Supplementary Figure 1 Data combination and normalization were successfully performed on 3 separate GEO datasets. (A, B) PCA plot reveals the effect of data before (A) and after (B) batch effect removal. (C, D) data from different datasets have been normalization.
Supplement table 1 KEGG analysis identified 38 significant enriched pathways in AD hippocampus compared with control hippocampus.

| ID      | Description                                                   | GeneRatio | BgRatio | pvalue     | p.adjust   | qvalue     | Count |
|---------|---------------------------------------------------------------|-----------|---------|------------|------------|------------|-------|
| hsa05016 | Huntington disease                                           | 57/580    | 306/9180| 6.19E-14   | 1.93E-11   | 1.45E-11   | 57    |
| hsa05020 | Prion disease                                                | 50/580    | 273/9180| 7.15E-10   | 5.40E-10   | 50        |
| hsa05012 | Parkinson disease                                            | 48/580    | 266/9180| 2.19E-11   | 2.27E-09   | 1.71E-09   | 48    |
| hsa05014 | Amyotrophic lateral sclerosis                               | 58/580    | 365/9180| 3.71E-11   | 2.88E-09   | 2.17E-09   | 58    |
| hsa05010 | Alzheimer disease                                            | 58/580    | 384/9180| 2.92E-10   | 1.81E-08   | 1.37E-08   | 58    |
| hsa05208 | Chemical carcinogenesis - reactive oxygen species            | 39/580    | 223/9180| 4.51E-09   | 2.34E-07   | 1.76E-07   | 39    |
| hsa03050 | Proteasome                                                   | 16/580    | 46/9180 | 8.80E-09   | 3.91E-07   | 2.95E-07   | 16    |
| hsa05022 | Pathways of neurodegeneration - multiple diseases            | 63/580    | 476/9180| 1.09E-08   | 4.25E-07   | 3.21E-07   | 63    |
| hsa00190 | Oxidative phosphorylation                                   | 27/580    | 134/9180| 5.60E-08   | 1.93E-06   | 1.46E-06   | 27    |
| hsa04932 | Non-alcoholic fatty liver disease                            | 28/580    | 155/9180| 3.56E-07   | 1.11E-05   | 8.35E-06   | 28    |
| hsa05017 | Spinocerebellar ataxia                                       | 26/580    | 143/9180| 8.20E-07   | 2.32E-05   | 1.75E-05   | 26    |
| hsa04218 | Cellular senescence                                         | 26/580    | 156/9180| 4.47E-06   | 0.000116   | 8.75E-05   | 26    |
| hsa05415 | Diabetic cardiomyopathy                                     | 30/580    | 203/9180| 1.04E-05   | 0.000249   | 0.000188   | 30    |
| hsa04068 | FoxO signaling pathway                                       | 22/580    | 131/9180| 2.14E-05   | 0.000466   | 0.000352   | 22    |
| hsa04714 | Thermogenesis                                                | 32/580    | 232/9180| 2.25E-05   | 0.000466   | 0.000352   | 32    |
| hsa05215 | Prostate cancer                                              | 18/580    | 97/9180 | 3.03E-05   | 0.000589   | 0.000444   | 18    |
| hsa04066 | HIF-1 signaling pathway                                      | 18/580    | 109/9180| 0.000148   | 0.002704   | 0.002041   | 18    |
| hsa04919 | Thyroid hormone signaling pathway                            | 19/580    | 121/9180| 0.000194   | 0.003346   | 0.002525   | 19    |
| hsa05120 | Epithelial cell signaling in Helicobacter pylori infection   | 13/580    | 70/9180 | 0.000376   | 0.00616    | 0.00465    | 13    |
| hsa05165 | Human papillomavirus infection                               | 37/580    | 331/9180| 0.000473   | 0.007361   | 0.00556    | 37    |
| hsa04015 | Rap1 signaling pathway                                       | 26/580    | 210/9180| 0.000727   | 0.010601   | 0.008001   | 26    |
| hsa04110 | Cell cycle                                                   | 18/580    | 124/9180| 0.00075    | 0.010601   | 0.008001   | 18    |
| hsa05169 | Epstein-Barr virus infection                                 | 25/580    | 202/9180| 0.000919   | 0.012428   | 0.00938    | 25    |
| hsa04723 | Retrograde endocannabinoid signaling                         | 20/580    | 148/9180| 0.000988   | 0.0128     | 0.009661   | 20    |
| hsa05167 | Kaposi sarcoma-associated herpesvirus infection              | 24/580    | 194/9180| 0.001162   | 0.014452   | 0.010908   | 24    |
| hsa05132 | Salmonella infection                                         | 28/580    | 249/9180| 0.002057   | 0.024607   | 0.018573   | 28    |
| hsa05161 | Hepatitis B                                                  | 20/580    | 162/9180| 0.002974   | 0.033489   | 0.025277   | 20    |
| hsa04151 | PI3K-Akt signaling pathway                                   | 36/580    | 354/9180| 0.003015   | 0.033489   | 0.025277   | 36    |
| hsa01522 | Endocrine resistance                                         | 14/580    | 98/9180 | 0.003264   | 0.033664   | 0.025409   | 14    |
| hsa04010 | MAPK signaling pathway                                       | 31/580    | 294/9180| 0.003399   | 0.033664   | 0.025409   | 31    |
| hsa04540 | Gap junction                                                 | 13/580    | 88/9180 | 0.003356   | 0.033664   | 0.025409   | 13    |
| hsa05219 | Bladder cancer                                               | 8/580     | 41/9180 | 0.00361    | 0.034424   | 0.025983   | 8     |
| ID       | Description                                      | Count | Total | P1   | P2   | P3   | Rank |
|----------|--------------------------------------------------|-------|-------|------|------|------|------|
| hsa05211 | Renal cell carcinoma                             | 11/580| 69/9180| 0.00372 | 0.034424 | 0.025983 | 11   |
| hsa01521 | EGFR tyrosine kinase inhibitor resistance         | 12/580| 79/9180| 0.003763 | 0.034424 | 0.025983 | 12   |
| hsa00061 | Fatty acid biosynthesis                          | 5/580 | 18/9180| 0.004254 | 0.037803 | 0.028533 | 5    |
| hsa04213 | Longevity regulating pathway - multiple species   | 10/580| 62/9180| 0.005112 | 0.04367 | 0.032961 | 10   |
| hsa05218 | Melanoma                                         | 11/580| 72/9180| 0.005195 | 0.04367 | 0.032961 | 11   |
| hsa04014 | Ras signaling pathway                            | 25/580| 232/9180| 0.006063 | 0.049624 | 0.037455 | 25   |