**Supplementary Information**

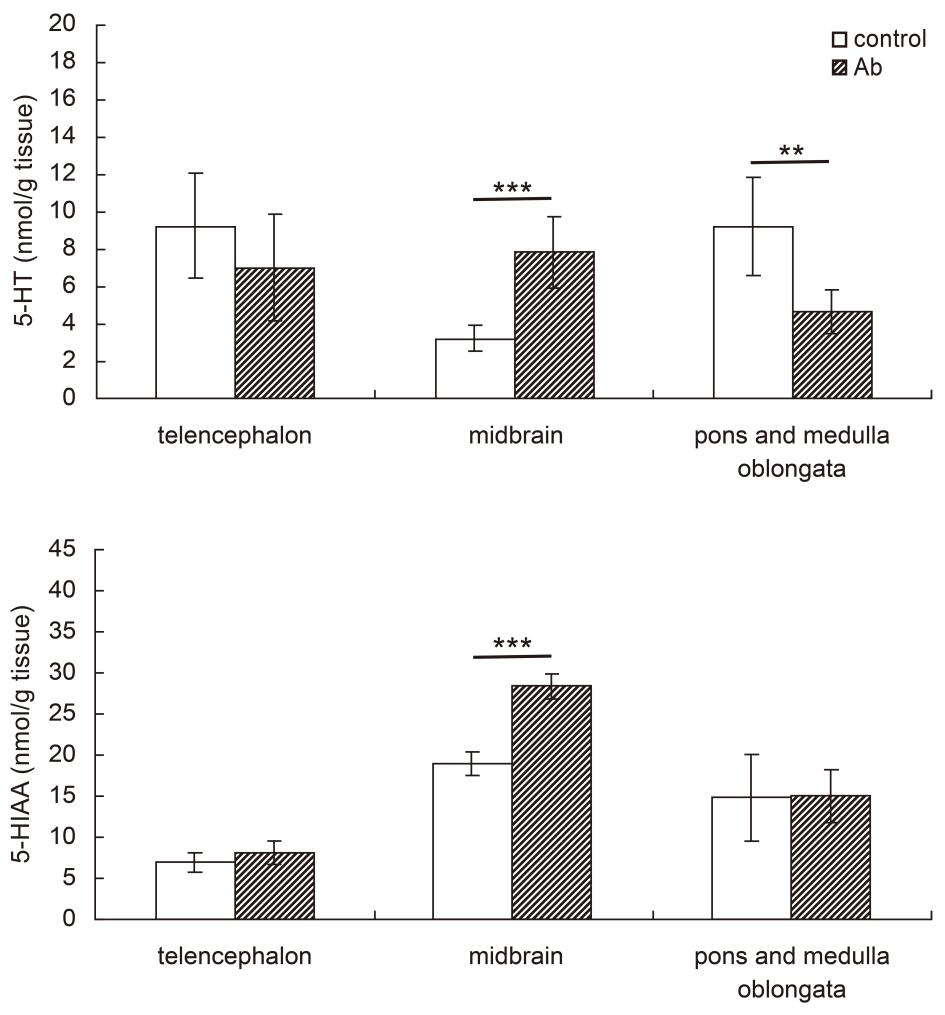
**Supplementary Table. 1** Nutrientscomposition of both ND and HTD. ND, normal diet; HTD, high tryptophan diet

|  |  |
| --- | --- |
| **Nutrients** | **[Content](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;)** |
| **Metabolizable energy** |  |
| Protein | 23.07% |
| [Carbohydrate](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 65.08% |
| Fat | 11.85% |
| **[Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;)** |  |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) [A](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 7800.00 IU**/**kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) D | 1200.00 IU/kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) E | 67.00 mg/kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) K | 5.00 mg /kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) B1 | 10.00 mg/kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) B2 | 15.00 mg/kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) B6 | 10.00 mg/kg |
| [Vitamin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) B12 | 0.02 mg/kg |
| Nicotinic acid | 55.00 mg/kg |
| [Pantothenic](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) [acid](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 22.00 mg/kg |
| [Biotin](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 0.20 mg/kg |
| [Folic](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) [acid](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 6.60 mg/kg |
| **[Mineral](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) [substance](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;)** |  |
| [Sodium](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (Na) | 3.10 g/kg |
| [Magnesium](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (Mg) | 2.90 g/kg |
| [Kalium](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (K) | 7.40 g/kg |
| [Cuprum](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (Cu) | 11.40 mg/kg |
| Iron (Fe) | 113.70 mg/kg |
| [Manganese](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (Mn) | 80.00 mg/kg |
| [Zinc](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) ([Zn](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;)) | 31.60 mg/kg |
| [Selenium](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (Se) | 0.20 mg/kg |
| [Iodine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) (I) | 0.70 mg/kg |

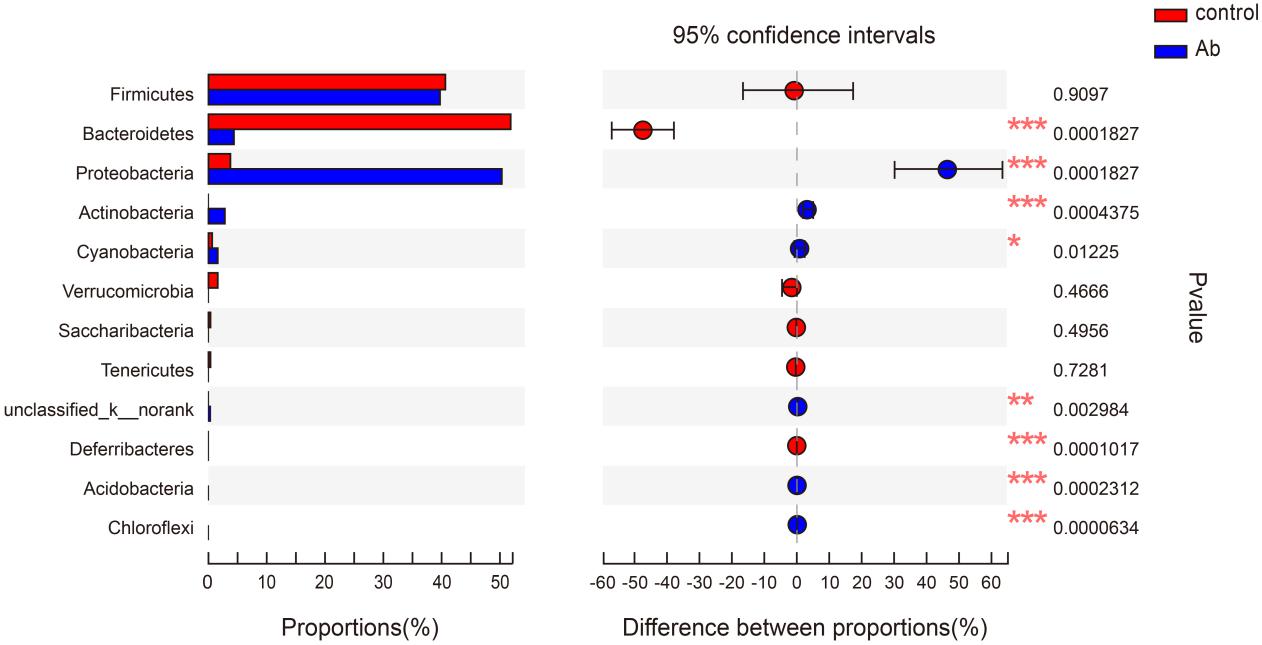
**Supplementary Table. 2** Aminoacids present in ND and HTD (g/kg). The ND and HTD are the same composition in nutrients except the tryptophan content. ND, normal diet; HTD, high tryptophan diet

|  |  |  |
| --- | --- | --- |
| **Aminoacids** | **ND** | **HTD** |
| [Methionine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;)+[Cystine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 5.80 | 5.80 |
| Lysine | 8.90 | 8.90 |
| [Arginine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 9.90 | 9.90 |
| [Leucine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 14.80 | 14.80 |
| [Isoleucine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 7.40 | 7.40 |
| [Threonine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 6.60 | 6.60 |
| [Valine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 8.90 | 8.90 |
| [Histidine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 4.90 | 4.90 |
| Phenylalanine+[Tyrosine](C:/Program%20Files/Youdao/Dict/8.9.3.0/resultui/html/index.html" \l "/javascript:;) | 14.60 | 14.60 |
| **Tryptophan** | **2.10** | **4.00** |

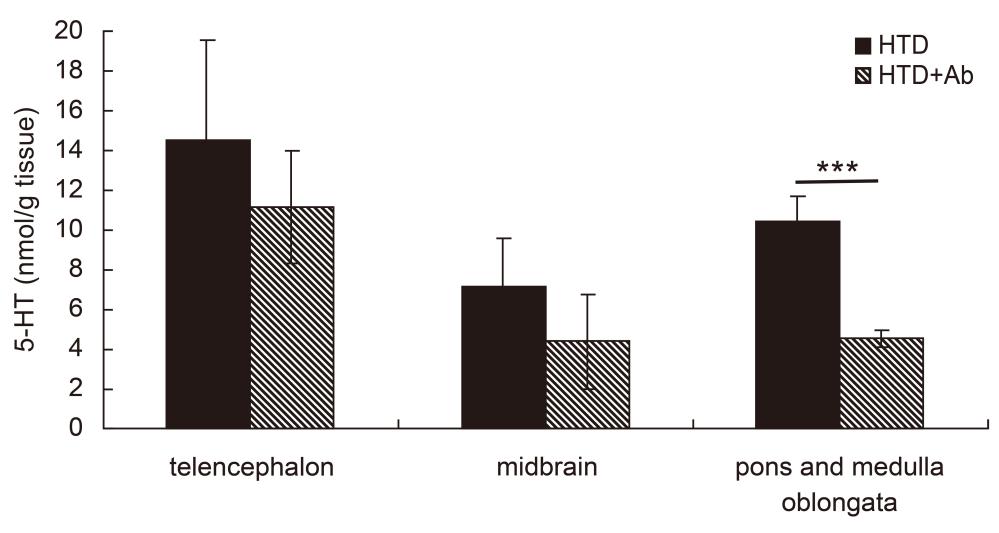
**Supplementary Fig. 1** The levels of 5-HT and 5-HIAA in midbrain were significantly increased in the Ab treatment group compared with the control group in DBA/1 mice. n=6 in each group. Statistical analysis was performed by the independent samples t-test. \*\* *p* < 0.01, \*\*\* *p* < 0.001. Data represents as mean ± SD. 5-HT, 5-hydroxytryptamine; 5-HIAA, 5-hydroxyindoleacetic acid; Ab, antibiotics

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**Supplementary Fig. 2** Ab treatment caused a change in the gut microbiota composition compared with their control in DBA/1 mice, and with a high frequency of *Proteobacteria* and low frequency of *Firmicutes* and *Bacteroidetes* in the Ab treatment mice. The horizontal bar charts depict the taxonomic differences between the two groups at the phylum level. n=10 in each group. Statistical analysis was performed by the Wilcoxon rank-sum test. \* *p* ＜ 0.05, \*\* *p* ＜ 0.01, \*\*\* *p* ＜ 0.001. Ab, antibiotics



**Supplementary Fig. 3** HTD+Ab treatment did not significantly increase the 5-HT level in the brain of DBA/1 mice compared with the HTD group. n=6 in each group. Statistical analysis was performed by the independent samples t-test. \*\*\* *p* < 0.001. Data represents as mean ± SD. 5-HT, 5-hydroxytryptamine; HTD, high tryptophan diet; HTD+Ab, high tryptophan diet with antibiotics



**Supplementary Fig. 4** HTD+Pb treatment did not significantly change the metabolism of TRP and 5-HT in plasma and brain of DBA/1 mice. n=6 in each group. Statistical analysis was performed by the independent samples t-test. Data represents as mean ± SD. TRP, tryptophan; 5-HT, 5-hydroxytryptamine; HTD, high tryptophan diet; HTD+Pb, high tryptophan diet with probiotics

