**Table S1** Chemical shifts (s) in ppm and scalar couplings (J) in Hz for glutamate, glutamine, and glutamyl glutathione.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Glutamate | Glutamine | Glutamyl  glutathione |
| s2 | 3.7433 | 3.7530 | 3.769 |
| s3 | 2.0375 | 2.1290 | 2.161 |
| s3’ | 2.1200 | 2.1090 | 2.149 |
| s4 | 2.3378 | 2.4320 | 2.559 |
| s4’ | 2.3520 | 2.4540 | 2.537 |
| J23 | 7.331 | 5.847 | 6.3 |
| J23’ | 4.651 | 6.500 | 6.3 |
| J24 | 0 | 0 | 0 |
| J24’ | 0 | 0 | 0 |
| J33’ | -14.849 | -14.504 | -14.6 |
| J34 | 6.413 | 9.165 | 6.4 |
| J34’ | 8.406 | 6.347 | 8.4 |
| J3’4 | 8.478 | 6.324 | 8.4 |
| J3’4’ | 6.875 | 9.209 | 7.2 |
| J44’ | -15.915 | -15.371 | -15.4 |

**Table S2** Numerically computed glutamate, glutamine, and glutamyl glutathione H4 peak amplitudes at TE1 = 16 ms and three different TE values of 100, 106, and 110 ms. The peak amplitudes were normalized by the amplitude of the N-acetylaspartate singlet.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **T2 relaxation ignored** | | | **T2 = 184 ms** | | |
| TE | 100 ms | 106 ms | 110 ms | 100 ms | 106 ms | 110 ms |
| Glutamate | 0.286 | 0.299 | 0.295 | 0.166 | 0.168 | 0.162 |
| Glutamine | 0.178 | 0.185 | 0.187 | 0.103 | 0.104 | 0.103 |
| Glutathione | 0.215 | 0.225 | 0.228 | 0.125 | 0.126 | 0.125 |