

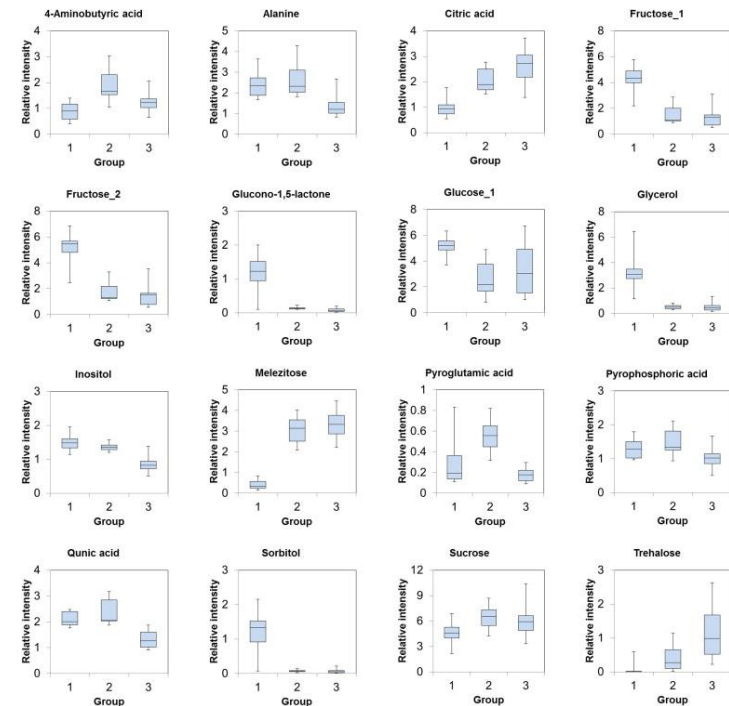
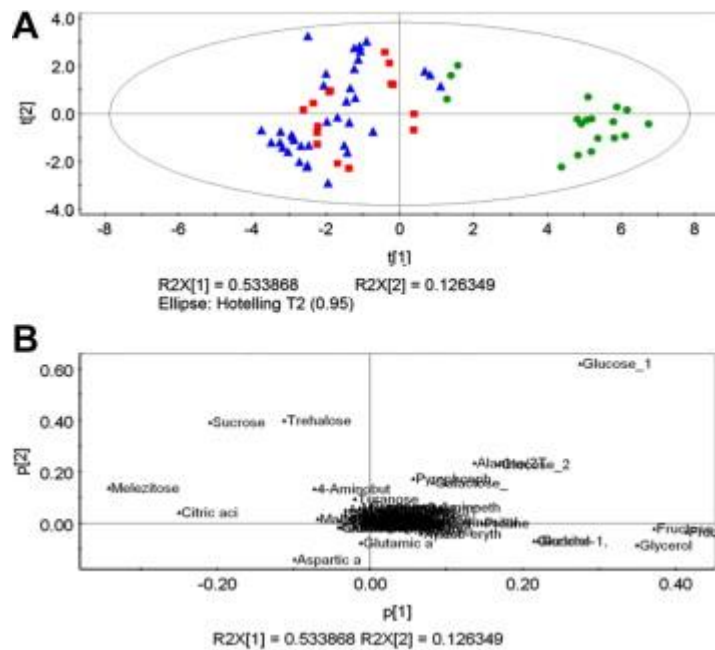
Metabolomics for medical application

Herbal medicine

discrimination between species or production regions

Multivariate analysis

Comparison of metabolite between groups

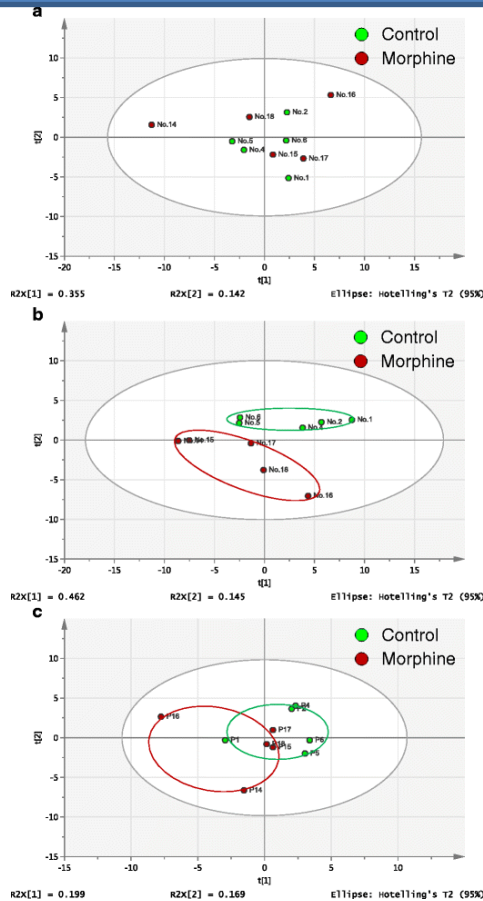


[Metabolic profiling and identification of the genetic varieties and agricultural origin of *Cnidium officinale* and *Ligusticum chuanxiong*.](#)

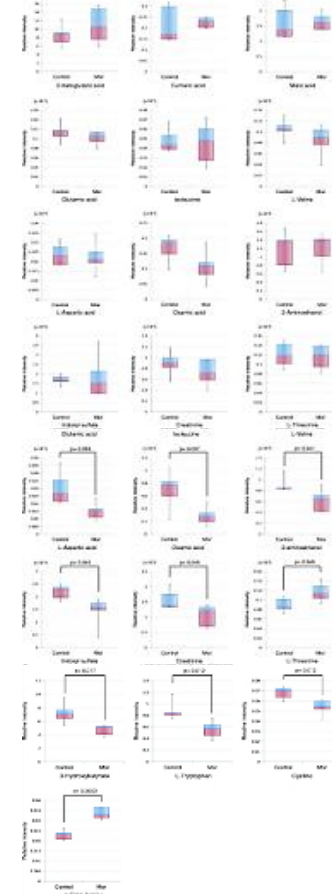
Kobayashi S, Nagasawa S, Yamamoto Y, Donghyo K, Bamba T, Fukusaki E.
J Biosci Bioeng. 2012 Jul;114(1):86-91. Epub 2012 May 22.

Drug-addicted / disease-model rats

Multivariate analysis



Comparison of metabolite between groups

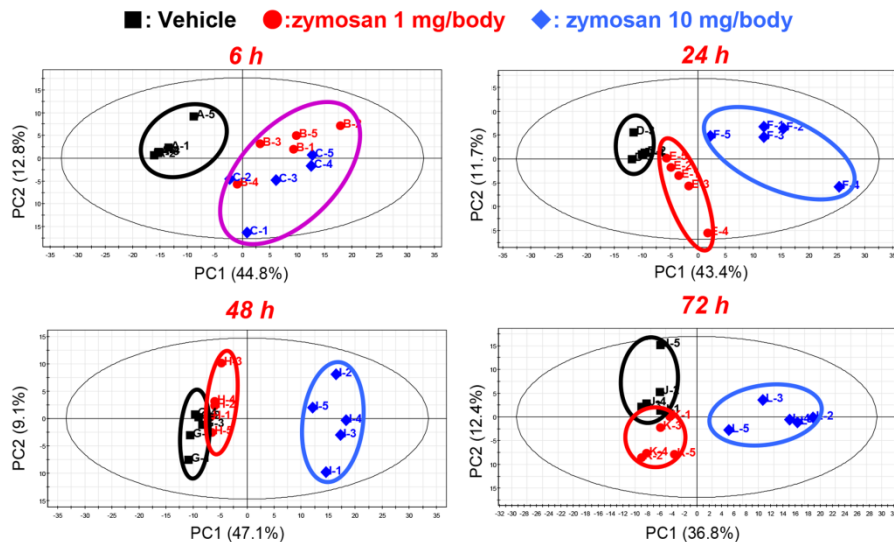


[Metabolic profiling of urine and blood plasma in rat models of drug addiction on the basis of morphine, methamphetamine, and cocaine-induced conditioned place preference.](#)

Zaitso K, Miyawaki I, Bando K, Horie H, Shima N, Katagi M, Tatsuno M, Bamba T, Sato T, Ishii A, Tsuchihashi H, Suzuki K, Fukusaki E. Anal Bioanal Chem. 2013 Aug 4.

Zymosan-Induced Peritonitis / inflammation

Multivariate analysis



Comparison of metabolite between groups

Metabolite	Zymosan 1 mg vs. Vehicle				Zymosan 10 mg vs. Vehicle			
	Fold change				Fold change			
Polysaturated fatty acids (PUFAs)	6 h	24 h	48 h	72 h	6 h	24 h	48 h	72 h
Arachidonate (20:4n6)	7.85	2.44	1.78	1.50	10.35	6.32	4.39	2.70
Docosahexaenoate (DHA; 22:6n3)	16.84	2.55	1.79	1.93	23.05	11.16	7.49	4.68
Docosapentaenoate (DPA; 22:5n3)	4.38	1.73	1.15	1.53	5.14	4.68	3.03	2.15
Eicosapentaenoate (EPA; 20:5n3)	2.71	1.25	1.10	0.92	3.44	2.56	2.55	1.34
Lysolipids								
1-Arachidonoyl-GPC (20:4)	6.21	1.64	2.56	2.18	6.66	2.51	1.77	1.14
1-Docosahexaenoyl-GPC (22:6)	4.75	2.77	1.62	1.41	6.19	4.89	2.17	1.55
1-Oleoyl-GPC (18:1)	4.39	2.27	3.91	0.85	5.47	7.69	3.81	1.09
1-Oleoyl-GPE (18:1)	3.54	1.94	1.26	1.25	2.48	3.42	3.64	1.89
1-Palmitoyl-GPC (16:0)	3.31	2.96	5.52	1.08	4.15	12.93	11.32	1.92
1-Stearoyl-GPC (18:0)	4.36	6.22	5.32	1.56	5.56	20.95	22.26	3.91
Tryptophan metabolism								
Tryptophan	2.88	2.07	1.43	1.00	3.19	3.35	2.79	2.23
Kynurenine	2.41	1.78	0.83	1.24	2.34	4.47	3.87	2.18
Nicotinamide	2.03	1.28	1.16	0.74	2.06	0.68	1.66	1.25
Glutathione Synthesis and Turnover								
Glutathione, oxidized (GSSG)	4.60	1.79	0.90	0.66	2.63	1.74	1.42	0.93
Cysteine-glutathione disulfide	2.85	1.99	1.05	0.92	2.16	2.63	2.18	1.75
Cysteine	1.25	1.03	1.27	1.21	2.07	2.52	3.65	1.68
S-Oxoproline	2.93	1.79	1.25	1.06	2.95	2.36	3.31	1.37
2-Aminobutyrate	1.86	0.82	1.07	1.06	1.78	1.43	2.68	1.44
Purine Catabolism								
AMP	3.68	3.85	2.89	1.94	0.48	0.29	1.25	2.77
Adenosine	0.18	0.15	0.15	0.19	0.12	0.06	0.14	0.09
Inosine	0.66	0.32	1.08	0.29	0.65	0.28	0.75	0.24
Urate	3.23	1.29	1.28	0.66	2.74	2.24	3.54	1.36
Carnitines								
2-Methylbutyrylcarnitine (C5)	1.96	1.29	1.03	0.97	2.18	1.69	1.34	1.28
3-Dehydrocarnitine	2.03	1.38	1.10	0.94	1.82	1.55	2.07	1.59
3-Methylglutaryl carnitine (C6)	3.73	1.72	1.49	0.74	3.56	6.36	9.55	1.01
Acetylcarnitine (C2)	2.60	1.46	0.92	0.78	2.44	1.88	2.37	1.25
Butyrylcarnitine (C4)	3.34	1.40	0.99	1.07	2.30	1.29	1.31	1.11
Carnitine	1.65	1.19	1.06	0.97	1.22	0.80	1.48	1.46
Deoxycarnitine	1.69	1.72	1.09	0.75	1.99	1.19	1.39	1.84
Hexanoylcarnitine (C6)	2.47	1.43	0.98	1.29	3.01	2.19	3.10	1.48
Isobutyrylcarnitine (C4)	1.76	1.70	1.05	0.71	1.89	1.98	1.65	1.35
Isovalerylcarnitine (C5)	1.65	1.48	1.12	0.94	2.10	3.05	2.96	2.01
Propionylcarnitine (C3)	1.73	1.45	1.25	0.83	1.56	1.01	1.65	1.86

Statistically significant changes are in bold ($P < 0.05$, compared with vehicle control). GPC refers to glycerophosphocholine and GPE refers to glycerophosphoethanolamine.

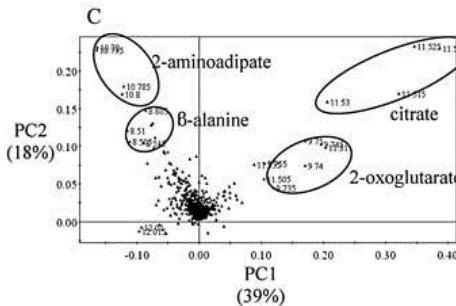
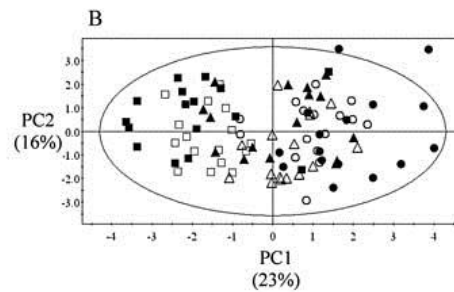
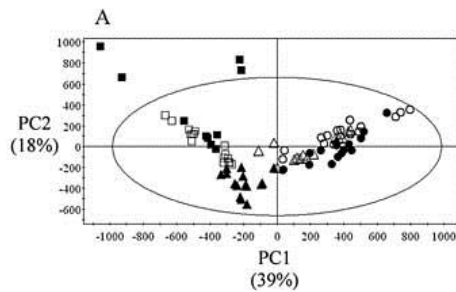
Inflammation and Resolution Are Associated with Upregulation of Fatty Acid β -Oxidation in Zymosan-Induced Peritonitis.

Fujieda Y, Manno A, Hayashi Y, Rhodes N, Guo L, Arita M, Bamba T, Fukusaki E.
PLoS One. 2013 Jun 11;8(6)

Hydrazine induced hepatotoxicity / mechanism

Multivariate analysis

Comparison of metabolite between groups



- Now we are conducting cooperative research on “metabolomics involving higher animals or biomedical applications” with faculty of medicine, faculty of dentistry, and other institutes.