0.97 (0.87-1.08)	5.427E-01

Table S12 Summary statistics for the associations of the 2-methylbutyroylcarnitine-associated SNPs with these exposures and lung cancer in International Lung Cancer Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
2-methylbutyroylcarnitine	rs1003533	5	T	C	0.0125	0.0027	2.330E-06	0.0031	0.0218	8.886E-01
2-methylbutyroylcarnitine	rs10139470	14	T	G	-0.0156	0.0032	1.470E-06	0.0080	0.0231	7.319E-01
2-methylbutyroylcarnitine	rs1016988	5	T	C	-0.0125	0.0027	2.510E-06	0.0046	0.0218	8.352E-01
2-methylbutyroylcarnitine	rs10484836	6	T	C	0.0208	0.0044	2.980E-06	-0.0524	0.0351	1.715E-01
2-methylbutyroylcarnitine	rs10740761	10	A	C	-0.0124	0.0026	2.660E-06	0.0119	0.0214	5.919E-01
2-methylbutyroylcarnitine	rs10866705	5	A	C	-0.0133	0.0026	3.470E-07	0.0300	0.0197	1.482E-01
2-methylbutyroylcarnitine	rs10896604	11	A	G	0.0162	0.0037	8.900E-06	0.0096	0.0283	7.383E-01
2-methylbutyroylcarnitine	rs11006251	10	T	C	0.0129	0.0027	1.550E-06	0.0374	0.0219	1.086E-01
2-methylbutyroylcarnitine	rs11006260	10	A	C	0.0120	0.0027	5.670E-06	0.0245	0.0216	2.776E-01
2-methylbutyroylcarnitine	rs11057695	12	T	C	0.0291	0.0062	2.790E-06	-0.0171	0.0355	6.486E-01
2-methylbutyroylcarnitine	rs11639506	16	A	G	-0.0340	0.0075	5.690E-06	-0.0185	0.0416	6.759E-01
2-methylbutyroylcarnitine	rs11753995	6	A	G	-0.0165	0.0034	1.100E-06	-0.0410	0.0233	9.995E-02
2-methylbutyroylcarnitine	rs11758111	6	T	C	-0.0154	0.0035	9.720E-06	0.0213	0.0276	4.427E-01
2-methylbutyroylcarnitine	rs12477840	2	T	C	0.0122	0.0027	5.890E-06	0.0124	0.0231	5.948E-01
2-methylbutyroylcarnitine	rs12777552	10	T	C	-0.0124	0.0026	2.370E-06	0.0115	0.0214	6.029E-01
2-methylbutyroylcarnitine	rs12929328	16	C	G	-0.0206	0.0046	8.890E-06	0.0028	0.0247	9.102E-01
2-methylbutyroylcarnitine	rs1447059	7	A	G	-0.0115	0.0025	7.060E-06	0.0127	0.0187	4.997E-01
2-methylbutyroylcarnitine	rs1447060	7	A	G	-0.0115	0.0025	7.070E-06	0.0136	0.0187	4.684E-01
2-methylbutyroylcarnitine	rs156322	5	T	C	-0.0114	0.0026	9.190E-06	0.0266	0.0187	1.734E-01
2-methylbutyroylcarnitine	rs1564348	6	T	C	0.0158	0.0034	2.870E-06	-0.0419	0.0233	9.185E-02
2-methylbutyroylcarnitine	rs1596972	7	A	G	-0.0117	0.0025	3.820E-06	0.0093	0.0180	6.096E-01
2-methylbutyroylcarnitine	rs17098575	12	A	C	-0.0270	0.0056	1.540E-06	-0.0107	0.0352	7.718E-01
2-methylbutyroylcarnitine	rs17098581	12	C	G	-0.0267	0.0059	5.200E-06	-0.0015	0.0350	9.678E-01
2-methylbutyroylcarnitine	rs17145256	10	A	G	0.0312	0.0069	6.580E-06	0.0563	0.0570	3.226E-01
2-methylbutyroylcarnitine	rs17435220	10	T	C	-0.0310	0.0069	7.940E-06	0.0527	0.0566	3.527E-01
2-methylbutyroylcarnitine	rs1838932	7	T	C	-0.0128	0.0026	5.070E-07	0.0154	0.0200	4.413E-01
2-methylbutyroylcarnitine	rs183898	5	C	G	-0.0123	0.0026	1.840E-06	-0.0265	0.0187	1.744E-01
2-methylbutyroylcarnitine	rs1981524	5	T	C	0.0123	0.0027	3.530E-06	0.0043	0.0219	8.460E-01
2-methylbutyroylcarnitine	rs2367533	7	T	C	0.0263	0.0059	8.010E-06	0.0873	0.0470	5.263E-02
2-methylbutyroylcarnitine	rs2410833	3	T	C	-0.0237	0.0053	8.270E-06	-0.0386	0.0309	2.435E-01
2-methylbutyroylcarnitine	rs2552122	8	A	C	0.0115	0.0026	6.290E-06	0.0146	0.0198	4.768E-01
2-methylbutyroylcarnitine	rs2631362	5	A	G	-0.0119	0.0026	4.120E-06	-0.0265	0.0187	1.751E-01
2-methylbutyroylcarnitine	rs2631370	5	T	C	-0.0121	0.0025	1.790E-06	-0.0481	0.0174	9.558E-03

2-methylbutyroylcarnitine	rs2631372	5	C	G	0.0124	0.0026	2.010E-06	-0.0272	0.0187	1.630E-01
2-methylbutyroylcarnitine	rs2665348	14	A	C	-0.0123	0.0027	7.010E-06	0.0350	0.0218	1.300E-01
2-methylbutyroylcarnitine	rs270601	5	T	C	0.0124	0.0026	1.380E-06	0.0273	0.0187	1.634E-01
2-methylbutyroylcarnitine	rs270602	5	T	C	0.0123	0.0025	1.090E-06	0.0444	0.0175	1.691E-02
2-methylbutyroylcarnitine	rs270605	5	T	C	-0.0124	0.0025	8.400E-07	0.0482	0.0174	9.349E-03
2-methylbutyroylcarnitine	rs270606	5	A	G	0.0123	0.0026	1.680E-06	0.0265	0.0187	1.741E-01
2-methylbutyroylcarnitine	rs270607	5	A	G	0.0123	0.0026	1.680E-06	0.0244	0.0186	2.093E-01
2-methylbutyroylcarnitine	rs270613	5	A	G	0.0124	0.0025	1.070E-06	0.0468	0.0174	1.158E-02
2-methylbutyroylcarnitine	rs272842	5	A	G	0.0128	0.0025	5.130E-07	0.0480	0.0174	9.690E-03
2-methylbutyroylcarnitine	rs272865	5	A	T	-0.0117	0.0025	3.980E-06	0.0441	0.0175	1.771E-02
2-methylbutyroylcarnitine	rs272867	5	A	G	-0.0123	0.0025	1.040E-06	0.0478	0.0174	9.936E-03
2-methylbutyroylcarnitine	rs272868	5	C	G	0.0126	0.0026	9.130E-07	0.0259	0.0187	1.841E-01
2-methylbutyroylcarnitine	rs272869	5	A	G	0.0123	0.0025	1.020E-06	0.0441	0.0175	1.772E-02
2-methylbutyroylcarnitine	rs272872	5	A	G	0.0125	0.0026	1.180E-06	0.0259	0.0187	1.850E-01
2-methylbutyroylcarnitine	rs272874	5	T	C	-0.0116	0.0026	6.900E-06	0.0441	0.0175	1.783E-02
2-methylbutyroylcarnitine	rs272875	5	T	C	0.0124	0.0025	1.020E-06	0.0480	0.0174	9.645E-03
2-methylbutyroylcarnitine	rs272878	5	T	C	0.0126	0.0026	9.950E-07	0.0259	0.0187	1.851E-01
2-methylbutyroylcarnitine	rs272879	5	C	G	0.0124	0.0025	1.010E-06	0.0480	0.0174	9.645E-03
2-methylbutyroylcarnitine	rs272880	5	T	C	-0.0126	0.0026	9.330E-07	0.0255	0.0187	1.908E-01
2-methylbutyroylcarnitine	rs272881	5	A	G	-0.0124	0.0025	1.010E-06	0.0473	0.0174	1.076E-02
2-methylbutyroylcarnitine	rs272882	5	T	G	-0.0126	0.0026	9.520E-07	0.0259	0.0187	1.850E-01
2-methylbutyroylcarnitine	rs272883	5	A	G	0.0126	0.0026	9.620E-07	0.0265	0.0187	1.745E-01
2-methylbutyroylcarnitine	rs272886	5	T	C	0.0123	0.0025	1.230E-06	0.0475	0.0174	1.048E-02
2-methylbutyroylcarnitine	rs272887	5	A	G	0.0124	0.0026	1.360E-06	0.0249	0.0187	2.016E-01
2-methylbutyroylcarnitine	rs272888	5	T	C	0.0124	0.0026	1.360E-06	0.0257	0.0187	1.880E-01
2-methylbutyroylcarnitine	rs272889	5	A	G	0.0123	0.0025	1.080E-06	0.0437	0.0175	1.878E-02
2-methylbutyroylcarnitine	rs272892	5	T	C	-0.0124	0.0026	1.360E-06	0.0257	0.0187	1.880E-01
2-methylbutyroylcarnitine	rs272893	5	T	C	0.0123	0.0025	1.080E-06	0.0434	0.0175	1.945E-02
2-methylbutyroylcarnitine	rs273901	5	T	G	-0.0124	0.0026	1.520E-06	0.0254	0.0187	1.927E-01
2-methylbutyroylcarnitine	rs273911	5	C	G	0.0124	0.0026	1.360E-06	0.0254	0.0187	1.936E-01
2-methylbutyroylcarnitine	rs273912	5	T	G	-0.0124	0.0026	1.630E-06	0.0257	0.0187	1.888E-01
2-methylbutyroylcarnitine	rs273913	5	T	C	0.0116	0.0025	4.700E-06	0.0471	0.0174	1.119E-02
2-methylbutyroylcarnitine	rs273914	5	A	T	0.0131	0.0025	2.070E-07	0.0478	0.0174	9.936E-03
2-methylbutyroylcarnitine	rs273915	5	C	G	-0.0124	0.0026	1.370E-06	0.0260	0.0187	1.836E-01
2-methylbutyroylcarnitine	rs273916	5	A	C	-0.0124	0.0026	1.370E-06	0.0260	0.0187	1.835E-01
2-methylbutyroylcarnitine	rs274546	5	A	G	0.0121	0.0025	1.590E-06	0.0457	0.0175	1.410E-02
2-methylbutyroylcarnitine	rs274557	5	T	C	-0.0118	0.0025	3.420E-06	-0.0477	0.0175	1.083E-02

2-methylbutyroylcarnitine	rs274558	5	A	G	-0.0118	0.0025	3.430E-06	-0.0475	0.0175	1.120E-02
2-methylbutyroylcarnitine	rs274559	5	A	G	-0.0117	0.0026	4.170E-06	-0.0478	0.0175	1.072E-02
2-methylbutyroylcarnitine	rs274560	5	T	C	-0.0119	0.0025	2.430E-06	-0.0451	0.0176	1.607E-02
2-methylbutyroylcarnitine	rs274561	5	A	C	0.0119	0.0025	2.220E-06	-0.0448	0.0176	1.676E-02
2-methylbutyroylcarnitine	rs274567	5	T	C	0.0121	0.0025	1.710E-06	-0.0455	0.0175	1.465E-02
2-methylbutyroylcarnitine	rs274570	5	T	C	0.0127	0.0026	1.170E-06	-0.0265	0.0187	1.747E-01
2-methylbutyroylcarnitine	rs3778129	6	A	G	-0.0182	0.0041	9.910E-06	0.0213	0.0277	4.434E-01
2-methylbutyroylcarnitine	rs4074995	5	A	G	0.0123	0.0026	1.770E-06	-0.0178	0.0196	3.820E-01
2-methylbutyroylcarnitine	rs4075958	5	A	G	0.0124	0.0026	1.920E-06	-0.0193	0.0195	3.397E-01
2-methylbutyroylcarnitine	rs419291	5	T	C	0.0123	0.0025	1.330E-06	0.0443	0.0175	1.759E-02
2-methylbutyroylcarnitine	rs456598	6	A	G	-0.0155	0.0035	7.090E-06	-0.0569	0.0250	3.595E-02
2-methylbutyroylcarnitine	rs4626843	1	A	G	0.0292	0.0065	7.390E-06	-0.0061	0.0460	8.997E-01
2-methylbutyroylcarnitine	rs4648860	1	T	C	0.0124	0.0027	4.720E-06	-0.0419	0.0215	6.738E-02
2-methylbutyroylcarnitine	rs4719207	7	T	C	-0.0140	0.0030	3.060E-06	-0.0334	0.0204	1.215E-01
2-methylbutyroylcarnitine	rs4730501	7	A	G	-0.0121	0.0026	4.180E-06	-0.0197	0.0204	3.538E-01
2-methylbutyroylcarnitine	rs4732399	7	A	G	-0.0311	0.0070	8.690E-06	0.0826	0.0478	7.285E-02
2-methylbutyroylcarnitine	rs4948546	10	A	G	-0.0125	0.0026	2.370E-06	0.0118	0.0214	5.942E-01
2-methylbutyroylcarnitine	rs6575209	14	T	C	0.0120	0.0026	5.100E-06	0.0002	0.0222	9.944E-01
2-methylbutyroylcarnitine	rs662138	6	C	G	0.0187	0.0034	3.650E-08	-0.0470	0.0226	5.262E-02
2-methylbutyroylcarnitine	rs671473	5	A	C	0.0122	0.0026	2.130E-06	-0.0265	0.0187	1.748E-01
2-methylbutyroylcarnitine	rs6764615	3	C	G	0.0159	0.0033	2.170E-06	0.0487	0.0251	4.665E-02
2-methylbutyroylcarnitine	rs7081819	10	A	G	0.0120	0.0027	5.630E-06	0.0267	0.0215	2.366E-01
2-methylbutyroylcarnitine	rs7087186	10	C	G	0.0126	0.0027	2.230E-06	0.0256	0.0219	2.636E-01
2-methylbutyroylcarnitine	rs715	2	T	C	0.0123	0.0026	2.400E-06	-0.0066	0.0201	7.514E-01
2-methylbutyroylcarnitine	rs7903712	10	C	G	0.0127	0.0027	1.650E-06	0.0186	0.0218	4.130E-01
2-methylbutyroylcarnitine	rs7920393	10	A	G	0.0120	0.0027	6.050E-06	0.0251	0.0215	2.664E-01
2-methylbutyroylcarnitine	rs7946997	11	T	C	-0.0123	0.0026	2.970E-06	0.0116	0.0204	5.717E-01
2-methylbutyroylcarnitine	rs9416742	10	A	G	0.0120	0.0027	5.640E-06	-0.0244	0.0216	2.810E-01
2-methylbutyroylcarnitine	rs9492253	6	A	G	-0.0119	0.0027	8.620E-06	0.0081	0.0221	7.190E-01
2-methylbutyroylcarnitine	rs9641894	7	T	G	-0.0117	0.0025	4.130E-06	0.0086	0.0182	6.398E-01
2-methylbutyroylcarnitine	rs9642829	8	A	G	-0.0346	0.0075	3.610E-06	0.0487	0.0609	4.284E-01
2-methylbutyroylcarnitine	rs9839755	3	T	C	0.0152	0.0034	7.620E-06	0.0493	0.0253	4.595E-02
2-methylbutyroylcarnitine	rs999845	10	T	C	0.0121	0.0027	4.870E-06	0.0240	0.0216	2.891E-01
2-methylbutyroylcarnitine	rs999846	10	A	G	0.0120	0.0027	5.710E-06	0.0234	0.0216	3.007E-01

Table S13 Summary statistics for the associations of the 2-methylbutyroylcarnitine-associated SNPs with these exposures and breast cancer in Breast Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
2-methylbutyroylcarnitine	rs1003533	5	T	C	0.0125	0.0027	2.330E-06	-0.0140	0.0077	7.144E-02
2-methylbutyroylcarnitine	rs10139470	14	T	G	-0.0156	0.0032	1.470E-06	0.0235	0.0078	2.784E-03
2-methylbutyroylcarnitine	rs1016988	5	T	C	-0.0125	0.0027	2.510E-06	-0.0131	0.0078	9.208E-02
2-methylbutyroylcarnitine	rs10484836	6	T	C	0.0208	0.0044	2.980E-06	0.0107	0.0167	5.213E-01
2-methylbutyroylcarnitine	rs10866705	5	A	C	-0.0133	0.0026	3.470E-07	0.0009	0.0077	9.067E-01
2-methylbutyroylcarnitine	rs11006251	10	T	C	0.0129	0.0027	1.550E-06	0.0226	0.0091	1.339E-02
2-methylbutyroylcarnitine	rs11006260	10	A	C	0.0120	0.0027	5.670E-06	0.0175	0.0090	5.207E-02
2-methylbutyroylcarnitine	rs11753995	6	A	G	-0.0165	0.0034	1.100E-06	-0.0036	0.0084	6.649E-01
2-methylbutyroylcarnitine	rs11758111	6	T	C	-0.0154	0.0035	9.720E-06	0.0168	0.0095	7.628E-02
2-methylbutyroylcarnitine	rs12477840	2	T	C	0.0122	0.0027	5.890E-06	-0.0013	0.0082	8.728E-01
2-methylbutyroylcarnitine	rs12777552	10	T	C	-0.0124	0.0026	2.370E-06	0.0155	0.0088	7.877E-02
2-methylbutyroylcarnitine	rs12929328	16	C	G	-0.0206	0.0046	8.890E-06	0.0003	0.0087	9.728E-01
2-methylbutyroylcarnitine	rs1447059	7	A	G	-0.0115	0.0025	7.060E-06	-0.0129	0.0069	6.384E-02
2-methylbutyroylcarnitine	rs1447060	7	A	G	-0.0115	0.0025	7.070E-06	-0.0123	0.0069	7.527E-02
2-methylbutyroylcarnitine	rs156322	5	T	C	-0.0114	0.0026	9.190E-06	0.0262	0.0067	9.460E-05
2-methylbutyroylcarnitine	rs1564348	6	T	C	0.0158	0.0034	2.870E-06	-0.0044	0.0084	5.998E-01
2-methylbutyroylcarnitine	rs1596972	7	A	G	-0.0117	0.0025	3.820E-06	-0.0169	0.0068	1.325E-02
2-methylbutyroylcarnitine	rs17145256	10	A	G	0.0312	0.0069	6.580E-06	0.0653	0.0186	4.529E-04
2-methylbutyroylcarnitine	rs17435220	10	T	C	-0.0310	0.0069	7.940E-06	0.0655	0.0187	4.601E-04
2-methylbutyroylcarnitine	rs1838932	7	T	C	-0.0128	0.0026	5.070E-07	-0.0098	0.0072	1.757E-01
2-methylbutyroylcarnitine	rs183898	5	C	G	-0.0123	0.0026	1.840E-06	-0.0257	0.0067	1.229E-04
2-methylbutyroylcarnitine	rs1981524	5	T	C	0.0123	0.0027	3.530E-06	-0.0138	0.0078	7.521E-02
2-methylbutyroylcarnitine	rs2367533	7	T	C	0.0263	0.0059	8.010E-06	0.0061	0.0150	6.826E-01
2-methylbutyroylcarnitine	rs2410833	3	T	C	-0.0237	0.0053	8.270E-06	0.0173	0.0110	1.159E-01
2-methylbutyroylcarnitine	rs2552122	8	A	C	0.0115	0.0026	6.290E-06	-0.0121	0.0068	7.604E-02
2-methylbutyroylcarnitine	rs2631362	5	A	G	-0.0119	0.0026	4.120E-06	-0.0256	0.0067	1.324E-04
2-methylbutyroylcarnitine	rs2631370	5	T	C	-0.0121	0.0025	1.790E-06	-0.0221	0.0063	4.865E-04
2-methylbutyroylcarnitine	rs2631372	5	C	G	0.0124	0.0026	2.010E-06	-0.0264	0.0067	7.910E-05
2-methylbutyroylcarnitine	rs2665348	14	A	C	-0.0123	0.0027	7.010E-06	-0.0212	0.0081	8.982E-03
2-methylbutyroylcarnitine	rs270601	5	T	C	0.0124	0.0026	1.380E-06	0.0259	0.0067	1.108E-04
2-methylbutyroylcarnitine	rs270602	5	T	C	0.0123	0.0025	1.090E-06	0.0213	0.0063	8.047E-04
2-methylbutyroylcarnitine	rs270605	5	T	C	-0.0124	0.0025	8.400E-07	0.0221	0.0063	4.737E-04

2-methylbutyroylcarnitine	rs270606	5	A	G	0.0123	0.0026	1.680E-06	0.0258	0.0067	1.190E-04
2-methylbutyroylcarnitine	rs270607	5	A	G	0.0123	0.0026	1.680E-06	0.0250	0.0067	1.770E-04
2-methylbutyroylcarnitine	rs270613	5	A	G	0.0124	0.0025	1.070E-06	0.0241	0.0064	1.568E-04
2-methylbutyroylcarnitine	rs272842	5	A	G	0.0128	0.0025	5.130E-07	0.0220	0.0063	5.055E-04
2-methylbutyroylcarnitine	rs272865	5	A	T	-0.0117	0.0025	3.980E-06	0.0221	0.0063	4.851E-04
2-methylbutyroylcarnitine	rs272867	5	A	G	-0.0123	0.0025	1.040E-06	0.0221	0.0063	4.804E-04
2-methylbutyroylcarnitine	rs272868	5	C	G	0.0126	0.0026	9.130E-07	0.0260	0.0067	1.024E-04
2-methylbutyroylcarnitine	rs272869	5	A	G	0.0123	0.0025	1.020E-06	0.0215	0.0063	7.085E-04
2-methylbutyroylcarnitine	rs272872	5	A	G	0.0125	0.0026	1.180E-06	0.0259	0.0067	1.137E-04
2-methylbutyroylcarnitine	rs272874	5	T	C	-0.0116	0.0026	6.900E-06	0.0214	0.0064	7.477E-04
2-methylbutyroylcarnitine	rs272875	5	T	C	0.0124	0.0025	1.020E-06	0.0221	0.0063	4.734E-04
2-methylbutyroylcarnitine	rs272878	5	T	C	0.0126	0.0026	9.950E-07	0.0259	0.0067	1.123E-04
2-methylbutyroylcarnitine	rs272879	5	C	G	0.0124	0.0025	1.010E-06	0.0221	0.0063	4.892E-04
2-methylbutyroylcarnitine	rs272880	5	T	C	-0.0126	0.0026	9.330E-07	0.0256	0.0067	1.322E-04
2-methylbutyroylcarnitine	rs272881	5	A	G	-0.0124	0.0025	1.010E-06	0.0220	0.0063	5.144E-04
2-methylbutyroylcarnitine	rs272882	5	T	G	-0.0126	0.0026	9.520E-07	0.0259	0.0067	1.113E-04
2-methylbutyroylcarnitine	rs272883	5	A	G	0.0126	0.0026	9.620E-07	0.0259	0.0067	1.108E-04
2-methylbutyroylcarnitine	rs272886	5	T	C	0.0123	0.0025	1.230E-06	0.0220	0.0063	4.903E-04
2-methylbutyroylcarnitine	rs272887	5	A	G	0.0124	0.0026	1.360E-06	0.0258	0.0067	1.195E-04
2-methylbutyroylcarnitine	rs272888	5	T	C	0.0124	0.0026	1.360E-06	0.0257	0.0067	1.218E-04
2-methylbutyroylcarnitine	rs272889	5	A	G	0.0123	0.0025	1.080E-06	0.0213	0.0063	7.900E-04
2-methylbutyroylcarnitine	rs272892	5	T	C	-0.0124	0.0026	1.360E-06	0.0259	0.0067	1.089E-04
2-methylbutyroylcarnitine	rs272893	5	T	C	0.0123	0.0025	1.080E-06	0.0214	0.0063	7.435E-04
2-methylbutyroylcarnitine	rs273901	5	T	G	-0.0124	0.0026	1.520E-06	0.0261	0.0067	9.840E-05
2-methylbutyroylcarnitine	rs273911	5	C	G	0.0124	0.0026	1.360E-06	0.0256	0.0067	1.326E-04
2-methylbutyroylcarnitine	rs273912	5	T	G	-0.0124	0.0026	1.630E-06	0.0257	0.0067	1.219E-04
2-methylbutyroylcarnitine	rs273913	5	T	C	0.0116	0.0025	4.700E-06	0.0219	0.0063	5.388E-04
2-methylbutyroylcarnitine	rs273914	5	A	T	0.0131	0.0025	2.070E-07	0.0220	0.0063	5.155E-04
2-methylbutyroylcarnitine	rs273915	5	C	G	-0.0124	0.0026	1.370E-06	0.0260	0.0067	1.053E-04
2-methylbutyroylcarnitine	rs273916	5	A	C	-0.0124	0.0026	1.370E-06	0.0259	0.0067	1.105E-04
2-methylbutyroylcarnitine	rs274546	5	A	G	0.0121	0.0025	1.590E-06	0.0215	0.0064	7.054E-04
2-methylbutyroylcarnitine	rs274557	5	T	C	-0.0118	0.0025	3.420E-06	-0.0220	0.0063	5.174E-04
2-methylbutyroylcarnitine	rs274558	5	A	G	-0.0118	0.0025	3.430E-06	-0.0220	0.0063	5.164E-04
2-methylbutyroylcarnitine	rs274559	5	A	G	-0.0117	0.0026	4.170E-06	-0.0220	0.0063	5.020E-04
2-methylbutyroylcarnitine	rs274560	5	T	C	-0.0119	0.0025	2.430E-06	-0.0217	0.0064	6.365E-04
2-methylbutyroylcarnitine	rs274561	5	A	C	0.0119	0.0025	2.220E-06	-0.0215	0.0064	7.341E-04
2-methylbutyroylcarnitine	rs274567	5	T	C	0.0121	0.0025	1.710E-06	-0.0227	0.0064	3.561E-04

2-methylbutyroylcarnitine	rs274570	5	T	C	0.0127	0.0026	1.170E-06	-0.0255	0.0067	1.455E-04
2-methylbutyroylcarnitine	rs3778129	6	A	G	-0.0182	0.0041	9.910E-06	0.0169	0.0094	7.163E-02
2-methylbutyroylcarnitine	rs4074995	5	A	G	0.0123	0.0026	1.770E-06	0.0055	0.0074	4.570E-01
2-methylbutyroylcarnitine	rs4075958	5	A	G	0.0124	0.0026	1.920E-06	0.0055	0.0075	4.625E-01
2-methylbutyroylcarnitine	rs419291	5	T	C	0.0123	0.0025	1.330E-06	0.0237	0.0064	2.182E-04
2-methylbutyroylcarnitine	rs456598	6	A	G	-0.0155	0.0035	7.090E-06	0.0033	0.0091	7.163E-01
2-methylbutyroylcarnitine	rs4626843	1	A	G	0.0292	0.0065	7.390E-06	-0.0056	0.0165	7.336E-01
2-methylbutyroylcarnitine	rs4648860	1	T	C	0.0124	0.0027	4.720E-06	-0.0077	0.0084	3.598E-01
2-methylbutyroylcarnitine	rs4719207	7	T	C	-0.0140	0.0030	3.060E-06	-0.0094	0.0074	2.013E-01
2-methylbutyroylcarnitine	rs4730501	7	A	G	-0.0121	0.0026	4.180E-06	0.0044	0.0076	5.609E-01
2-methylbutyroylcarnitine	rs4732399	7	A	G	-0.0311	0.0070	8.690E-06	-0.0004	0.0159	9.817E-01
2-methylbutyroylcarnitine	rs4948546	10	A	G	-0.0125	0.0026	2.370E-06	0.0155	0.0088	7.829E-02
2-methylbutyroylcarnitine	rs6575209	14	T	C	0.0120	0.0026	5.100E-06	0.0222	0.0078	4.457E-03
2-methylbutyroylcarnitine	rs662138	6	C	G	0.0187	0.0034	3.650E-08	0.0002	0.0082	9.824E-01
2-methylbutyroylcarnitine	rs6764615	3	C	G	0.0159	0.0033	2.170E-06	0.0145	0.0089	1.034E-01
2-methylbutyroylcarnitine	rs7081819	10	A	G	0.0120	0.0027	5.630E-06	0.0176	0.0090	5.032E-02
2-methylbutyroylcarnitine	rs7087186	10	C	G	0.0126	0.0027	2.230E-06	0.0202	0.0090	2.521E-02
2-methylbutyroylcarnitine	rs715	2	T	C	0.0123	0.0026	2.400E-06	0.0124	0.0070	7.437E-02
2-methylbutyroylcarnitine	rs7903712	10	C	G	0.0127	0.0027	1.650E-06	0.0170	0.0089	5.594E-02
2-methylbutyroylcarnitine	rs7920393	10	A	G	0.0120	0.0027	6.050E-06	0.0189	0.0090	3.530E-02
2-methylbutyroylcarnitine	rs7946997	11	T	C	-0.0123	0.0026	2.970E-06	0.0017	0.0068	8.035E-01
2-methylbutyroylcarnitine	rs9416742	10	A	G	0.0120	0.0027	5.640E-06	-0.0163	0.0092	7.562E-02
2-methylbutyroylcarnitine	rs9492253	6	A	G	-0.0119	0.0027	8.620E-06	0.0048	0.0077	5.320E-01
2-methylbutyroylcarnitine	rs9641894	7	T	G	-0.0117	0.0025	4.130E-06	-0.0162	0.0069	1.816E-02
2-methylbutyroylcarnitine	rs9642829	8	A	G	-0.0346	0.0075	3.610E-06	-0.0253	0.0221	2.512E-01
2-methylbutyroylcarnitine	rs9839755	3	T	C	0.0152	0.0034	7.620E-06	0.0158	0.0089	7.509E-02
2-methylbutyroylcarnitine	rs999845	10	T	C	0.0121	0.0027	4.870E-06	0.0187	0.0090	3.730E-02
2-methylbutyroylcarnitine	rs999846	10	A	G	0.0120	0.0027	5.710E-06	0.0187	0.0090	3.705E-02

Table S14 Summary statistics for the associations of the 2-methylbutyroylcarnitine-associated SNPs with these exposures and ovarian cancer in Ovarian Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
2-methylbutyroylcarnitine	rs1003533	5	T	C	0.0125	0.0027	2.330E-06	-0.0275	0.0164	9.451E-02
2-methylbutyroylcarnitine	rs10139470	14	T	G	-0.0156	0.0032	1.470E-06	0.0183	0.0158	2.455E-01
2-methylbutyroylcarnitine	rs1016988	5	T	C	-0.0125	0.0027	2.510E-06	-0.0268	0.0164	1.030E-01
2-methylbutyroylcarnitine	rs10484836	6	T	C	0.0208	0.0044	2.980E-06	-0.0056	0.0346	8.721E-01
2-methylbutyroylcarnitine	rs10740761	10	A	C	-0.0124	0.0026	2.660E-06	-0.0198	0.0171	2.471E-01
2-methylbutyroylcarnitine	rs10866705	5	A	C	-0.0133	0.0026	3.470E-07	-0.0017	0.0159	9.130E-01
2-methylbutyroylcarnitine	rs10896604	11	A	G	0.0162	0.0037	8.900E-06	-0.0199	0.0217	3.588E-01
2-methylbutyroylcarnitine	rs11006251	10	T	C	0.0129	0.0027	1.550E-06	-0.0131	0.0177	4.590E-01
2-methylbutyroylcarnitine	rs11006260	10	A	C	0.0120	0.0027	5.670E-06	-0.0163	0.0175	3.516E-01
2-methylbutyroylcarnitine	rs11639506	16	A	G	-0.0340	0.0075	5.690E-06	0.0609	0.0316	5.416E-02
2-methylbutyroylcarnitine	rs11753995	6	A	G	-0.0165	0.0034	1.100E-06	0.0153	0.0178	3.899E-01
2-methylbutyroylcarnitine	rs11758111	6	T	C	-0.0154	0.0035	9.720E-06	-0.0349	0.0202	8.388E-02
2-methylbutyroylcarnitine	rs12477840	2	T	C	0.0122	0.0027	5.890E-06	0.0089	0.0173	6.049E-01
2-methylbutyroylcarnitine	rs12777552	10	T	C	-0.0124	0.0026	2.370E-06	-0.0175	0.0171	3.080E-01
2-methylbutyroylcarnitine	rs12929328	16	C	G	-0.0206	0.0046	8.890E-06	0.0174	0.0178	3.286E-01
2-methylbutyroylcarnitine	rs1447059	7	A	G	-0.0115	0.0025	7.060E-06	-0.0027	0.0140	8.450E-01
2-methylbutyroylcarnitine	rs1447060	7	A	G	-0.0115	0.0025	7.070E-06	-0.0037	0.0140	7.898E-01
2-methylbutyroylcarnitine	rs156322	5	T	C	-0.0114	0.0026	9.190E-06	0.0131	0.0143	3.587E-01
2-methylbutyroylcarnitine	rs1564348	6	T	C	0.0158	0.0034	2.870E-06	0.0180	0.0179	3.148E-01
2-methylbutyroylcarnitine	rs1596972	7	A	G	-0.0117	0.0025	3.820E-06	-0.0033	0.0138	8.129E-01
2-methylbutyroylcarnitine	rs17145256	10	A	G	0.0312	0.0069	6.580E-06	0.0218	0.0401	5.870E-01
2-methylbutyroylcarnitine	rs17435220	10	T	C	-0.0310	0.0069	7.940E-06	0.0237	0.0401	5.549E-01
2-methylbutyroylcarnitine	rs1838932	7	T	C	-0.0128	0.0026	5.070E-07	0.0017	0.0148	9.074E-01
2-methylbutyroylcarnitine	rs183898	5	C	G	-0.0123	0.0026	1.840E-06	-0.0123	0.0143	3.906E-01
2-methylbutyroylcarnitine	rs1981524	5	T	C	0.0123	0.0027	3.530E-06	-0.0276	0.0164	9.358E-02
2-methylbutyroylcarnitine	rs2367533	7	T	C	0.0263	0.0059	8.010E-06	-0.0480	0.0315	1.273E-01
2-methylbutyroylcarnitine	rs2410833	3	T	C	-0.0237	0.0053	8.270E-06	0.0170	0.0235	4.694E-01
2-methylbutyroylcarnitine	rs2552122	8	A	C	0.0115	0.0026	6.290E-06	-0.0268	0.0144	6.238E-02
2-methylbutyroylcarnitine	rs2631362	5	A	G	-0.0119	0.0026	4.120E-06	-0.0122	0.0143	3.933E-01
2-methylbutyroylcarnitine	rs2631370	5	T	C	-0.0121	0.0025	1.790E-06	-0.0130	0.0135	3.381E-01
2-methylbutyroylcarnitine	rs2631372	5	C	G	0.0124	0.0026	2.010E-06	-0.0124	0.0143	3.878E-01
2-methylbutyroylcarnitine	rs2665348	14	A	C	-0.0123	0.0027	7.010E-06	-0.0113	0.0171	5.091E-01
2-methylbutyroylcarnitine	rs270601	5	T	C	0.0124	0.0026	1.380E-06	0.0124	0.0143	3.849E-01

2-methylbutyroylcarnitine	rs270602	5	T	C	0.0123	0.0025	1.090E-06	0.0097	0.0136	4.726E-01
2-methylbutyroylcarnitine	rs270605	5	T	C	-0.0124	0.0025	8.400E-07	0.0134	0.0135	3.206E-01
2-methylbutyroylcarnitine	rs270606	5	A	G	0.0123	0.0026	1.680E-06	0.0120	0.0143	4.024E-01
2-methylbutyroylcarnitine	rs270607	5	A	G	0.0123	0.0026	1.680E-06	0.0147	0.0142	3.037E-01
2-methylbutyroylcarnitine	rs270613	5	A	G	0.0124	0.0025	1.070E-06	0.0113	0.0137	4.090E-01
2-methylbutyroylcarnitine	rs272842	5	A	G	0.0128	0.0025	5.130E-07	0.0134	0.0135	3.236E-01
2-methylbutyroylcarnitine	rs272865	5	A	T	-0.0117	0.0025	3.980E-06	0.0134	0.0135	3.207E-01
2-methylbutyroylcarnitine	rs272867	5	A	G	-0.0123	0.0025	1.040E-06	0.0135	0.0135	3.186E-01
2-methylbutyroylcarnitine	rs272868	5	C	G	0.0126	0.0026	9.130E-07	0.0125	0.0143	3.818E-01
2-methylbutyroylcarnitine	rs272869	5	A	G	0.0123	0.0025	1.020E-06	0.0098	0.0136	4.716E-01
2-methylbutyroylcarnitine	rs272872	5	A	G	0.0125	0.0026	1.180E-06	0.0125	0.0143	3.829E-01
2-methylbutyroylcarnitine	rs272874	5	T	C	-0.0116	0.0026	6.900E-06	0.0098	0.0136	4.722E-01
2-methylbutyroylcarnitine	rs272875	5	T	C	0.0124	0.0025	1.020E-06	0.0136	0.0135	3.130E-01
2-methylbutyroylcarnitine	rs272878	5	T	C	0.0126	0.0026	9.950E-07	0.0126	0.0143	3.803E-01
2-methylbutyroylcarnitine	rs272879	5	C	G	0.0124	0.0025	1.010E-06	0.0135	0.0135	3.175E-01
2-methylbutyroylcarnitine	rs272880	5	T	C	-0.0126	0.0026	9.330E-07	0.0122	0.0143	3.954E-01
2-methylbutyroylcarnitine	rs272881	5	A	G	-0.0124	0.0025	1.010E-06	0.0134	0.0135	3.214E-01
2-methylbutyroylcarnitine	rs272882	5	T	G	-0.0126	0.0026	9.520E-07	0.0126	0.0143	3.803E-01
2-methylbutyroylcarnitine	rs272883	5	A	G	0.0126	0.0026	9.620E-07	0.0126	0.0143	3.790E-01
2-methylbutyroylcarnitine	rs272886	5	T	C	0.0123	0.0025	1.230E-06	0.0135	0.0135	3.179E-01
2-methylbutyroylcarnitine	rs272887	5	A	G	0.0124	0.0026	1.360E-06	0.0124	0.0143	3.855E-01
2-methylbutyroylcarnitine	rs272888	5	T	C	0.0124	0.0026	1.360E-06	0.0123	0.0143	3.912E-01
2-methylbutyroylcarnitine	rs272889	5	A	G	0.0123	0.0025	1.080E-06	0.0098	0.0136	4.694E-01
2-methylbutyroylcarnitine	rs272892	5	T	C	-0.0124	0.0026	1.360E-06	0.0125	0.0143	3.816E-01
2-methylbutyroylcarnitine	rs272893	5	T	C	0.0123	0.0025	1.080E-06	0.0099	0.0136	4.664E-01
2-methylbutyroylcarnitine	rs273901	5	T	G	-0.0124	0.0026	1.520E-06	0.0122	0.0143	3.927E-01
2-methylbutyroylcarnitine	rs273911	5	C	G	0.0124	0.0026	1.360E-06	0.0122	0.0143	3.950E-01
2-methylbutyroylcarnitine	rs273912	5	T	G	-0.0124	0.0026	1.630E-06	0.0122	0.0143	3.923E-01
2-methylbutyroylcarnitine	rs273913	5	T	C	0.0116	0.0025	4.700E-06	0.0131	0.0135	3.339E-01
2-methylbutyroylcarnitine	rs273914	5	A	T	0.0131	0.0025	2.070E-07	0.0135	0.0135	3.195E-01
2-methylbutyroylcarnitine	rs273915	5	C	G	-0.0124	0.0026	1.370E-06	0.0124	0.0143	3.865E-01
2-methylbutyroylcarnitine	rs273916	5	A	C	-0.0124	0.0026	1.370E-06	0.0125	0.0143	3.824E-01
2-methylbutyroylcarnitine	rs274546	5	A	G	0.0121	0.0025	1.590E-06	0.0095	0.0136	4.860E-01
2-methylbutyroylcarnitine	rs274557	5	T	C	-0.0118	0.0025	3.420E-06	-0.0133	0.0135	3.254E-01
2-methylbutyroylcarnitine	rs274558	5	A	G	-0.0118	0.0025	3.430E-06	-0.0134	0.0135	3.213E-01
2-methylbutyroylcarnitine	rs274559	5	A	G	-0.0117	0.0026	4.170E-06	-0.0134	0.0135	3.225E-01
2-methylbutyroylcarnitine	rs274560	5	T	C	-0.0119	0.0025	2.430E-06	-0.0100	0.0136	4.625E-01

2-methylbutyroylcarnitine	rs274561	5	A	C	0.0119	0.0025	2.220E-06	-0.0096	0.0136	4.786E-01
2-methylbutyroylcarnitine	rs274567	5	T	C	0.0121	0.0025	1.710E-06	-0.0103	0.0136	4.487E-01
2-methylbutyroylcarnitine	rs274570	5	T	C	0.0127	0.0026	1.170E-06	-0.0122	0.0143	3.928E-01
2-methylbutyroylcarnitine	rs3778129	6	A	G	-0.0182	0.0041	9.910E-06	-0.0259	0.0199	1.948E-01
2-methylbutyroylcarnitine	rs4074995	5	A	G	0.0123	0.0026	1.770E-06	0.0007	0.0152	9.656E-01
2-methylbutyroylcarnitine	rs4075958	5	A	G	0.0124	0.0026	1.920E-06	-0.0039	0.0153	7.994E-01
2-methylbutyroylcarnitine	rs419291	5	T	C	0.0123	0.0025	1.330E-06	0.0075	0.0137	5.852E-01
2-methylbutyroylcarnitine	rs456598	6	A	G	-0.0155	0.0035	7.090E-06	-0.0144	0.0194	4.593E-01
2-methylbutyroylcarnitine	rs4626843	1	A	G	0.0292	0.0065	7.390E-06	0.0267	0.0343	4.368E-01
2-methylbutyroylcarnitine	rs4648860	1	T	C	0.0124	0.0027	4.720E-06	-0.0080	0.0174	6.469E-01
2-methylbutyroylcarnitine	rs4719207	7	T	C	-0.0140	0.0030	3.060E-06	0.0062	0.0157	6.921E-01
2-methylbutyroylcarnitine	rs4730501	7	A	G	-0.0121	0.0026	4.180E-06	-0.0094	0.0160	5.575E-01
2-methylbutyroylcarnitine	rs4732399	7	A	G	-0.0311	0.0070	8.690E-06	-0.0647	0.0336	5.368E-02
2-methylbutyroylcarnitine	rs4948546	10	A	G	-0.0125	0.0026	2.370E-06	-0.0197	0.0171	2.479E-01
2-methylbutyroylcarnitine	rs6575209	14	T	C	0.0120	0.0026	5.100E-06	0.0107	0.0155	4.896E-01
2-methylbutyroylcarnitine	rs662138	6	C	G	0.0187	0.0034	3.650E-08	0.0124	0.0173	4.721E-01
2-methylbutyroylcarnitine	rs6764615	3	C	G	0.0159	0.0033	2.170E-06	-0.0235	0.0188	2.115E-01
2-methylbutyroylcarnitine	rs7081819	10	A	G	0.0120	0.0027	5.630E-06	-0.0188	0.0175	2.811E-01
2-methylbutyroylcarnitine	rs7087186	10	C	G	0.0126	0.0027	2.230E-06	-0.0167	0.0176	3.428E-01
2-methylbutyroylcarnitine	rs715	2	T	C	0.0123	0.0026	2.400E-06	0.0059	0.0145	6.818E-01
2-methylbutyroylcarnitine	rs7903712	10	C	G	0.0127	0.0027	1.650E-06	-0.0196	0.0173	2.556E-01
2-methylbutyroylcarnitine	rs7920393	10	A	G	0.0120	0.0027	6.050E-06	-0.0189	0.0174	2.775E-01
2-methylbutyroylcarnitine	rs7946997	11	T	C	-0.0123	0.0026	2.970E-06	0.0067	0.0145	6.430E-01
2-methylbutyroylcarnitine	rs9416742	10	A	G	0.0120	0.0027	5.640E-06	0.0178	0.0178	3.182E-01
2-methylbutyroylcarnitine	rs9492253	6	A	G	-0.0119	0.0027	8.620E-06	-0.0145	0.0163	3.746E-01
2-methylbutyroylcarnitine	rs9641894	7	T	G	-0.0117	0.0025	4.130E-06	-0.0037	0.0139	7.888E-01
2-methylbutyroylcarnitine	rs9642829	8	A	G	-0.0346	0.0075	3.610E-06	-0.1175	0.0477	1.378E-02
2-methylbutyroylcarnitine	rs9839755	3	T	C	0.0152	0.0034	7.620E-06	-0.0242	0.0189	2.016E-01
2-methylbutyroylcarnitine	rs999845	10	T	C	0.0121	0.0027	4.870E-06	-0.0173	0.0175	3.222E-01
2-methylbutyroylcarnitine	rs999846	10	A	G	0.0120	0.0027	5.710E-06	-0.0171	0.0175	3.280E-01

Table S15 Summary statistics for the associations of the 2-methylbutyroylcarnitine-associated SNPs with these exposures and glioma in GliomaScan

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
2-methylbutyroylcarnitine	rs1003533	5	T	C	0.0125	0.0027	2.330E-06	-0.0406	0.0583	4.873E-01
2-methylbutyroylcarnitine	rs1016988	5	T	C	-0.0125	0.0027	2.510E-06	-0.0075	0.0533	8.879E-01
2-methylbutyroylcarnitine	rs10866705	5	A	C	-0.0133	0.0026	3.470E-07	0.0266	0.0503	5.959E-01
2-methylbutyroylcarnitine	rs10896604	11	A	G	0.0162	0.0037	8.900E-06	-0.0449	0.0689	5.148E-01
2-methylbutyroylcarnitine	rs11006260	10	A	C	0.0120	0.0027	5.670E-06	0.0356	0.0552	5.183E-01
2-methylbutyroylcarnitine	rs11753995	6	A	G	-0.0165	0.0034	1.100E-06	0.0498	0.0616	4.184E-01
2-methylbutyroylcarnitine	rs156322	5	T	C	-0.0114	0.0026	9.190E-06	-0.0397	0.0543	4.650E-01
2-methylbutyroylcarnitine	rs1564348	6	T	C	0.0158	0.0034	2.870E-06	0.0498	0.0616	4.184E-01
2-methylbutyroylcarnitine	rs183898	5	C	G	-0.0123	0.0026	1.840E-06	-0.0453	0.0543	4.041E-01
2-methylbutyroylcarnitine	rs2410833	3	T	C	-0.0237	0.0053	8.270E-06	-0.0502	0.0780	5.203E-01
2-methylbutyroylcarnitine	rs2631362	5	A	G	-0.0119	0.0026	4.120E-06	0.0417	0.0543	4.432E-01
2-methylbutyroylcarnitine	rs2631370	5	T	C	-0.0121	0.0025	1.790E-06	0.0481	0.0520	3.540E-01
2-methylbutyroylcarnitine	rs2665348	14	A	C	-0.0123	0.0027	7.010E-06	0.0571	0.0571	3.176E-01
2-methylbutyroylcarnitine	rs270601	5	T	C	0.0124	0.0026	1.380E-06	-0.0501	0.0542	3.557E-01
2-methylbutyroylcarnitine	rs270602	5	T	C	0.0123	0.0025	1.090E-06	-0.0639	0.0521	2.206E-01
2-methylbutyroylcarnitine	rs270605	5	T	C	-0.0124	0.0025	8.400E-07	0.0522	0.0522	3.166E-01
2-methylbutyroylcarnitine	rs270606	5	A	G	0.0123	0.0026	1.680E-06	-0.0425	0.0542	4.326E-01
2-methylbutyroylcarnitine	rs270607	5	A	G	0.0123	0.0026	1.680E-06	-0.0378	0.0538	4.824E-01
2-methylbutyroylcarnitine	rs270613	5	A	G	0.0124	0.0025	1.070E-06	-0.0999	0.0448	2.559E-02
2-methylbutyroylcarnitine	rs272842	5	A	G	0.0128	0.0025	5.130E-07	-0.0533	0.0521	3.065E-01
2-methylbutyroylcarnitine	rs272865	5	A	T	-0.0117	0.0025	3.980E-06	0.0521	0.0521	3.173E-01
2-methylbutyroylcarnitine	rs272867	5	A	G	-0.0123	0.0025	1.040E-06	-0.0584	0.0521	2.632E-01
2-methylbutyroylcarnitine	rs272872	5	A	G	0.0125	0.0026	1.180E-06	-0.0452	0.0543	4.044E-01
2-methylbutyroylcarnitine	rs272875	5	T	C	0.0124	0.0025	1.020E-06	-0.0584	0.0521	2.632E-01
2-methylbutyroylcarnitine	rs272879	5	C	G	0.0124	0.0025	1.010E-06	0.0530	0.0527	3.150E-01
2-methylbutyroylcarnitine	rs272880	5	T	C	-0.0126	0.0026	9.330E-07	0.0417	0.0543	4.432E-01
2-methylbutyroylcarnitine	rs272882	5	T	G	-0.0126	0.0026	9.520E-07	-0.0786	0.0468	9.261E-02
2-methylbutyroylcarnitine	rs272883	5	A	G	0.0126	0.0026	9.620E-07	-0.0397	0.0543	4.650E-01
2-methylbutyroylcarnitine	rs272886	5	T	C	0.0123	0.0025	1.230E-06	-0.0560	0.0521	2.821E-01
2-methylbutyroylcarnitine	rs272887	5	A	G	0.0124	0.0026	1.360E-06	-0.0769	0.0468	9.995E-02
2-methylbutyroylcarnitine	rs272888	5	T	C	0.0124	0.0026	1.360E-06	-0.0452	0.0543	4.044E-01
2-methylbutyroylcarnitine	rs272889	5	A	G	0.0123	0.0025	1.080E-06	-0.0727	0.0524	1.656E-01

2-methylbutyroylcarnitine	rs272892	5	T	C	-0.0124	0.0026	1.360E-06	0.0441	0.0543	4.169E-01
2-methylbutyroylcarnitine	rs272893	5	T	C	0.0123	0.0025	1.080E-06	-0.0897	0.0448	4.485E-02
2-methylbutyroylcarnitine	rs273901	5	T	G	-0.0124	0.0026	1.520E-06	-0.0786	0.0468	9.261E-02
2-methylbutyroylcarnitine	rs273911	5	C	G	0.0124	0.0026	1.360E-06	0.0440	0.0543	4.180E-01
2-methylbutyroylcarnitine	rs273912	5	T	G	-0.0124	0.0026	1.630E-06	-0.0501	0.0542	3.557E-01
2-methylbutyroylcarnitine	rs273914	5	A	T	0.0131	0.0025	2.070E-07	0.0565	0.0521	2.778E-01
2-methylbutyroylcarnitine	rs273915	5	C	G	-0.0124	0.0026	1.370E-06	0.0402	0.0547	4.626E-01
2-methylbutyroylcarnitine	rs273916	5	A	C	-0.0124	0.0026	1.370E-06	-0.0769	0.0468	9.995E-02
2-methylbutyroylcarnitine	rs274546	5	A	G	0.0121	0.0025	1.590E-06	0.0485	0.0520	3.518E-01
2-methylbutyroylcarnitine	rs274557	5	T	C	-0.0118	0.0025	3.420E-06	0.0485	0.0520	3.518E-01
2-methylbutyroylcarnitine	rs274559	5	A	G	-0.0117	0.0026	4.170E-06	0.0481	0.0520	3.540E-01
2-methylbutyroylcarnitine	rs274567	5	T	C	0.0121	0.0025	1.710E-06	0.0521	0.0521	3.173E-01
2-methylbutyroylcarnitine	rs274570	5	T	C	0.0127	0.0026	1.170E-06	0.0440	0.0543	4.180E-01
2-methylbutyroylcarnitine	rs4075958	5	A	G	0.0124	0.0026	1.920E-06	-0.0535	0.0496	2.798E-01
2-methylbutyroylcarnitine	rs419291	5	T	C	0.0123	0.0025	1.330E-06	-0.0560	0.0521	2.821E-01
2-methylbutyroylcarnitine	rs456598	6	A	G	-0.0155	0.0035	7.090E-06	0.0401	0.0664	5.459E-01
2-methylbutyroylcarnitine	rs4648860	1	T	C	0.0124	0.0027	4.720E-06	-0.0170	0.0551	7.585E-01
2-methylbutyroylcarnitine	rs4719207	7	T	C	-0.0140	0.0030	3.060E-06	0.0408	0.0513	4.261E-01
2-methylbutyroylcarnitine	rs4730501	7	A	G	-0.0121	0.0026	4.180E-06	-0.0205	0.0554	7.113E-01
2-methylbutyroylcarnitine	rs6575209	14	T	C	0.0120	0.0026	5.100E-06	-0.0084	0.0488	8.631E-01
2-methylbutyroylcarnitine	rs671473	5	A	C	0.0122	0.0026	2.130E-06	0.0419	0.0543	4.403E-01
2-methylbutyroylcarnitine	rs7903712	10	C	G	0.0127	0.0027	1.650E-06	-0.0256	0.0538	6.335E-01
2-methylbutyroylcarnitine	rs9416742	10	A	G	0.0120	0.0027	5.640E-06	0.0356	0.0552	5.183E-01
2-methylbutyroylcarnitine	rs9492253	6	A	G	-0.0119	0.0027	8.620E-06	-0.0262	0.0535	6.246E-01
2-methylbutyroylcarnitine	rs9839755	3	T	C	0.0152	0.0034	7.620E-06	0.0124	0.0590	8.338E-01
2-methylbutyroylcarnitine	rs999845	10	T	C	0.0121	0.0027	4.870E-06	-0.0389	0.0552	4.809E-01

Table S16 Summary statistics for the associations of the leucylalanine-associated SNPs with these exposures and lung cancer in International Lung Cancer Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
leucylalanine	rs11079672	17	T	C	-0.0819	0.0180	5.270E-06	0.0183	0.0503	7.239E-01
leucylalanine	rs12494751	3	A	C	0.0429	0.0094	4.942E-06	-0.0435	0.0260	1.194E-01
leucylalanine	rs12617093	2	T	C	-0.0348	0.0076	4.812E-06	-0.0043	0.0206	8.406E-01
leucylalanine	rs13105073	4	A	T	0.1236	0.0261	2.158E-06	-0.0457	0.0590	4.874E-01
leucylalanine	rs16992910	22	A	G	0.0646	0.0141	4.792E-06	-0.0160	0.0385	6.948E-01
leucylalanine	rs2357258	2	A	C	-0.0370	0.0079	2.535E-06	-0.0113	0.0193	5.597E-01
leucylalanine	rs4351	17	A	G	-0.0581	0.0060	3.642E-22	-0.0164	0.0176	3.674E-01
leucylalanine	rs463106	5	T	C	0.0367	0.0081	6.290E-06	0.0027	0.0179	8.804E-01
leucylalanine	rs651007	9	T	C	-0.0461	0.0075	9.578E-10	-0.0115	0.0213	6.025E-01
leucylalanine	rs7229244	18	A	C	-0.0328	0.0072	5.672E-06	0.0049	0.0198	8.058E-01
leucylalanine	rs9479657	6	T	C	-0.0530	0.0118	7.752E-06	-0.0005	0.0326	9.881E-01

Table S17 Summary statistics for the associations of the 3-dehydrocarnitine-associated SNPs with these exposures and breast cancer in Breast Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
3-dehydrocarnitine	rs10792093	11	T	G	0.0164	0.0035	3.149E-06	0.0070	0.0104	4.988E-01
3-dehydrocarnitine	rs11589817	1	A	G	0.0124	0.0026	2.464E-06	-0.0059	0.0076	4.395E-01
3-dehydrocarnitine	rs12138756	1	A	G	0.0116	0.0025	3.598E-06	-0.0054	0.0065	4.037E-01
3-dehydrocarnitine	rs12573437	10	A	C	0.0377	0.0084	7.960E-06	-0.0116	0.0110	2.937E-01
3-dehydrocarnitine	rs1578905	14	T	G	0.0420	0.0090	3.061E-06	0.0212	0.0204	2.988E-01
3-dehydrocarnitine	rs1948709	4	T	C	0.0186	0.0038	7.722E-07	0.0106	0.0117	3.648E-01
3-dehydrocarnitine	rs2186677	11	A	G	-0.0124	0.0027	5.859E-06	-0.0043	0.0077	5.798E-01
3-dehydrocarnitine	rs2269340	1	T	C	-0.0222	0.0044	3.584E-07	-0.0142	0.0124	2.514E-01
3-dehydrocarnitine	rs2291428	10	C	G	-0.0168	0.0026	8.707E-11	0.0127	0.0072	7.952E-02
3-dehydrocarnitine	rs2610815	10	T	C	-0.0195	0.0043	5.841E-06	-0.0015	0.0130	9.064E-01
3-dehydrocarnitine	rs273913	5	T	C	0.0261	0.0025	1.084E-25	0.0219	0.0063	5.388E-04
3-dehydrocarnitine	rs316019	6	A	C	-0.0229	0.0041	2.059E-08	-0.0086	0.0102	3.974E-01
3-dehydrocarnitine	rs4781555	16	A	G	0.0170	0.0036	2.031E-06	-0.0107	0.0081	1.906E-01
3-dehydrocarnitine	rs6429601	1	A	C	0.0119	0.0027	7.078E-06	0.0013	0.0089	8.860E-01
3-dehydrocarnitine	rs6691848	1	A	G	0.0288	0.0061	2.121E-06	0.0432	0.0170	1.084E-02
3-dehydrocarnitine	rs6817256	4	T	C	0.0213	0.0045	1.986E-06	-0.0028	0.0140	8.423E-01
3-dehydrocarnitine	rs6862720	5	T	C	0.0191	0.0041	4.280E-06	-0.0139	0.0104	1.823E-01
3-dehydrocarnitine	rs7819084	8	A	G	0.0123	0.0026	2.447E-06	0.0037	0.0072	6.090E-01
3-dehydrocarnitine	rs927907	10	A	G	-0.0115	0.0026	7.725E-06	-0.0118	0.0071	9.553E-02
3-dehydrocarnitine	rs9382940	6	T	C	0.0172	0.0033	2.312E-07	-0.0167	0.0083	4.303E-02
3-dehydrocarnitine	rs9551761	13	A	G	0.0170	0.0035	1.514E-06	0.0059	0.0121	6.275E-01

Table S18 Summary statistics for the associations of the ibuprofen-associated SNPs with these exposures and ovarian cancer in Ovarian Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
ibuprofen	rs10005912		T	G	0.1151	0.0252	5.094E-06	-0.0109	0.0269	6.862E-01
ibuprofen	rs10015080		A	C	0.1094	0.0176	5.051E-10	0.0172	0.0237	4.681E-01
ibuprofen	rs10068843		A	C	-0.1072	0.0239	7.434E-06	-0.0090	0.0268	7.367E-01
ibuprofen	rs10421478		T	C	-0.0639	0.0143	7.684E-06	0.0002	0.0178	9.931E-01
ibuprofen	rs10425230		T	C	-0.1209	0.0239	4.210E-07	0.0144	0.0309	6.414E-01
ibuprofen	rs10875231		T	G	-0.0515	0.0113	5.427E-06	-0.0173	0.0160	2.806E-01
ibuprofen	rs10900676		C	G	-0.3050	0.0670	5.308E-06	0.0438	0.0584	4.534E-01
ibuprofen	rs10988783		T	C	-0.1623	0.0299	5.624E-08	-0.0180	0.0243	4.607E-01
ibuprofen	rs10998867		A	G	0.1623	0.0299	5.624E-08	0.0206	0.0203	3.095E-01
ibuprofen	rs11127379		A	G	-0.1010	0.0196	2.442E-07	-0.0039	0.0268	8.843E-01
ibuprofen	rs11158062		A	G	-0.0638	0.0141	5.938E-06	-0.0107	0.0150	4.768E-01
ibuprofen	rs11161725		A	C	-0.1623	0.0299	5.624E-08	-0.0533	0.0496	2.829E-01
ibuprofen	rs11265416		A	G	0.0995	0.0202	8.302E-07	0.0231	0.0529	6.628E-01
ibuprofen	rs1138253		A	G	0.0579	0.0129	7.878E-06	0.0182	0.0137	1.835E-01
ibuprofen	rs1165210		T	C	-0.1214	0.0270	6.709E-06	-0.0271	0.0323	4.018E-01
ibuprofen	rs11703458		A	G	-0.1963	0.0432	5.458E-06	0.0020	0.0870	9.820E-01
ibuprofen	rs11803192		T	C	0.1002	0.0172	6.104E-09	-0.0066	0.0237	7.812E-01
ibuprofen	rs11819046		T	C	-0.1237	0.0205	1.676E-09	-0.0292	0.0353	4.092E-01
ibuprofen	rs12238450		A	G	0.1431	0.0307	3.093E-06	0.0550	0.0330	9.516E-02
ibuprofen	rs12327976		A	G	0.1079	0.0195	3.276E-08	0.0165	0.0261	5.286E-01
ibuprofen	rs12622555		T	C	-0.1623	0.0299	5.624E-08	0.0002	0.0297	9.959E-01
ibuprofen	rs12684749		A	G	0.1623	0.0299	5.624E-08	-0.0063	0.0379	8.687E-01
ibuprofen	rs12983955		A	G	-0.1301	0.0271	1.602E-06	0.0082	0.0212	6.983E-01
ibuprofen	rs13007817		A	G	-0.1140	0.0218	1.616E-07	0.0330	0.0216	1.275E-01
ibuprofen	rs13035089		T	G	0.0630	0.0143	9.807E-06	0.0104	0.0182	5.666E-01
ibuprofen	rs13041562		T	C	0.0697	0.0151	3.761E-06	0.0056	0.0168	7.390E-01
ibuprofen	rs1353529		T	G	-0.0569	0.0127	7.455E-06	0.0039	0.0133	7.686E-01
ibuprofen	rs1382668		A	G	0.0927	0.0206	7.014E-06	-0.0174	0.0327	5.953E-01
ibuprofen	rs1429342		A	G	0.1439	0.0284	4.145E-07	0.0180	0.0635	7.771E-01
ibuprofen	rs1462176		T	C	-0.1390	0.0285	1.067E-06	0.0131	0.0316	6.790E-01
ibuprofen	rs1498721		T	C	0.1222	0.0241	3.900E-07	-0.0162	0.0274	5.538E-01
ibuprofen	rs1561803		T	G	0.1304	0.0280	3.282E-06	-0.0366	0.0318	2.492E-01

ibuprofen	rs1608368		T	C	-0.1623	0.0299	5.624E-08	0.0236	0.0282	4.012E-01
ibuprofen	rs16828389		T	C	-0.1650	0.0303	5.009E-08	-0.0849	0.0613	1.657E-01
ibuprofen	rs16834234		T	C	-0.1418	0.0321	9.918E-06	-0.0323	0.0348	3.536E-01
ibuprofen	rs16874680		T	C	0.1181	0.0250	2.378E-06	0.0202	0.0310	5.142E-01
ibuprofen	rs16947929		A	G	-0.1419	0.0282	4.870E-07	-0.0173	0.0406	6.704E-01
ibuprofen	rs16962386		A	C	0.1009	0.0226	8.285E-06	-0.0276	0.0215	1.982E-01
ibuprofen	rs16986678		A	G	-0.1548	0.0224	5.221E-12	-0.0099	0.0446	8.246E-01
ibuprofen	rs17025221		A	T	-0.0944	0.0195	1.319E-06	-0.0151	0.0221	4.950E-01
ibuprofen	rs17069415		A	G	-0.1552	0.0286	5.664E-08	-0.0560	0.0431	1.941E-01
ibuprofen	rs17224513		A	G	-0.0911	0.0192	2.078E-06	-0.0542	0.0249	2.931E-02
ibuprofen	rs17303404		C	G	0.1424	0.0265	7.461E-08	0.0039	0.0327	9.055E-01
ibuprofen	rs17488959		T	G	-0.1116	0.0218	3.194E-07	-0.0256	0.0334	4.444E-01
ibuprofen	rs17506661		T	C	-0.1171	0.0235	6.218E-07	-0.0244	0.0295	4.083E-01
ibuprofen	rs17557803		T	C	0.0971	0.0213	5.386E-06	-0.0003	0.0238	9.895E-01
ibuprofen	rs1790642		A	G	-0.0732	0.0165	8.927E-06	-0.0149	0.0184	4.178E-01
ibuprofen	rs1792131		A	G	0.1008	0.0208	1.208E-06	0.0042	0.0218	8.472E-01
ibuprofen	rs187090		T	C	-0.1623	0.0299	5.624E-08	-0.0160	0.0548	7.704E-01
ibuprofen	rs1896703		T	G	-0.1538	0.0226	9.672E-12	0.0403	0.0251	1.080E-01
ibuprofen	rs1954097		T	C	0.0926	0.0202	4.639E-06	-0.0018	0.0165	9.117E-01
ibuprofen	rs2155977		T	C	0.0964	0.0195	8.179E-07	-0.0765	0.0457	9.430E-02
ibuprofen	rs217763		T	C	0.0552	0.0108	3.233E-07	0.0055	0.0134	6.834E-01
ibuprofen	rs2374150		C	G	-0.1422	0.0282	4.548E-07	0.0333	0.0280	2.348E-01
ibuprofen	rs2469235		A	G	0.1221	0.0204	2.093E-09	-0.0050	0.0388	8.965E-01
ibuprofen	rs2473138		A	G	0.1053	0.0218	1.421E-06	-0.0294	0.0229	2.002E-01
ibuprofen	rs2486578		A	G	0.1523	0.0326	2.988E-06	0.0048	0.0164	7.712E-01
ibuprofen	rs2493147		T	C	-0.0912	0.0184	7.179E-07	0.0194	0.0252	4.412E-01
ibuprofen	rs2623167		A	C	0.0940	0.0210	7.567E-06	0.0113	0.0221	6.098E-01
ibuprofen	rs268125		C	G	0.1492	0.0302	7.714E-07	-0.0354	0.0318	2.648E-01
ibuprofen	rs268424		A	C	-0.1129	0.0237	1.826E-06	-0.0337	0.0217	1.205E-01
ibuprofen	rs276642		A	G	0.1626	0.0299	5.623E-08	0.0036	0.0288	8.997E-01
ibuprofen	rs2861997		A	G	0.0897	0.0187	1.541E-06	0.0065	0.0232	7.800E-01
ibuprofen	rs28951670		T	C	-0.1627	0.0299	5.152E-08	-0.0383	0.0256	1.357E-01
ibuprofen	rs3925748		A	C	-0.0826	0.0182	5.549E-06	0.0026	0.0202	8.973E-01
ibuprofen	rs4141286		C	G	0.1065	0.0231	3.951E-06	0.0089	0.0273	7.446E-01
ibuprofen	rs4295303		A	T	-0.0696	0.0145	1.526E-06	-0.0031	0.0133	8.138E-01
ibuprofen	rs4434498		A	G	-0.0554	0.0120	4.232E-06	-0.0117	0.0133	3.801E-01
ibuprofen	rs4454728		A	G	-0.1672	0.0307	5.209E-08	-0.0501	0.0409	2.210E-01

ibuprofen	rs4488147		T	C	-0.1623	0.0299	5.624E-08	0.0205	0.0419	6.243E-01
ibuprofen	rs463183		A	G	-0.1164	0.0232	4.981E-07	0.0055	0.0281	8.434E-01
ibuprofen	rs4733038		A	C	-0.1718	0.0387	9.034E-06	0.0731	0.0450	1.045E-01
ibuprofen	rs4875362		T	G	-0.1646	0.0355	3.428E-06	0.0534	0.0338	1.143E-01
ibuprofen	rs4905451		T	C	-0.1551	0.0279	2.567E-08	0.0016	0.0531	9.753E-01
ibuprofen	rs5809847		T	C	0.1145	0.0250	4.601E-06	-0.0097	0.0285	7.335E-01
ibuprofen	rs600711		A	G	0.1004	0.0179	2.077E-08	0.0141	0.0237	5.507E-01
ibuprofen	rs6070814		T	C	-0.0813	0.0165	7.875E-07	0.0061	0.0265	8.175E-01
ibuprofen	rs6506569		T	C	0.0541	0.0105	2.400E-07	-0.0080	0.0132	5.453E-01
ibuprofen	rs6783548		T	C	-0.0779	0.0162	1.624E-06	-0.0059	0.0135	6.637E-01
ibuprofen	rs7144659		A	G	0.0554	0.0113	9.857E-07	0.0349	0.0353	3.233E-01
ibuprofen	rs7454011		T	G	-0.1313	0.0235	2.342E-08	-0.0207	0.0296	4.844E-01
ibuprofen	rs7616688		A	G	-0.1630	0.0300	5.502E-08	0.0046	0.0328	8.882E-01
ibuprofen	rs7688643		T	C	0.0830	0.0186	8.233E-06	-0.0223	0.0243	3.581E-01
ibuprofen	rs7692251		A	G	0.1330	0.0280	1.966E-06	0.0816	0.0317	1.005E-02
ibuprofen	rs7701924		A	G	-0.0907	0.0191	2.083E-06	0.0358	0.0234	1.257E-01
ibuprofen	rs7708256		T	C	-0.1541	0.0348	9.602E-06	0.0464	0.0386	2.292E-01
ibuprofen	rs771788		A	G	-0.0881	0.0187	2.515E-06	-0.0369	0.0256	1.485E-01
ibuprofen	rs7751252		T	C	0.1050	0.0227	3.895E-06	0.0323	0.0273	2.355E-01
ibuprofen	rs7755387		T	G	-0.1252	0.0259	1.298E-06	0.0064	0.0289	8.258E-01
ibuprofen	rs7785951		T	G	-0.1396	0.0267	1.666E-07	0.0344	0.0319	2.809E-01
ibuprofen	rs8118890		A	G	0.1147	0.0235	1.059E-06	0.0105	0.0240	6.637E-01
ibuprofen	rs831541		T	C	-0.0567	0.0116	9.874E-07	-0.0014	0.0175	9.384E-01
ibuprofen	rs836533		A	T	0.1623	0.0299	5.624E-08	0.0128	0.0604	8.327E-01
ibuprofen	rs928907		T	C	-0.0749	0.0166	6.037E-06	0.0109	0.0376	7.716E-01
ibuprofen	rs9341191		T	C	-0.1636	0.0301	5.675E-08	0.0303	0.0292	2.992E-01
ibuprofen	rs945493		A	G	-0.1625	0.0301	6.451E-08	0.0330	0.0248	1.835E-01
ibuprofen	rs9497904		A	G	-0.0543	0.0120	6.362E-06	-0.0063	0.0136	6.428E-01
ibuprofen	rs9557045		A	T	-0.1164	0.0234	6.281E-07	0.0352	0.0276	2.021E-01
ibuprofen	rs9861255		A	G	0.1156	0.0231	5.739E-07	0.0140	0.0236	5.536E-01
ibuprofen	rs997892		A	C	0.0925	0.0181	3.139E-07	0.0338	0.0245	1.686E-01
ibuprofen	rs9999552		A	G	0.1464	0.0213	5.697E-12	0.0353	0.0211	9.496E-02

Table S19 Summary statistics for the associations of the leucylalanine-associated SNPs with these exposures and ovarian cancer in Ovarian Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
leucylalanine	rs11079672	7	T	C	-0.0993	0.0185	8.169E-08	-0.0374	0.0142	8.216E-03
leucylalanine	rs13025191	17	C	G	-0.0364	0.0081	6.717E-06	-0.0294	0.0367	4.230E-01
leucylalanine	rs205208	2	T	C	-0.0495	0.0107	4.111E-06	0.0076	0.0172	6.591E-01
leucylalanine	rs6124466	5	T	C	-0.0400	0.0085	2.361E-06	-0.0225	0.0138	1.030E-01
leucylalanine	rs9574536	5	T	C	-0.0517	0.0113	5.060E-06	0.0010	0.0134	9.398E-01
leucylalanine	rs779741	6	A	C	-0.0285	0.0064	8.212E-06	0.0007	0.0236	9.762E-01
leucylalanine	rs1106806	1	A	C	-0.0284	0.0063	6.775E-06	0.0087	0.0136	5.226E-01
leucylalanine	rs17121435	20	A	G	0.1236	0.0256	1.364E-06	0.0039	0.0181	8.298E-01
leucylalanine	rs297192	16	T	G	0.0310	0.0068	4.541E-06	-0.0040	0.0133	7.656E-01
leucylalanine	rs4949966	4	T	C	0.0468	0.0092	3.555E-07	-0.0107	0.0137	4.336E-01
leucylalanine	rs4351	1	A	G	-0.0529	0.0063	3.111E-17	0.0054	0.0220	8.061E-01
leucylalanine	rs7840544	1	A	G	0.0947	0.0208	5.392E-06	-0.0052	0.0289	8.582E-01
leucylalanine	rs2278161	5	T	C	-0.0341	0.0073	3.250E-06	0.0072	0.0177	6.836E-01
leucylalanine	rs6070840	19	A	C	0.0397	0.0084	2.478E-06	-0.0211	0.0290	4.680E-01
leucylalanine	rs6533515	2	A	G	-0.0350	0.0078	7.041E-06	-0.0040	0.0147	7.851E-01
leucylalanine	rs35060330	8	T	C	0.0356	0.0080	9.446E-06	-0.0287	0.0423	4.975E-01
leucylalanine	rs649129	10	T	C	-0.0437	0.0077	1.262E-08	-0.0512	0.0616	4.059E-01
leucylalanine	rs9574536	13	T	C	-0.0517	0.0113	5.060E-06	0.0516	0.0351	1.784E-01

Table S20 Summary statistics for the associations of the 2-methylbutyroylcarnitine-associated SNPs with these exposures and lung adenocarcinoma in International Lung Cancer Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
2-methylbutyroylcarnitine	rs1003533	5	T	C	0.0125	0.0027	2.330E-06	0.0035	0.0333	9.176E-01
2-methylbutyroylcarnitine	rs10139470	14	T	G	-0.0156	0.0032	1.470E-06	-0.0179	0.0343	6.202E-01
2-methylbutyroylcarnitine	rs1016988	5	T	C	-0.0125	0.0027	2.510E-06	0.0027	0.0332	9.374E-01
2-methylbutyroylcarnitine	rs10484836	6	T	C	0.0208	0.0044	2.980E-06	-0.0016	0.0551	9.781E-01
2-methylbutyroylcarnitine	rs10740761	10	A	C	-0.0124	0.0026	2.660E-06	-0.0252	0.0340	4.630E-01
2-methylbutyroylcarnitine	rs10866705	5	A	C	-0.0133	0.0026	3.470E-07	0.0072	0.0307	8.225E-01
2-methylbutyroylcarnitine	rs10896604	11	A	G	0.0162	0.0037	8.900E-06	-0.0444	0.0412	3.232E-01
2-methylbutyroylcarnitine	rs11006251	10	T	C	0.0129	0.0027	1.550E-06	0.0185	0.0343	6.086E-01
2-methylbutyroylcarnitine	rs11006260	10	A	C	0.0120	0.0027	5.670E-06	-0.0018	0.0338	9.585E-01
2-methylbutyroylcarnitine	rs11057695	12	T	C	0.0291	0.0062	2.790E-06	-0.0443	0.0532	4.518E-01
2-methylbutyroylcarnitine	rs11639506	16	A	G	-0.0340	0.0075	5.690E-06	0.0425	0.0663	5.310E-01
2-methylbutyroylcarnitine	rs11753995	6	A	G	-0.0165	0.0034	1.100E-06	-0.0568	0.0350	1.395E-01
2-methylbutyroylcarnitine	rs11758111	6	T	C	-0.0154	0.0035	9.720E-06	-0.0283	0.0401	5.105E-01
2-methylbutyroylcarnitine	rs12477840	2	T	C	0.0122	0.0027	5.890E-06	0.0452	0.0369	2.156E-01
2-methylbutyroylcarnitine	rs12777552	10	T	C	-0.0124	0.0026	2.370E-06	-0.0275	0.0341	4.229E-01
2-methylbutyroylcarnitine	rs12929328	16	C	G	-0.0206	0.0046	8.890E-06	-0.0096	0.0373	8.054E-01
2-methylbutyroylcarnitine	rs1447059	7	A	G	-0.0115	0.0025	7.060E-06	-0.0013	0.0283	9.639E-01
2-methylbutyroylcarnitine	rs1447060	7	A	G	-0.0115	0.0025	7.070E-06	-0.0002	0.0284	9.939E-01
2-methylbutyroylcarnitine	rs156322	5	T	C	-0.0114	0.0026	9.190E-06	0.0221	0.0287	4.651E-01
2-methylbutyroylcarnitine	rs1564348	6	T	C	0.0158	0.0034	2.870E-06	-0.0579	0.0349	1.321E-01
2-methylbutyroylcarnitine	rs1596972	7	A	G	-0.0117	0.0025	3.820E-06	-0.0001	0.0273	9.958E-01
2-methylbutyroylcarnitine	rs17098575	12	A	C	-0.0270	0.0056	1.540E-06	0.0277	0.0555	6.277E-01
2-methylbutyroylcarnitine	rs17098581	12	C	G	-0.0267	0.0059	5.200E-06	0.0362	0.0550	5.181E-01
2-methylbutyroylcarnitine	rs17145256	10	A	G	0.0312	0.0069	6.580E-06	0.1352	0.0936	1.290E-01
2-methylbutyroylcarnitine	rs17435220	10	T	C	-0.0310	0.0069	7.940E-06	0.1276	0.0925	1.501E-01
2-methylbutyroylcarnitine	rs1838932	7	T	C	-0.0128	0.0026	5.070E-07	0.0041	0.0303	8.943E-01
2-methylbutyroylcarnitine	rs183898	5	C	G	-0.0123	0.0026	1.840E-06	-0.0215	0.0289	4.792E-01
2-methylbutyroylcarnitine	rs1981524	5	T	C	0.0123	0.0027	3.530E-06	0.0043	0.0333	9.011E-01
2-methylbutyroylcarnitine	rs2367533	7	T	C	0.0263	0.0059	8.010E-06	0.0989	0.0722	1.581E-01
2-methylbutyroylcarnitine	rs2410833	3	T	C	-0.0237	0.0053	8.270E-06	-0.0084	0.0482	8.689E-01
2-methylbutyroylcarnitine	rs2552122	8	A	C	0.0115	0.0026	6.290E-06	0.0340	0.0294	2.782E-01
2-methylbutyroylcarnitine	rs2631362	5	A	G	-0.0119	0.0026	4.120E-06	-0.0210	0.0288	4.885E-01

2-methylbutyroylcarnitine	rs2631370	5	T	C	-0.0121	0.0025	1.790E-06	-0.0334	0.0271	2.475E-01
2-methylbutyroylcarnitine	rs2631372	5	C	G	0.0124	0.0026	2.010E-06	-0.0234	0.0287	4.389E-01
2-methylbutyroylcarnitine	rs2665348	14	A	C	-0.0123	0.0027	7.010E-06	0.0155	0.0338	6.621E-01
2-methylbutyroylcarnitine	rs270601	5	T	C	0.0124	0.0026	1.380E-06	0.0216	0.0289	4.770E-01
2-methylbutyroylcarnitine	rs270602	5	T	C	0.0123	0.0025	1.090E-06	0.0257	0.0273	3.724E-01
2-methylbutyroylcarnitine	rs270605	5	T	C	-0.0124	0.0025	8.400E-07	0.0332	0.0270	2.471E-01
2-methylbutyroylcarnitine	rs270606	5	A	G	0.0123	0.0026	1.680E-06	0.0216	0.0287	4.748E-01
2-methylbutyroylcarnitine	rs270607	5	A	G	0.0123	0.0026	1.680E-06	0.0236	0.0286	4.350E-01
2-methylbutyroylcarnitine	rs270613	5	A	G	0.0124	0.0025	1.070E-06	0.0323	0.0270	2.602E-01
2-methylbutyroylcarnitine	rs272842	5	A	G	0.0128	0.0025	5.130E-07	0.0329	0.0270	2.519E-01
2-methylbutyroylcarnitine	rs272865	5	A	T	-0.0117	0.0025	3.980E-06	0.0248	0.0274	3.918E-01
2-methylbutyroylcarnitine	rs272867	5	A	G	-0.0123	0.0025	1.040E-06	0.0329	0.0271	2.535E-01
2-methylbutyroylcarnitine	rs272868	5	C	G	0.0126	0.0026	9.130E-07	0.0213	0.0287	4.807E-01
2-methylbutyroylcarnitine	rs272869	5	A	G	0.0123	0.0025	1.020E-06	0.0257	0.0273	3.723E-01
2-methylbutyroylcarnitine	rs272872	5	A	G	0.0125	0.0026	1.180E-06	0.0213	0.0287	4.821E-01
2-methylbutyroylcarnitine	rs272874	5	T	C	-0.0116	0.0026	6.900E-06	0.0257	0.0273	3.721E-01
2-methylbutyroylcarnitine	rs272875	5	T	C	0.0124	0.0025	1.020E-06	0.0332	0.0270	2.475E-01
2-methylbutyroylcarnitine	rs272878	5	T	C	0.0126	0.0026	9.950E-07	0.0212	0.0287	4.824E-01
2-methylbutyroylcarnitine	rs272879	5	C	G	0.0124	0.0025	1.010E-06	0.0332	0.0270	2.475E-01
2-methylbutyroylcarnitine	rs272880	5	T	C	-0.0126	0.0026	9.330E-07	0.0205	0.0288	4.975E-01
2-methylbutyroylcarnitine	rs272881	5	A	G	-0.0124	0.0025	1.010E-06	0.0323	0.0270	2.613E-01
2-methylbutyroylcarnitine	rs272882	5	T	G	-0.0126	0.0026	9.520E-07	0.0211	0.0287	4.855E-01
2-methylbutyroylcarnitine	rs272883	5	A	G	0.0126	0.0026	9.620E-07	0.0219	0.0287	4.684E-01
2-methylbutyroylcarnitine	rs272886	5	T	C	0.0123	0.0025	1.230E-06	0.0322	0.0270	2.621E-01
2-methylbutyroylcarnitine	rs272887	5	A	G	0.0124	0.0026	1.360E-06	0.0199	0.0288	5.112E-01
2-methylbutyroylcarnitine	rs272888	5	T	C	0.0124	0.0026	1.360E-06	0.0209	0.0287	4.884E-01
2-methylbutyroylcarnitine	rs272889	5	A	G	0.0123	0.0025	1.080E-06	0.0250	0.0273	3.851E-01
2-methylbutyroylcarnitine	rs272892	5	T	C	-0.0124	0.0026	1.360E-06	0.0209	0.0287	4.885E-01
2-methylbutyroylcarnitine	rs272893	5	T	C	0.0123	0.0025	1.080E-06	0.0249	0.0273	3.871E-01
2-methylbutyroylcarnitine	rs273901	5	T	G	-0.0124	0.0026	1.520E-06	0.0206	0.0288	4.959E-01
2-methylbutyroylcarnitine	rs273911	5	C	G	0.0124	0.0026	1.360E-06	0.0202	0.0288	5.038E-01
2-methylbutyroylcarnitine	rs273912	5	T	G	-0.0124	0.0026	1.630E-06	0.0203	0.0288	5.025E-01
2-methylbutyroylcarnitine	rs273913	5	T	C	0.0116	0.0025	4.700E-06	0.0311	0.0271	2.791E-01
2-methylbutyroylcarnitine	rs273914	5	A	T	0.0131	0.0025	2.070E-07	0.0329	0.0271	2.535E-01
2-methylbutyroylcarnitine	rs273915	5	C	G	-0.0124	0.0026	1.370E-06	0.0213	0.0287	4.817E-01
2-methylbutyroylcarnitine	rs273916	5	A	C	-0.0124	0.0026	1.370E-06	0.0213	0.0287	4.813E-01
2-methylbutyroylcarnitine	rs274546	5	A	G	0.0121	0.0025	1.590E-06	0.0286	0.0273	3.225E-01

2-methylbutyroylcarnitine	rs274557	5	T	C	-0.0118	0.0025	3.420E-06	-0.0325	0.0272	2.608E-01
2-methylbutyroylcarnitine	rs274558	5	A	G	-0.0118	0.0025	3.430E-06	-0.0325	0.0272	2.608E-01
2-methylbutyroylcarnitine	rs274559	5	A	G	-0.0117	0.0026	4.170E-06	-0.0327	0.0272	2.591E-01
2-methylbutyroylcarnitine	rs274560	5	T	C	-0.0119	0.0025	2.430E-06	-0.0283	0.0274	3.289E-01
2-methylbutyroylcarnitine	rs274561	5	A	C	0.0119	0.0025	2.220E-06	-0.0276	0.0274	3.408E-01
2-methylbutyroylcarnitine	rs274567	5	T	C	0.0121	0.0025	1.710E-06	-0.0284	0.0274	3.273E-01
2-methylbutyroylcarnitine	rs274570	5	T	C	0.0127	0.0026	1.170E-06	-0.0213	0.0288	4.824E-01
2-methylbutyroylcarnitine	rs3778129	6	A	G	-0.0182	0.0041	9.910E-06	-0.0327	0.0401	4.497E-01
2-methylbutyroylcarnitine	rs4074995	5	A	G	0.0123	0.0026	1.770E-06	0.0016	0.0305	9.584E-01
2-methylbutyroylcarnitine	rs4075958	5	A	G	0.0124	0.0026	1.920E-06	0.0029	0.0302	9.258E-01
2-methylbutyroylcarnitine	rs419291	5	T	C	0.0123	0.0025	1.330E-06	0.0268	0.0274	3.554E-01
2-methylbutyroylcarnitine	rs456598	6	A	G	-0.0155	0.0035	7.090E-06	-0.0943	0.0366	2.462E-02
2-methylbutyroylcarnitine	rs4626843	1	A	G	0.0292	0.0065	7.390E-06	-0.0046	0.0701	9.517E-01
2-methylbutyroylcarnitine	rs4648860	1	T	C	0.0124	0.0027	4.720E-06	-0.0303	0.0331	3.913E-01
2-methylbutyroylcarnitine	rs4719207	7	T	C	-0.0140	0.0030	3.060E-06	-0.0353	0.0311	2.891E-01
2-methylbutyroylcarnitine	rs4730501	7	A	G	-0.0121	0.0026	4.180E-06	-0.0484	0.0307	1.463E-01
2-methylbutyroylcarnitine	rs4732399	7	A	G	-0.0311	0.0070	8.690E-06	0.0873	0.0733	2.254E-01
2-methylbutyroylcarnitine	rs4948546	10	A	G	-0.0125	0.0026	2.370E-06	-0.0240	0.0340	4.848E-01
2-methylbutyroylcarnitine	rs6575209	14	T	C	0.0120	0.0026	5.100E-06	-0.0265	0.0329	4.484E-01
2-methylbutyroylcarnitine	rs662138	6	C	G	0.0187	0.0034	3.650E-08	-0.0668	0.0337	7.423E-02
2-methylbutyroylcarnitine	rs671473	5	A	C	0.0122	0.0026	2.130E-06	-0.0211	0.0288	4.874E-01
2-methylbutyroylcarnitine	rs6764615	3	C	G	0.0159	0.0033	2.170E-06	0.0683	0.0386	6.754E-02
2-methylbutyroylcarnitine	rs7081819	10	A	G	0.0120	0.0027	5.630E-06	0.0033	0.0336	9.236E-01
2-methylbutyroylcarnitine	rs7087186	10	C	G	0.0126	0.0027	2.230E-06	0.0025	0.0342	9.430E-01
2-methylbutyroylcarnitine	rs715	2	T	C	0.0123	0.0026	2.400E-06	0.0480	0.0327	1.355E-01
2-methylbutyroylcarnitine	rs7903712	10	C	G	0.0127	0.0027	1.650E-06	-0.0150	0.0344	6.674E-01
2-methylbutyroylcarnitine	rs7920393	10	A	G	0.0120	0.0027	6.050E-06	0.0030	0.0336	9.306E-01
2-methylbutyroylcarnitine	rs7946997	11	T	C	-0.0123	0.0026	2.970E-06	0.0147	0.0312	6.434E-01
2-methylbutyroylcarnitine	rs9416742	10	A	G	0.0120	0.0027	5.640E-06	0.0015	0.0338	9.665E-01
2-methylbutyroylcarnitine	rs9492253	6	A	G	-0.0119	0.0027	8.620E-06	-0.0515	0.0320	1.397E-01
2-methylbutyroylcarnitine	rs9641894	7	T	G	-0.0117	0.0025	4.130E-06	-0.0017	0.0276	9.536E-01
2-methylbutyroylcarnitine	rs9642829	8	A	G	-0.0346	0.0075	3.610E-06	0.1436	0.0952	1.105E-01
2-methylbutyroylcarnitine	rs9839755	3	T	C	0.0152	0.0034	7.620E-06	0.0705	0.0390	6.162E-02
2-methylbutyroylcarnitine	rs999845	10	T	C	0.0121	0.0027	4.870E-06	0.0003	0.0338	9.936E-01
2-methylbutyroylcarnitine	rs999846	10	A	G	0.0120	0.0027	5.710E-06	-0.0010	0.0338	9.771E-01

Table S21 Summary statistics for the associations of the 2-methylbutyroylcarnitine-associated SNPs with these exposures and ER-positive breast cancer in Breast Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
2-methylbutyroylcarnitine	rs1003533	5	T	C	0.0125	0.0027	2.330E-06	-0.0146	0.0092	1.138E-01
2-methylbutyroylcarnitine	rs10139470	14	T	G	-0.0156	0.0032	1.470E-06	0.0255	0.0093	6.366E-03
2-methylbutyroylcarnitine	rs1016988	5	T	C	-0.0125	0.0027	2.510E-06	-0.0143	0.0092	1.205E-01
2-methylbutyroylcarnitine	rs10484836	6	T	C	0.0208	0.0044	2.980E-06	0.0124	0.0204	5.425E-01
2-methylbutyroylcarnitine	rs10740761	10	A	C	-0.0124	0.0026	2.660E-06	0.0220	0.0106	3.791E-02
2-methylbutyroylcarnitine	rs10866705	5	A	C	-0.0133	0.0026	3.470E-07	-0.0048	0.0092	6.003E-01
2-methylbutyroylcarnitine	rs10896604	11	A	G	0.0162	0.0037	8.900E-06	-0.0016	0.0125	8.973E-01
2-methylbutyroylcarnitine	rs11006251	10	T	C	0.0129	0.0027	1.550E-06	0.0275	0.0110	1.210E-02
2-methylbutyroylcarnitine	rs11006260	10	A	C	0.0120	0.0027	5.670E-06	0.0216	0.0108	4.566E-02
2-methylbutyroylcarnitine	rs11639506	16	A	G	-0.0340	0.0075	5.690E-06	-0.0067	0.0185	7.168E-01
2-methylbutyroylcarnitine	rs11753995	6	A	G	-0.0165	0.0034	1.100E-06	-0.0014	0.0100	8.868E-01
2-methylbutyroylcarnitine	rs11758111	6	T	C	-0.0154	0.0035	9.720E-06	0.0100	0.0114	3.785E-01
2-methylbutyroylcarnitine	rs12477840	2	T	C	0.0122	0.0027	5.890E-06	-0.0099	0.0099	3.157E-01
2-methylbutyroylcarnitine	rs12777552	10	T	C	-0.0124	0.0026	2.370E-06	0.0209	0.0106	4.927E-02
2-methylbutyroylcarnitine	rs12929328	16	C	G	-0.0206	0.0046	8.890E-06	0.0018	0.0103	8.622E-01
2-methylbutyroylcarnitine	rs1447059	7	A	G	-0.0115	0.0025	7.060E-06	-0.0201	0.0083	1.524E-02
2-methylbutyroylcarnitine	rs1447060	7	A	G	-0.0115	0.0025	7.070E-06	-0.0198	0.0083	1.684E-02
2-methylbutyroylcarnitine	rs156322	5	T	C	-0.0114	0.0026	9.190E-06	0.0286	0.0080	3.425E-04
2-methylbutyroylcarnitine	rs1564348	6	T	C	0.0158	0.0034	2.870E-06	-0.0022	0.0101	8.268E-01
2-methylbutyroylcarnitine	rs1596972	7	A	G	-0.0117	0.0025	3.820E-06	-0.0247	0.0081	2.395E-03
2-methylbutyroylcarnitine	rs17145256	10	A	G	0.0312	0.0069	6.580E-06	0.0862	0.0221	9.460E-05
2-methylbutyroylcarnitine	rs17435220	10	T	C	-0.0310	0.0069	7.940E-06	0.0843	0.0221	1.425E-04
2-methylbutyroylcarnitine	rs1838932	7	T	C	-0.0128	0.0026	5.070E-07	-0.0191	0.0086	2.665E-02
2-methylbutyroylcarnitine	rs183898	5	C	G	-0.0123	0.0026	1.840E-06	-0.0280	0.0080	4.496E-04
2-methylbutyroylcarnitine	rs1981524	5	T	C	0.0123	0.0027	3.530E-06	-0.0146	0.0092	1.146E-01
2-methylbutyroylcarnitine	rs2367533	7	T	C	0.0263	0.0059	8.010E-06	-0.0084	0.0180	6.398E-01
2-methylbutyroylcarnitine	rs2410833	3	T	C	-0.0237	0.0053	8.270E-06	0.0131	0.0132	3.200E-01
2-methylbutyroylcarnitine	rs2552122	8	A	C	0.0115	0.0026	6.290E-06	-0.0167	0.0081	3.891E-02
2-methylbutyroylcarnitine	rs2631362	5	A	G	-0.0119	0.0026	4.120E-06	-0.0281	0.0080	4.326E-04
2-methylbutyroylcarnitine	rs2631370	5	T	C	-0.0121	0.0025	1.790E-06	-0.0229	0.0075	2.404E-03
2-methylbutyroylcarnitine	rs2631372	5	C	G	0.0124	0.0026	2.010E-06	-0.0285	0.0080	3.492E-04
2-methylbutyroylcarnitine	rs2665348	14	A	C	-0.0123	0.0027	7.010E-06	-0.0266	0.0097	5.863E-03

2-methylbutyroylcarnitine	rs270601	5	T	C	0.0124	0.0026	1.380E-06	0.0285	0.0080	3.634E-04
2-methylbutyroylcarnitine	rs270602	5	T	C	0.0123	0.0025	1.090E-06	0.0210	0.0076	5.438E-03
2-methylbutyroylcarnitine	rs270605	5	T	C	-0.0124	0.0025	8.400E-07	0.0228	0.0075	2.458E-03
2-methylbutyroylcarnitine	rs270606	5	A	G	0.0123	0.0026	1.680E-06	0.0283	0.0080	3.876E-04
2-methylbutyroylcarnitine	rs270607	5	A	G	0.0123	0.0026	1.680E-06	0.0284	0.0079	3.536E-04
2-methylbutyroylcarnitine	rs270613	5	A	G	0.0124	0.0025	1.070E-06	0.0249	0.0076	1.085E-03
2-methylbutyroylcarnitine	rs272842	5	A	G	0.0128	0.0025	5.130E-07	0.0226	0.0075	2.692E-03
2-methylbutyroylcarnitine	rs272865	5	A	T	-0.0117	0.0025	3.980E-06	0.0227	0.0075	2.561E-03
2-methylbutyroylcarnitine	rs272867	5	A	G	-0.0123	0.0025	1.040E-06	0.0228	0.0075	2.507E-03
2-methylbutyroylcarnitine	rs272868	5	C	G	0.0126	0.0026	9.130E-07	0.0286	0.0080	3.344E-04
2-methylbutyroylcarnitine	rs272869	5	A	G	0.0123	0.0025	1.020E-06	0.0213	0.0076	4.826E-03
2-methylbutyroylcarnitine	rs272872	5	A	G	0.0125	0.0026	1.180E-06	0.0284	0.0080	3.646E-04
2-methylbutyroylcarnitine	rs272874	5	T	C	-0.0116	0.0026	6.900E-06	0.0212	0.0076	5.009E-03
2-methylbutyroylcarnitine	rs272875	5	T	C	0.0124	0.0025	1.020E-06	0.0229	0.0075	2.425E-03
2-methylbutyroylcarnitine	rs272878	5	T	C	0.0126	0.0026	9.950E-07	0.0285	0.0080	3.500E-04
2-methylbutyroylcarnitine	rs272879	5	C	G	0.0124	0.0025	1.010E-06	0.0226	0.0075	2.668E-03
2-methylbutyroylcarnitine	rs272880	5	T	C	-0.0126	0.0026	9.330E-07	0.0282	0.0080	4.184E-04
2-methylbutyroylcarnitine	rs272881	5	A	G	-0.0124	0.0025	1.010E-06	0.0226	0.0075	2.678E-03
2-methylbutyroylcarnitine	rs272882	5	T	G	-0.0126	0.0026	9.520E-07	0.0285	0.0080	3.499E-04
2-methylbutyroylcarnitine	rs272883	5	A	G	0.0126	0.0026	9.620E-07	0.0285	0.0080	3.487E-04
2-methylbutyroylcarnitine	rs272886	5	T	C	0.0123	0.0025	1.230E-06	0.0227	0.0075	2.596E-03
2-methylbutyroylcarnitine	rs272887	5	A	G	0.0124	0.0026	1.360E-06	0.0283	0.0080	3.848E-04
2-methylbutyroylcarnitine	rs272888	5	T	C	0.0124	0.0026	1.360E-06	0.0285	0.0080	3.549E-04
2-methylbutyroylcarnitine	rs272889	5	A	G	0.0123	0.0025	1.080E-06	0.0211	0.0076	5.163E-03
2-methylbutyroylcarnitine	rs272892	5	T	C	-0.0124	0.0026	1.360E-06	0.0285	0.0080	3.553E-04
2-methylbutyroylcarnitine	rs272893	5	T	C	0.0123	0.0025	1.080E-06	0.0212	0.0076	5.117E-03
2-methylbutyroylcarnitine	rs273901	5	T	G	-0.0124	0.0026	1.520E-06	0.0286	0.0080	3.435E-04
2-methylbutyroylcarnitine	rs273911	5	C	G	0.0124	0.0026	1.360E-06	0.0281	0.0080	4.286E-04
2-methylbutyroylcarnitine	rs273912	5	T	G	-0.0124	0.0026	1.630E-06	0.0283	0.0080	3.887E-04
2-methylbutyroylcarnitine	rs273913	5	T	C	0.0116	0.0025	4.700E-06	0.0229	0.0075	2.432E-03
2-methylbutyroylcarnitine	rs273914	5	A	T	0.0131	0.0025	2.070E-07	0.0226	0.0075	2.674E-03
2-methylbutyroylcarnitine	rs273915	5	C	G	-0.0124	0.0026	1.370E-06	0.0285	0.0080	3.475E-04
2-methylbutyroylcarnitine	rs273916	5	A	C	-0.0124	0.0026	1.370E-06	0.0285	0.0080	3.542E-04
2-methylbutyroylcarnitine	rs274546	5	A	G	0.0121	0.0025	1.590E-06	0.0212	0.0076	5.141E-03
2-methylbutyroylcarnitine	rs274557	5	T	C	-0.0118	0.0025	3.420E-06	-0.0231	0.0075	2.261E-03
2-methylbutyroylcarnitine	rs274558	5	A	G	-0.0118	0.0025	3.430E-06	-0.0231	0.0075	2.263E-03
2-methylbutyroylcarnitine	rs274559	5	A	G	-0.0117	0.0026	4.170E-06	-0.0232	0.0076	2.159E-03

2-methylbutyroylcarnitine	rs274560	5	T	C	-0.0119	0.0025	2.430E-06	-0.0217	0.0076	4.242E-03
2-methylbutyroylcarnitine	rs274561	5	A	C	0.0119	0.0025	2.220E-06	-0.0213	0.0076	4.900E-03
2-methylbutyroylcarnitine	rs274567	5	T	C	0.0121	0.0025	1.710E-06	-0.0226	0.0076	2.859E-03
2-methylbutyroylcarnitine	rs274570	5	T	C	0.0127	0.0026	1.170E-06	-0.0279	0.0080	4.806E-04
2-methylbutyroylcarnitine	rs3778129	6	A	G	-0.0182	0.0041	9.910E-06	0.0117	0.0112	2.971E-01
2-methylbutyroylcarnitine	rs4074995	5	A	G	0.0123	0.0026	1.770E-06	0.0141	0.0088	1.117E-01
2-methylbutyroylcarnitine	rs4075958	5	A	G	0.0124	0.0026	1.920E-06	0.0147	0.0089	1.001E-01
2-methylbutyroylcarnitine	rs419291	5	T	C	0.0123	0.0025	1.330E-06	0.0228	0.0076	2.890E-03
2-methylbutyroylcarnitine	rs456598	6	A	G	-0.0155	0.0035	7.090E-06	0.0043	0.0109	6.892E-01
2-methylbutyroylcarnitine	rs4626843	1	A	G	0.0292	0.0065	7.390E-06	-0.0200	0.0198	3.111E-01
2-methylbutyroylcarnitine	rs4648860	1	T	C	0.0124	0.0027	4.720E-06	-0.0111	0.0101	2.705E-01
2-methylbutyroylcarnitine	rs4719207	7	T	C	-0.0140	0.0030	3.060E-06	-0.0080	0.0088	3.653E-01
2-methylbutyroylcarnitine	rs4730501	7	A	G	-0.0121	0.0026	4.180E-06	0.0045	0.0091	6.209E-01
2-methylbutyroylcarnitine	rs4732399	7	A	G	-0.0311	0.0070	8.690E-06	-0.0124	0.0190	5.131E-01
2-methylbutyroylcarnitine	rs4948546	10	A	G	-0.0125	0.0026	2.370E-06	0.0209	0.0106	4.829E-02
2-methylbutyroylcarnitine	rs6575209	14	T	C	0.0120	0.0026	5.100E-06	0.0241	0.0092	8.870E-03
2-methylbutyroylcarnitine	rs662138	6	C	G	0.0187	0.0034	3.650E-08	0.0015	0.0097	8.787E-01
2-methylbutyroylcarnitine	rs6764615	3	C	G	0.0159	0.0033	2.170E-06	0.0040	0.0106	7.092E-01
2-methylbutyroylcarnitine	rs7081819	10	A	G	0.0120	0.0027	5.630E-06	0.0217	0.0108	4.435E-02
2-methylbutyroylcarnitine	rs7087186	10	C	G	0.0126	0.0027	2.230E-06	0.0240	0.0109	2.673E-02
2-methylbutyroylcarnitine	rs715	2	T	C	0.0123	0.0026	2.400E-06	0.0018	0.0083	8.260E-01
2-methylbutyroylcarnitine	rs7903712	10	C	G	0.0127	0.0027	1.650E-06	0.0233	0.0107	2.994E-02
2-methylbutyroylcarnitine	rs7920393	10	A	G	0.0120	0.0027	6.050E-06	0.0220	0.0108	4.075E-02
2-methylbutyroylcarnitine	rs7946997	11	T	C	-0.0123	0.0026	2.970E-06	-0.0013	0.0081	8.754E-01
2-methylbutyroylcarnitine	rs9416742	10	A	G	0.0120	0.0027	5.640E-06	-0.0207	0.0111	6.243E-02
2-methylbutyroylcarnitine	rs9492253	6	A	G	-0.0119	0.0027	8.620E-06	-0.0017	0.0092	8.547E-01
2-methylbutyroylcarnitine	rs9641894	7	T	G	-0.0117	0.0025	4.130E-06	-0.0240	0.0082	3.369E-03
2-methylbutyroylcarnitine	rs9642829	8	A	G	-0.0346	0.0075	3.610E-06	-0.0199	0.0264	4.520E-01
2-methylbutyroylcarnitine	rs9839755	3	T	C	0.0152	0.0034	7.620E-06	0.0056	0.0107	5.976E-01
2-methylbutyroylcarnitine	rs999845	10	T	C	0.0121	0.0027	4.870E-06	0.0227	0.0108	3.569E-02
2-methylbutyroylcarnitine	rs999846	10	A	G	0.0120	0.0027	5.710E-06	0.0226	0.0108	3.659E-02

Table S22 Summary statistics for the associations of the 1-oleoylglycerophosphocholine-associated SNPs with these exposures and ER-negative Breast cancer in Breast Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
1-oleoylglycerophosphocholine	rs10019315	4	T	C	0.0121	0.0026	2.990E-06	beta.outcome	se.outcome	pval.outcome
1-oleoylglycerophosphocholine	rs10465080	9	A	T	-0.0121	0.0026	4.693E-06	-0.0090	0.0134	5.027E-01
1-oleoylglycerophosphocholine	rs12202351	6	T	C	0.0118	0.0026	7.135E-06	-0.0011	0.0155	9.438E-01
1-oleoylglycerophosphocholine	rs12605650	18	T	C	0.0120	0.0026	5.134E-06	0.0100	0.0139	4.725E-01
1-oleoylglycerophosphocholine	rs1366823	2	A	G	0.0118	0.0026	6.939E-06	0.0323	0.0152	3.362E-02
1-oleoylglycerophosphocholine	rs16968711	15	A	G	0.0205	0.0041	4.645E-07	-0.0452	0.0332	1.738E-01
1-oleoylglycerophosphocholine	rs17089560	4	T	C	0.0468	0.0092	3.393E-07	0.0258	0.0178	1.461E-01
1-oleoylglycerophosphocholine	rs303610	9	A	T	-0.0117	0.0026	8.877E-06	0.0343	0.0548	5.311E-01
1-oleoylglycerophosphocholine	rs4736583	8	A	C	-0.0120	0.0026	4.893E-06	-0.0055	0.0125	6.566E-01
1-oleoylglycerophosphocholine	rs476092	11	A	C	0.0120	0.0026	5.088E-06	-0.0042	0.0116	7.157E-01
1-oleoylglycerophosphocholine	rs4817185	21	C	G	0.0373	0.0084	7.784E-06	-0.0069	0.0131	5.995E-01
1-oleoylglycerophosphocholine	rs6061764	20	A	G	-0.0140	0.0030	3.061E-06	-0.0013	0.0125	9.186E-01
1-oleoylglycerophosphocholine	rs6977605	7	A	C	-0.0242	0.0050	1.674E-06	-0.0069	0.0120	5.626E-01
1-oleoylglycerophosphocholine	rs743452	21	T	C	-0.0231	0.0052	8.059E-06	0.0084	0.0129	5.153E-01
1-oleoylglycerophosphocholine	rs9489697	6	T	C	0.0116	0.0026	8.364E-06	0.0207	0.0115	7.304E-02
1-oleoylglycerophosphocholine	rs969948	4	T	C	-0.0117	0.0026	5.744E-06	-0.0057	0.0114	6.174E-01

Table S23 Summary statistics for the associations of the octanoylcarnitine-associated SNPs with these exposures and squamous cell lung cancer in International Lung Cancer Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
octanoylcarnitine	rs10170989	2	T	G	0.0198	0.0049	4.767E-05	0.0228	0.0358	5.286E-01
octanoylcarnitine	rs10868458	9	A	T	-0.0165	0.0035	1.923E-06	-0.0339	0.0275	2.472E-01
octanoylcarnitine	rs17638535	6	A	G	-0.0652	0.0132	8.745E-07	0.1265	0.1177	2.755E-01
octanoylcarnitine	rs2133336	17	A	G	0.0152	0.0034	9.562E-06	-0.0346	0.0269	2.281E-01
octanoylcarnitine	rs2720162	2	T	G	-0.0154	0.0034	7.305E-06	0.0582	0.0262	4.159E-02
octanoylcarnitine	rs274567	5	T	C	0.0158	0.0034	3.928E-06	-0.0108	0.0277	7.073E-01
octanoylcarnitine	rs4672596	2	T	C	0.0152	0.0034	9.595E-06	-0.0230	0.0283	4.197E-01
octanoylcarnitine	rs6907864	6	T	C	0.0261	0.0058	5.789E-06	-0.0400	0.0405	3.642E-01
octanoylcarnitine	rs7130402	11	A	G	0.0324	0.0073	9.875E-06	-0.1042	0.0465	5.529E-02
octanoylcarnitine	rs7246133	19	T	C	0.0205	0.0046	9.476E-06	-0.0022	0.0301	9.442E-01
octanoylcarnitine	rs7334793	13	T	C	-0.0152	0.0034	8.042E-06	-0.0328	0.0267	2.476E-01
octanoylcarnitine	rs7552404	1	A	G	0.0746	0.0040	1.269E-77	0.0446	0.0326	1.662E-01
octanoylcarnitine	rs7660477	4	T	C	-0.0151	0.0034	8.230E-06	-0.0280	0.0265	3.169E-01
octanoylcarnitine	rs8396	4	T	C	0.0478	0.0041	1.377E-31	0.0041	0.0305	8.953E-01
octanoylcarnitine	rs884760	6	T	C	0.0188	0.0042	7.161E-06	0.0540	0.0298	9.616E-02
octanoylcarnitine	rs888860	19	A	C	-0.0181	0.0037	9.389E-07	0.0405	0.0273	1.660E-01
octanoylcarnitine	rs924135	16	A	T	-0.0209	0.0034	1.085E-09	-0.0155	0.0283	5.893E-01

Table S24 Summary statistics for the associations of the salicylate-associated SNPs with these exposures and ER-negative Breast cancer in Breast Cancer Association Consortium

Phenotype	SNP	CHR	Effect Allele	Reference Allele	Summary statistics for exposure			Summary statistics for cancer		
					Beta	SE	P value	Beta	SE	P value
salicylate	rs10040805	5	T	C	-0.1765	0.0427	3.620E-05	-0.0785	0.0279	4.830E-03
salicylate	rs10205265	2	T	C	-0.0901	0.0202	7.794E-06	-0.0064	0.0142	6.516E-01
salicylate	rs10402106	19	T	C	0.9529	0.1924	7.348E-07	0.0596	0.0513	2.458E-01
salicylate	rs10458721	10	A	G	-0.0786	0.0175	7.228E-06	-0.0151	0.0127	2.338E-01
salicylate	rs10471169	4	T	C	0.9362	0.1854	4.427E-07	0.0583	0.0214	6.313E-03
salicylate	rs10749553	10	A	G	-0.0868	0.0194	7.554E-06	0.0137	0.0129	2.882E-01
salicylate	rs10977627	9	T	C	0.8146	0.1524	9.061E-08	-0.0040	0.0439	9.273E-01
salicylate	rs10984575	9	A	C	0.1144	0.0257	8.271E-06	-0.0036	0.0199	8.572E-01
salicylate	rs11256026	10	A	G	-0.2061	0.0409	4.601E-07	-0.0223	0.0117	5.638E-02
salicylate	rs1164673	11	C	G	0.0754	0.0168	7.267E-06	0.0142	0.0118	2.316E-01
salicylate	rs12005082	9	A	T	0.1232	0.0265	3.354E-06	0.0010	0.0153	9.479E-01
salicylate	rs12075728	1	T	G	-0.4196	0.0922	5.394E-06	0.0097	0.0248	6.976E-01
salicylate	rs16832600	1	T	C	0.2205	0.0469	2.579E-06	-0.0145	0.0300	6.285E-01
salicylate	rs16862165	3	T	C	-0.4130	0.0890	3.477E-06	-0.0364	0.0577	5.277E-01
salicylate	rs17682068	8	A	G	-0.1299	0.0290	7.452E-06	0.0092	0.0244	7.050E-01
salicylate	rs400214	1	T	C	0.3258	0.0723	6.599E-06	0.0158	0.0358	6.586E-01
salicylate	rs7701675	5	A	G	-0.7943	0.1733	4.558E-06	0.0458	0.0512	3.705E-01
salicylate	rs8178289	17	A	C	-0.1064	0.0233	5.095E-06	-0.0112	0.0168	5.071E-01
salicylate	rs9453415	6	A	G	0.3740	0.0830	6.605E-06	0.0025	0.0488	9.599E-01

Table S25 Significant Metabolic Associated with 4 Primary Cancers

Trait	Metabolic Pathway	Involved Metabolites	P value	Database
Lung cancer	Vitamin B6 metabolism	4-Pyridoxate	0.028734	KEGG,SMP
Lung cancer	Butanoate metabolism	2-Hydroxyglutarate	0.04752	KEGG,SMP
Lung adenocarcinoma	Aminoacyl-tRNA biosynthesis	L-Asparagine,L-Phenylalanine,L-Isoleucine	0.006411	KEGG
Lung adenocarcinoma	Phenylalanine, tyrosine and tryptophan biosynthesis	L-Phenylalanine	0.03316	KEGG,SMP