

**<sup>1</sup>H-NMR metabolomics analysis of nutritional components for two kinds of freshwater fish  
brain extracts**

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Table S1. <sup>1</sup>H NMR resonance assignments for fish brain

<sup>1</sup> H chemical shift (ppm)	Molecule	Assignment
1.0126 (d) 0.9816 (d)	Isoleucine	<sup>3</sup> CH <sub>3</sub>
0.9252 (m)		<sup>5</sup> CH <sub>3</sub>
0.9592 (d)	Leucine	<sup>5</sup> CH <sub>3</sub>
1.0456 (d)	Valine	<sup>4</sup> CH <sub>3</sub>
1.0024 (d)		<sup>4</sup> CH <sub>3</sub>
1.3331 (d)	Lactate	<sup>3</sup> CH <sub>3</sub>
4.122 (q)		<sup>2</sup> CH
1.4704 (d)	Alanine	<sup>3</sup> CH <sub>3</sub>
1.7220 (m)	Lysine	<sup>5</sup> CH <sub>2</sub>
1.9068 (qu)	GABA	<sup>3</sup> CH <sub>2</sub>
2.3023 (t)		<sup>4</sup> CH <sub>2</sub>
3.0189 (t)		<sup>2</sup> CH <sub>2</sub>
1.99 (s)	Acetamide	<sup>2</sup> CH <sub>3</sub>
2.0248 (s)	NAA	<sup>2</sup> CH <sub>3</sub>
2.7000 (dd) 2.5022 (m)		<sup>3</sup> CH <sub>2</sub>
2.1354 (m)	Glx-Glutamate+Glutamine	<sup>3</sup> CH <sub>2</sub>
3.7777 (m)		<sup>2</sup> CH
2.3569 (m)	Glutamate	<sup>4</sup> H <sub>2</sub>
2.4119 (t)	Oxoglutarate	<sup>4</sup> H <sub>2</sub>
2.4516 (m)	Glutamine	<sup>4</sup> H <sub>2</sub>
2.5482 (s)	Methylamine	<sup>1</sup> H <sub>3</sub>
3.097 (s)	Creatine	N(CH <sub>3</sub> )
3.9368 (s)		<sup>2</sup> CH <sub>2</sub>
3.1968 (s)	Choline	N(CH <sub>3</sub> ) <sub>3</sub>
3.2056 (s)	Phosphocholine	N(CH <sub>3</sub> ) <sub>3</sub>
3.4315 (t)	Taurine	<sup>1</sup> CH <sub>2</sub>
3.2689 (t)		<sup>2</sup> CH <sub>2</sub>
3.5416 (dd)	myo-Inositol	<sup>1</sup> CH; <sup>3</sup> CH
3.6282 (t)		<sup>4</sup> CH; <sup>6</sup> CH
3.5669 (s)	Glycine	<sup>2</sup> CH <sub>2</sub>

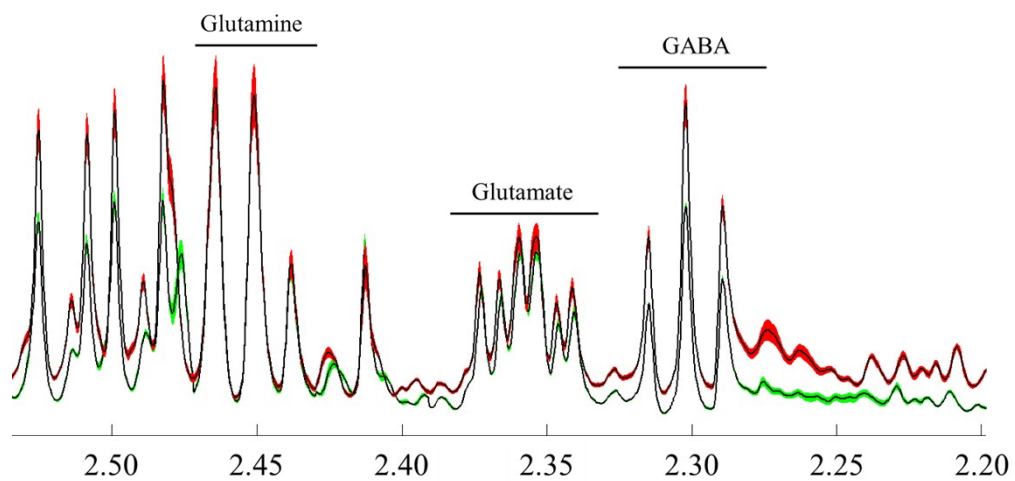
Note: S=singlet; d=doublet; t=triplet; q: quartet; qu, quintet; m, other multiplet; superscript number: Carbon position in the chemical structure; subscript number: Proton number in the chemical structure.

Table S2 The statistical analysis of the assigned metabolites in both freshwater fish brains.

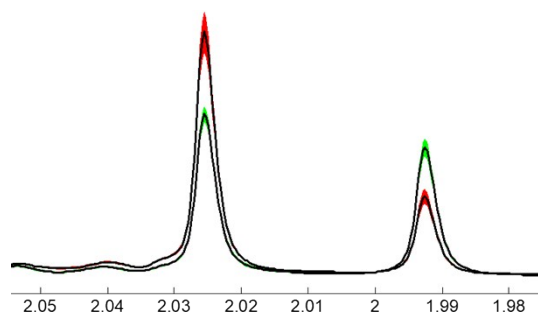
Chemicals	FJ-ave	FJ-SD	H-Ave	H-SD	<i>p</i> -Value	t-Value
Lactate	214.49	35.52	166.41	28.80	0.0125	2.896
Creatine	192.97	26.34	188.69	38.01	0.8066	0.250
Glycine	12.72	2.09	14.10	4.51	0.4727	-0.740
Taurine	83.23	20.74	80.96	16.36	0.8163	0.237
Choline	2.16	0.58	4.13	0.60	0.0000	-6.452
Glutamine	67.39	12.36	68.55	16.13	0.8797	-0.154
Glutamate	26.39	2.83	30.89	5.10	0.0593	-2.067
GABA	14.39	0.48	23.09	2.42	0.0000	-9.322
NAA	29.97	3.46	44.83	8.18	0.0006	-4.455
Acetamide	23.62	3.92	16.18	3.29	0.0015	3.996
Alanine	18.88	3.00	31.74	3.75	0.0000	-7.254
Myo-institol	74.17	35.81	54.73	13.01	0.1742	1.437

Note: FJ: crucian carp; H: yellow-head catfish; ave: average values ( $\mu\text{mol/g}$ ); SD: standard error deviations.

Fig. S1: Metabolites differences of the represents metabolites of the freshwater fish brain. A: Glutamine, glutamate and GABA; B. NAA (Left) and Acetaline (Right). *Note: Red: yellow catfish; Green: crucian carp.*



(A)



(B)