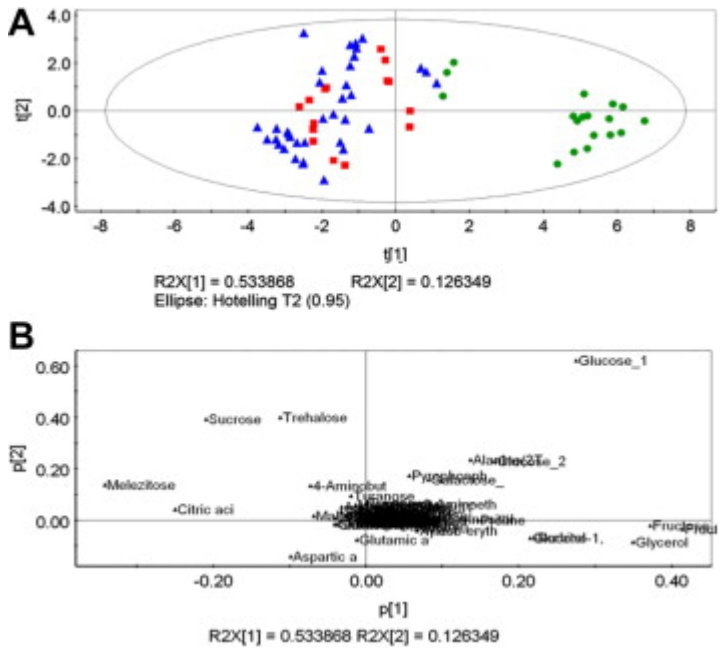
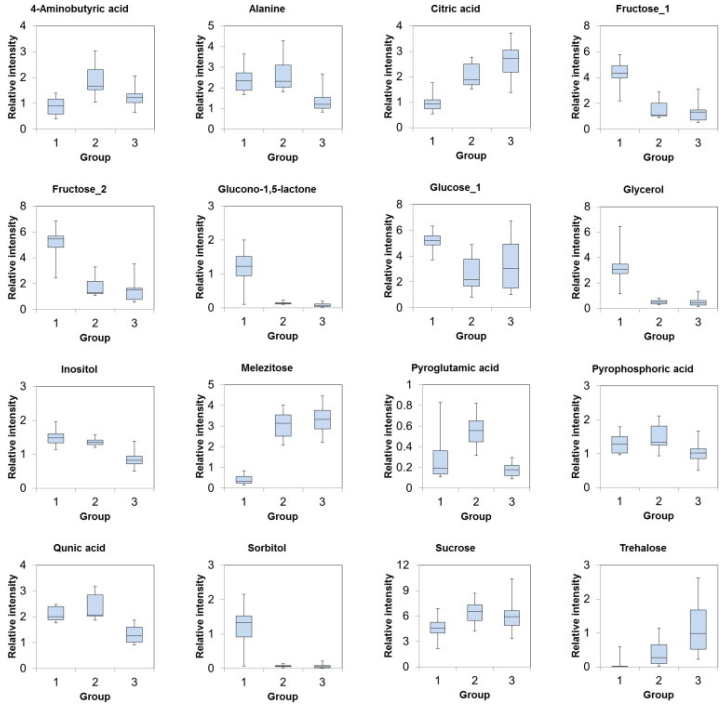
メディカル分野への
メタボロミクス技術の適用

生薬の種および産地判別

多変量解析



群間での代謝物の違い



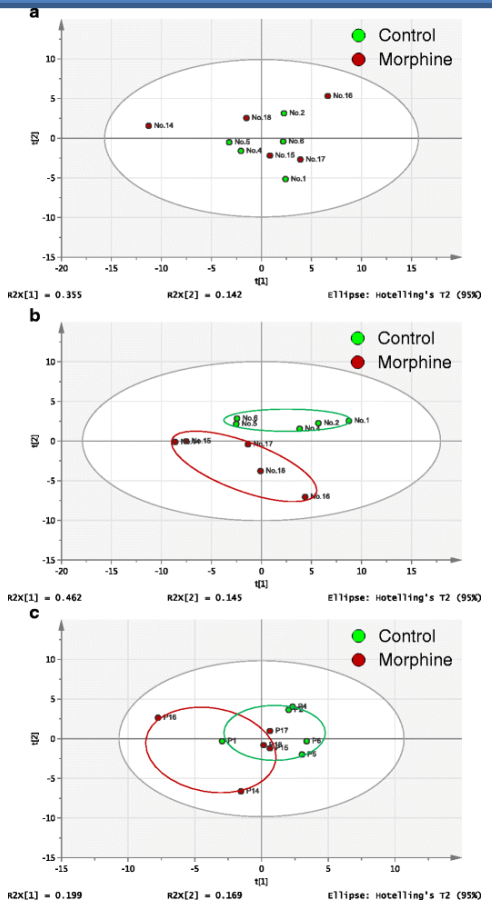
[Metabolic profiling and identification of the genetic varieties and agricultural origin of Cnidium officinale and Ligusticum chuanxiong.](#)

Kobayashi S, Nagasawa S, Yamamoto Y, Donghyo K, Bamba T, Fukusaki E.

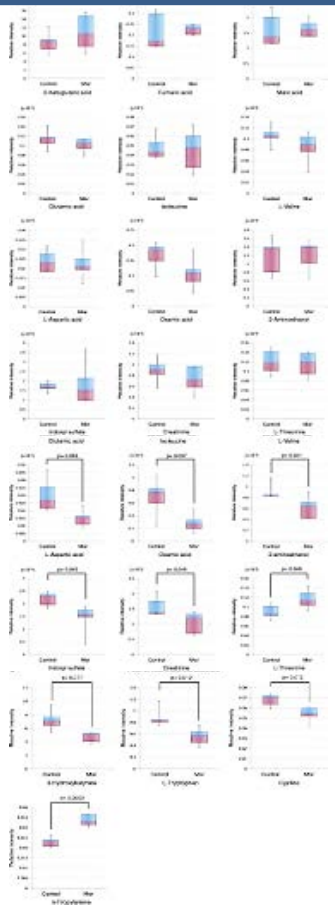
J Biosci Bioeng. 2012 Jul;114(1):86-91. Epub 2012 May 22.

薬物中毒モデルラットの代謝プロファイル変化

多変量解析



群間での代謝物の違い

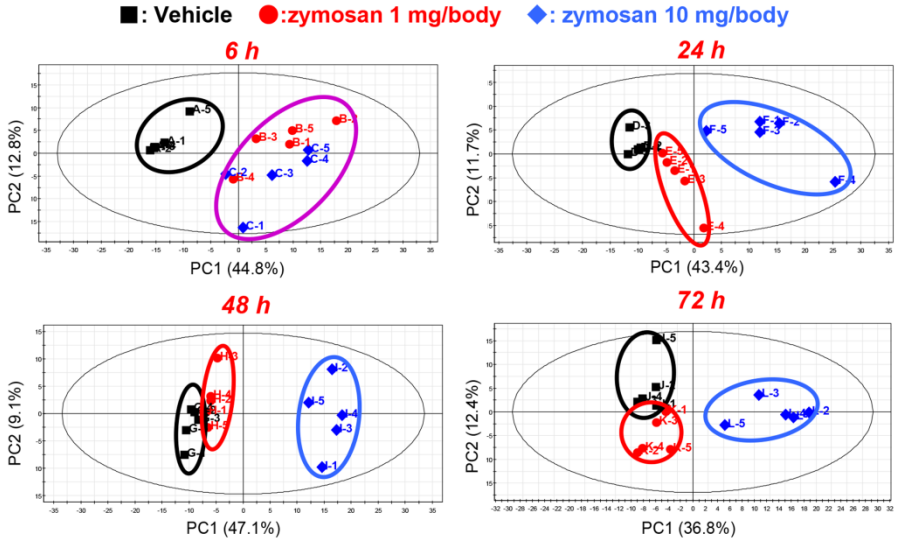


[Metabolic profiling of urine and blood plasma in rat models of drug addiction on the basis of morphine, methamphetamine, and cocaine-induced conditioned place preference.](#)

Zaitsu 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.

チモサン誘導性腹膜炎モデル動物における メタボロミクスによる炎症の評価

多変量解析



群間での代謝物の違い

Metabolite	Zymosan 1 mg vs. Vehicle Fold change				Zymosan 10 mg vs. Vehicle Fold change			
	6 h	24 h	48 h	72 h	6 h	24 h	48 h	72 h
Polyunsaturated fatty acids (PUFAs)								
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
5-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-Methylbutyroylcarnitine (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-Methylglutaroylcarnitine (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.

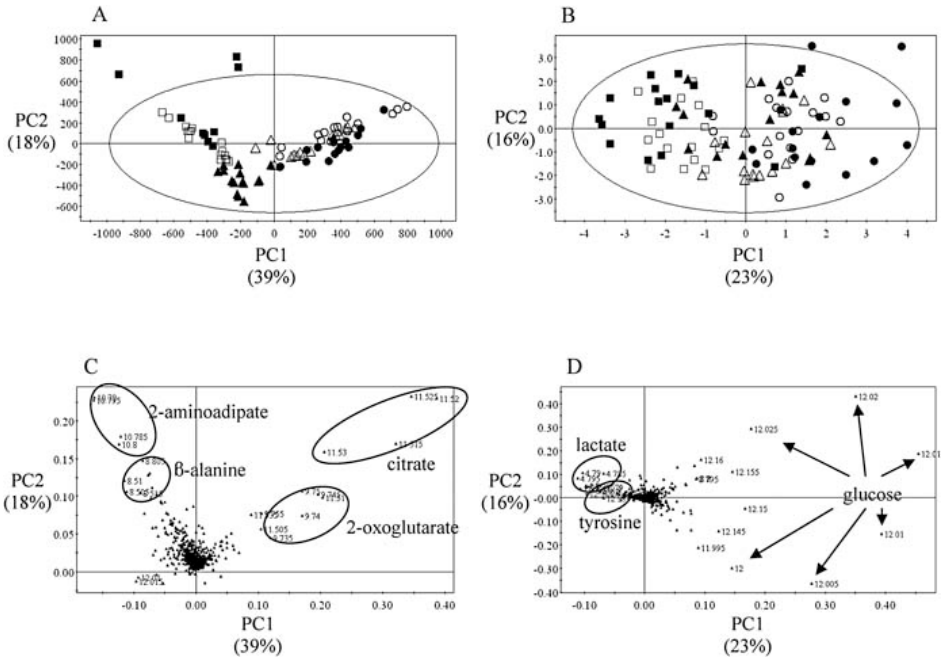
Fujieda Y, Manno A, Hayashi Y, Rhodes N, Guo L, Arita M, Bamba T, Fukusaki E.

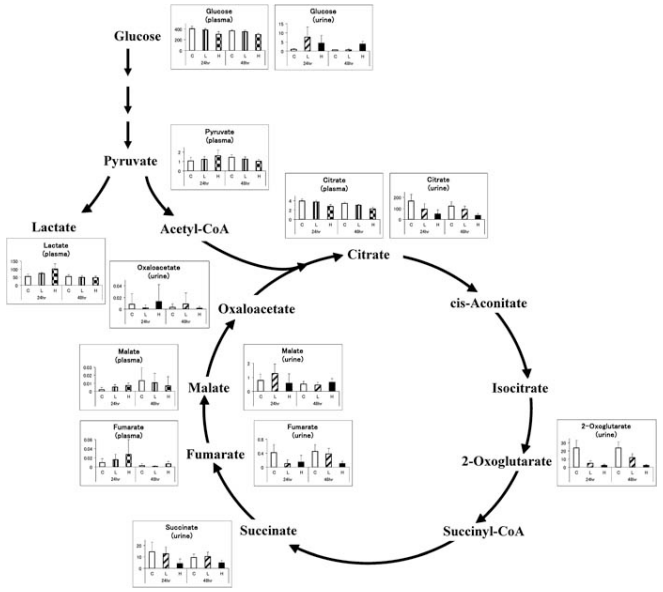
PLoS One. 2013 Jun 11;8(6)

メタボロミクスによる
ヒドラジン誘導性の肝毒性誘発メカニズムの考察

多変量解析

群間での代謝物の違い





GC-MS-based metabolomics reveals mechanism of action for hydrazine induced hepatotoxicity in rats.

Bando K, Kunimatsu T, Sakai J, Kimura J, Funabashi H, Seki T, Bamba T, Fukusaki E.

J Appl Toxicol,.2011. 31(6): 524-535. Epub Date 2010/12/15

- その他，医学部，歯学部やその他の研究所との共同研究を通して，疾患モデル動物などへのメタボロミクスの応用研究を行っております．