

## Supplementary data

**Table 1 The IPA conical pathway analysis classification of differentially expressed proteins in rat hippocampal treated with *K. parviflora*.**

| <b>Ingenuity Canonical Pathways</b>                        | <b>Molecules</b> |
|--|------------------|
| 14-3-3-mediated Signaling                                  | GFAP, PDCD6IP    |
| Creatine-phosphate Biosynthesis                            | CKB              |
| Thymine Degradation  | DPYSL2           |
| 4-aminobutyrate Degradation I                              | ALDH5A1          |
| Uracil Degradation II (Reductive)                          | DPYSL2           |
| Glutamate Degradation III (via 4-aminobutyrate)            | ALDH5A1          |
| Pentose Phosphate Pathway (Non-oxidative Branch)           | TKT              |
| Telomere Extension by Telomerase                           | HNRNPA1          |
| Signaling by Rho Family GTPases                            | SEPT8, GFAP      |
| Pentose Phosphate Pathway                                  | TKT              |
| Mechanisms of Viral Exit from Host Cells                   | PDCD6IP          |
| Glycolysis I   | PGK1             |
| Gluconeogenesis I  | PGK1             |
| Semaphorin Signaling in Neurons                            | DPYSL2           |
| GABA Receptor Signaling                                    | ALDH5A1          |
| Apoptosis Signaling  | SPTAN1           |
| Crosstalk between Dendritic Cells and Natural Killer Cells | FSCN1            |
| Death Receptor Signaling                                   | SPTAN1           |
| Oxidative Phosphorylation                                  | NDUFS1           |
| RhoA Signaling   | SEPT8            |
| Atherosclerosis Signaling                                  | APOB             |
| LXR/RXR Activation   | APOB             |

|   |         |
|---|---------|
| FXR/RXR Activation  | APOB    |
| IL-12 Signaling and Production in Macrophages                         | APOB    |
| Aryl Hydrocarbon Receptor Signaling                                   | ALDH5A1 |
| Tight Junction Signaling  | SPTAN1  |
| Dendritic Cell Maturation   | FSCN1   |
| Production of Nitric Oxide and Reactive Oxygen Species in Macrophages | APOB    |
| Sertoli Cell-Sertoli Cell Junction Signaling                          | SPTAN1  |
| Mitochondrial Dysfunction   | NDUFS1  |
| Clathrin-mediated Endocytosis Signaling                               | APOB    |
| LPS/IL-1 Mediated Inhibition of RXR Function                          | ALDH5A1 |
| Xenobiotic Metabolism Signaling                                       | ALDH5A1 |
| Axonal Guidance Signaling   | DPYSL2  |

**Table 2 The IPA conical pathway analysis classification of differentially expressed proteins in rat hippocampal treated with *M. fragrans*.**

| Ingenuity Canonical Pathways                               | Molecules                      |
|--|--------------------------------|
| Acetyl-CoA Biosynthesis I (Pyruvate Dehydrogenase Complex) | DLAT,DLD                       |
| Glycolysis I   | PGK1,Tpi1<br>(includes others) |
| Aldosterone Signaling in Epithelial Cells                  | HSPA8,PDIA3,HSPD1              |
| Gluconeogenesis I  | PGK1,ME1                       |
| GABA Receptor Signaling                                    | NSF,ALDH5A1                    |
| Protein Ubiquitination Pathway                             | UCHL1,HSPA8,HSPD1              |
| TR/RXR Activation  | ACACA,ME1                      |
| Regulation of Actin-based Motility by Rho                  | ARHGDIA,GSN                    |
| PRPP Biosynthesis I  | PRPS1                          |

|  |                        |
|--|------------------------|
| Glutamate Biosynthesis II                                | GLUD1                  |
| Glutamate Degradation X                                  | GLUD1                  |
| Creatine-phosphate Biosynthesis                          | CKB                    |
| 2-ketoglutarate Dehydrogenase Complex                    | DLD                    |
| Branched-chain $\alpha$ -keto acid Dehydrogenase Complex | DLD                    |
| Adenine and Adenosine Salvage I                          | APRT                   |
| Thymine Degradation                                      | DPYSL2                 |
| 4-aminobutyrate Degradation I                            | ALDH5A1                |
| 14-3-3-mediated Signaling                                | PDIA3,VIM              |
| Uracil Degradation II (Reductive)                        | DPYSL2                 |
| Glutamate Degradation III (via 4-aminobutyrate)          | ALDH5A1                |
| Glycine Cleavage Complex                                 | DLD                    |
| Biotin-carboxyl Carrier Protein Assembly                 | ACACA                  |
| Parkinson's Signaling                                    | UCHL1                  |
| 2-oxobutanoate Degradation I                             | DLD                    |
| Sucrose Degradation V (Mammalian)                        | Tpi1 (includes others) |
| Dendritic Cell Maturation                                | PDIA3,FSCN1            |
| Arginine Biosynthesis IV                                 | GLUD1                  |
| Clathrin-mediated Endocytosis Signaling                  | HSPA8,SH3GL2           |
| Lipid Antigen Presentation by CD1                        | PDIA3                  |
| Isoleucine Degradation I                                 | DLD                    |
| Valine Degradation I                                     | DLD                    |
| Huntington's Disease Signaling                           | HSPA8,NSF              |
| Signaling by Rho Family GTPases                          | VIM,SEPT11             |
| Retinoate Biosynthesis I                                 | ADH1C                  |
| Antigen Presentation Pathway                             | PDIA3                  |
| Mechanisms of Viral Exit from Host Cells                 | SH3GL2                 |

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|--|--------------|
| TCA Cycle II (Eukaryotic)                                  | DLD          |
| Ethanol Degradation II                                     | ADH1C        |
| Noradrenaline and Adrenaline Degradation                   | ADH1C        |
| Semaphorin Signaling in Neurons                            | DPYSL2       |
| Unfolded protein response                                  | HSPA8        |
| Wnt/Ca <sup>+</sup> pathway                                | PDIA3        |
| Superpathway of Methionine Degradation                     | DLD          |
| Phospholipases   | PDIA3        |
| Melatonin Signaling  | PDIA3        |
| Serotonin Degradation                                      | ADH1C        |
| Leptin Signaling in Obesity                                | PDIA3        |
| GPCR-Mediated Integration of Enteroendocrine Signaling     | PDIA3        |
| Exemplified by an L Cell                                   |              |
| RANK Signaling in Osteoclasts                              | GSN          |
| UVA-Induced MAPK Signaling                                 | PDIA3        |
| Crosstalk between Dendritic Cells and Natural Killer Cells | FSCN1        |
| GPCR-Mediated Nutrient Sensing in Enteroendocrine Cells    | PDIA3        |
| Antioxidant Action of Vitamin C                            | PDIA3        |
| Neuropathic Pain Signaling In Dorsal Horn Neurons          | PDIA3        |
| Axonal Guidance Signaling                                  | DPYSL2,PDIA3 |
| Type I Diabetes Mellitus Signaling                         | HSPD1        |
| Sphingosine-1-phosphate Signaling                          | PDIA3        |
| RhoA Signaling   | SEPT11       |
| p70S6K Signaling   | PDIA3        |
| Synaptic Long Term Potentiation                            | PDIA3        |
| LXR/RXR Activation   | ACACA        |
| P2Y Purigenic Receptor Signaling Pathway                   | PDIA3        |

|   |         |
|---|---------|
| PI3K Signaling in B Lymphocytes   | PDIA3   |
| Sperm Motility  | PDIA3   |
| Cellular Effects of Sildenafil (Viagra)                                   | PDIA3   |
| Aryl Hydrocarbon Receptor Signaling                                       | ALDH5A1 |
| AMPK Signaling  | ACACA   |
| Synaptic Long Term Depression   | PDIA3   |
| Glioblastoma Multiforme Signaling   | PDIA3   |
| eNOS Signaling  | HSPA8   |
| Germ Cell-Sertoli Cell Junction Signaling                                 | GSN     |
| Tight Junction Signaling  | NSF     |
| Gap Junction Signaling  | PDIA3   |
| Dopamine-DARPP32 Feedback in cAMP Signaling                               | PDIA3   |
| CREB Signaling in Neurons   | PDIA3   |
| RhoGDI Signaling  | ARHGDIA |
| RAR Activation  | ADH1C   |
| PPAR $\alpha$ /RXR $\alpha$ Activation                                    | PDIA3   |
| Endothelin-1 Signaling  | PDIA3   |
| Role of NFAT in Cardiac Hypertrophy                                       | PDIA3   |
| ILK Signaling   | VIM     |
| Thrombin Signaling  | PDIA3   |
| Actin Cytoskeleton Signaling  | GSN     |
| LPS/IL-1 Mediated Inhibition of RXR Function                              | ALDH5A1 |
| Role of Osteoblasts, Osteoclasts and Chondrocytes in Rheumatoid Arthritis | GSN     |
| Cardiac Hypertrophy Signaling   | PDIA3   |
| Glucocorticoid Receptor Signaling   | HSPA8   |
| Xenobiotic Metabolism Signaling   | ALDH5A1 |

Role of Macrophages, Fibroblasts and Endothelial Cells in Rheumatoid Arthritis PDIA3

Arthritis

Protein Kinase A Signaling PDIA3

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**Table 3 The IPA conical pathway analysis classification of differentially expressed proteins in rat hippocampal treated with Fluoxetine.**

| Ingenuity Canonical Pathways              | Molecules                        |
|---|----------------------------------|
| Mitochondrial Dysfunction                 | NDUFS1,SOD2,ATP5B,UQCRFS1, VDAC1 |
| 14-3-3-mediated Signaling                 | PDIA3,VIM,PDCD6IP                |
| Oxidative Phosphorylation                 | NDUFS1,ATP5B,UQCRFS1             |
| Mechanisms of Viral Exit from Host Cells  | SH3GL2,PDCD6IP                   |
| Glycolysis I                              | ENO1,Tpi1 (includes others)      |
| Gluconeogenesis I                         | ENO1,ME1                         |
| Aldosterone Signaling in Epithelial Cells | HSPA8,PDIA3,HSPD1                |
| Clathrin-mediated Endocytosis Signaling   | HSPA8,APOB,SH3GL2                |
| Huntington's Disease Signaling            | HSPA8,ATP5B,SNAP25               |
| Signaling by Rho Family GTPases           | SEPT7,VIM,SEPT11                 |
| Glutamate Biosynthesis II                 | GLUD1                            |
| Glutamate Degradation X                   | GLUD1                            |
| Protein Ubiquitination Pathway            | UCHL1,HSPA8,HSPD1                |
| TR/RXR Activation                         | ENO1,ME1                         |
| Regulation of Actin-based Motility by Rho | ARHGDIA,GSN                      |
| Creatine-phosphate Biosynthesis           | CKB                              |
| Methylglyoxal Degradation I               | HAGH                             |
| Superoxide Radicals Degradation           | SOD2                             |

|   |                        |
|---|------------------------|
| Xenobiotic Metabolism Signaling                                       | GSTM5,PPP2CA,ALDH5A1   |
| 2-ketoglutarate Dehydrogenase Complex                                 | DLST                   |
| Pyruvate Fermentation to Lactate                                      | LDHB                   |
| Thymine Degradation   | DPYSL2                 |
| 4-aminobutyrate Degradation I   | ALDH5A1                |
| Uracil Degradation II (Reductive)                                     | DPYSL2                 |
| Acetyl-CoA Biosynthesis I (Pyruvate Dehydrogenase Complex)            | DLAT                   |
| Glutamate Degradation III (via 4-aminobutyrate)                       | ALDH5A1                |
| RhoA Signaling  | SEPT7,SEPT11           |
| p70S6K Signaling  | PPP2CA,PDIA3           |
| Parkinson's Signaling   | UCHL1                  |
| Aryl Hydrocarbon Receptor Signaling                                   | GSTM5,ALDH5A1          |
| Synaptic Long Term Depression   | PPP2CA,PDIA3           |
| Sucrose Degradation V (Mammalian)                                     | Tpi1 (includes others) |
| Tight Junction Signaling  | PPP2CA,SNAP25          |
| Dopamine-DARPP32 Feedback in cAMP Signaling                           | PPP2CA,PDIA3           |
| Arginine Biosynthesis IV  | GLUD1                  |
| Dendritic Cell Maturation   | PDIA3,FSCN1            |
| NRF2-mediated Oxidative Stress Response                               | SOD2,GSTM5             |
| Lipid Antigen Presentation by CD1                                     | PDIA3                  |
| Production of Nitric Oxide and Reactive Oxygen Species in Macrophages | APOB,PPP2CA            |
| ILK Signaling   | PPP2CA,VIM             |
| Cell Cycle Regulation by BTG Family Proteins                          | PPP2CA                 |
| LPS/IL-1 Mediated Inhibition of RXR Function                          | GSTM5,ALDH5A1          |
| Antigen Presentation Pathway  | PDIA3                  |

|  |         |
|--|---------|
| Glutathione-mediated Detoxification                        | GSTM5   |
| TCA Cycle II (Eukaryotic)                                  | DLST    |
| Semaphorin Signaling in Neurons                            | DPYSL2  |
| Unfolded protein response                                  | HSPA8   |
| Role of CHK Proteins in Cell Cycle Checkpoint Control      | PPP2CA  |
| Wnt/Ca <sup>+</sup> pathway                                | PDIA3   |
| Mitotic Roles of Polo-Like Kinase                          | PPP2CA  |
| Phospholipases   | PDIA3   |
| PEDF Signaling   | SOD2    |
| GABA Receptor Signaling                                    | ALDH5A1 |
| Melatonin Signaling  | PDIA3   |
| Leptin Signaling in Obesity                                | PDIA3   |
| Cyclins and Cell Cycle Regulation                          | PPP2CA  |
| Ceramide Signaling   | PPP2CA  |
| HIPPO signaling  | PPP2CA  |
| CTLA4 Signaling in Cytotoxic T Lymphocytes                 | PPP2CA  |
| RANK Signaling in Osteoclasts                              | GSN     |
| UVA-Induced MAPK Signaling                                 | PDIA3   |
| Crosstalk between Dendritic Cells and Natural Killer Cells | FSCN1   |
| Dopamine Receptor Signaling                                | PPP2CA  |
| Telomerase Signaling                                       | PPP2CA  |
| CDK5 Signaling   | PPP2CA  |
| Antioxidant Action of Vitamin C                            | PDIA3   |
| HIF1 $\alpha$ Signaling                                    | LDHB    |
| Neuropathic Pain Signaling In Dorsal Horn Neurons          | PDIA3   |
| Type I Diabetes Mellitus Signaling                         | HSPD1   |
| Sphingosine-1-phosphate Signaling                          | PDIA3   |

|   |              |
|---|--------------|
| Axonal Guidance Signaling                     | DPYSL2,PDIA3 |
| Atherosclerosis Signaling                     | APOB         |
| Synaptic Long Term Potentiation               | PDIA3        |
| LXR/RXR Activation                            | APOB         |
| PI3K/AKT Signaling                            | PPP2CA       |
| P2Y Purigenic Receptor Signaling Pathway      | PDIA3        |
| PI3K Signaling in B Lymphocytes               | PDIA3        |
| Sperm Motility                                | PDIA3        |
| FXR/RXR Activation                            | APOB         |
| IL-12 Signaling and Production in Macrophages | APOB         |
| Cardiac $\beta$ -adrenergic Signaling         | PPP2CA       |
| Cellular Effects of Sildenafil (Viagra)       | PDIA3        |
| AMPK Signaling                                | PPP2CA       |
| Regulation of eIF4 and p70S6K Signaling       | PPP2CA       |
| Glioblastoma Multiforme Signaling             | PDIA3        |
| eNOS Signaling                                | HSPA8        |
| Germ Cell-Sertoli Cell Junction Signaling     | GSN          |
| Gap Junction Signaling                        | PDIA3        |
| Wnt/ $\beta$ -catenin Signaling               | PPP2CA       |
| Acute Phase Response Signaling                | SOD2         |
| CREB Signaling in Neurons                     | PDIA3        |
| RhoGDI Signaling                              | ARHGDIA      |
| PPAR $\alpha$ /RXR $\alpha$ Activation        | PDIA3        |
| Endothelin-1 Signaling                        | PDIA3        |
| Role of NFAT in Cardiac Hypertrophy           | PDIA3        |
| ERK/MAPK Signaling                            | PPP2CA       |
| mTOR Signaling                                | PPP2CA       |

|   |        |
|---|--------|
| Thrombin Signaling  | PDIA3  |
| Breast Cancer Regulation by Stathmin1                     | PPP2CA |
| Actin Cytoskeleton Signaling                              | GSN    |
| Role of Osteoblasts, Osteoclasts and Chondrocytes in      | GSN    |
| Rheumatoid Arthritis                                      |        |
| Cardiac Hypertrophy Signaling                             | PDIA3  |
| Glucocorticoid Receptor Signaling                         | HSPA8  |
| Role of Macrophages, Fibroblasts and Endothelial Cells in | PDIA3  |
| Rheumatoid Arthritis                                      |        |
| Protein Kinase A Signaling                                | PDIA3  |

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**Table 4 Functional classification of differentially expressed proteins in rat hippocampal treated with *K. parviflora* from IPA**

| Category                                | Molecules  |
|---|--|
| Neurological Disease                    | ANK3,PGK1,DPYSL2,APOB,HYOU1,CKB,NDUFS1,<br>HNRNPA1,CCT5,GFAP,SPTAN1,PURA,CA1,<br>ALDH5A1,PRDX2 |
| Nervous System Development and Function | CKB,DPYSL2,ANK3,APOB,TAGLN3,FSCN1,TKT,<br>GFAP,SPTAN1,PURA,ALDH5A1                             |
| Organ Morphology                        | ANK3,CKB,APOB,TKT,GFAP,PURA,PRDX2  |
| Tissue Morphology                       | ANK3,DPYSL2,CKB,APOB,FSCN1,TKT,GFAP,<br>PURA,PRDX2   |
| Organismal Development                  | ANK3,CKB,APOB,PURA,PRDX2   |
| Cell Morphology                         | ANK3,CKB,DPYSL2,NDUFS1,FSCN1,GFAP,<br>SPTAN1,PURA,PDGCD6IP,PRDX2                               |
| Infectious Disease                      | SEPT8,APOB,TKT,FSCN1,SPTAN1,PURA,PDGCD6IP,   |

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|--|--|
|  | CA1,ALDH5A1,PRDX2  |
| Cancer                                 | ANK3,PGK1,DPYSL2,APOB,HYOU1,CKB,NDUFS1,<br>HNRNPA1,FSCN1,STAG3,CCT5,GFAP,SPTAN1,<br>PDCD6IP,PURA,CA1,ALDH5A1,PRDX2 |
| Cell Death and Survival                | ANK3,APOB,HNRNPA1,HYOU1,CCT5,GFAP,<br>PDCD6IP,PURA,PRDX2   |
| Cell-To-Cell Signaling and Interaction | ANK3,CKB,DPYSL2,APOB,HYOU1,CCT5,GFAP,<br>SPTAN1,PDCD6IP,ALDH5A1  |
| Cellular Assembly and Organization     | CKB,ANK3,DPYSL2,NDUFS1,FSCN1,STAG3,CCT5,<br>GFAP,SPTAN1,PDCD6IP,PURA   |
| Cellular Compromise                    | ANK3,DPYSL2,HNRNPA1,SPTAN1,PDCD6IP,CA1   |
| Cellular Development                   | ANK3,DPYSL2,TAGLN3,HNRNPA1,FSCN1,GFAP,<br>SPTAN1,PURA,PRDX2  |
| Cellular Function and Maintenance      | CKB,ANK3,DPYSL2,NDUFS1,FSCN1,HYOU1,GFAP<br>SPTAN1,PDCD6IP  |
| Connective Tissue Disorders            | PGK1,HNRNPA1,GFAP,PURA,CA1,PRDX2   |
| Developmental Disorder                 | ANK3,CKB,NDUFS1,APOB,HNRNPA1,TKT,GFAP,<br>PURA,CA1,ALDH5A1   |
| Drug Metabolism                        | PGK1,NDUFS1,GFAP,ALDH5A1   |
| Hematological Disease                  | PGK1,APOB,TKT,CA1,PRDX2  |
| Hereditary Disorder                    | ANK3,CKB,PGK1,NDUFS1,APOB,HNRNPA1,CCT5,<br>GFAP,SPTAN1,CA1,ALDH5A1,PRDX2   |
| Inflammatory Disease                   | CKB,PGK1,APOB,HNRNPA1,TKT,GFAP,PURA,<br>CA1,PRDX2  |
| Metabolic Disease                      | DPYSL2,NDUFS1,APOB,HNRNPA1,HYOU1,GFAP,<br>CA1,ALDH5A1,PRDX2  |
| Nucleic Acid Metabolism                | PGK1,TKT   |

|  |   |
|--|---|
| Organismal Injury and Abnormalities                  | ANK3,PGK1,APOB,TKT,HYOU1,CKB,NDUFS1,CCT5,GFAP,SPTAN1,PURA,CA1,ALDH5A1,PRDX2 |
| Renal and Urological System Development and Function | TKT,PDCD6IP   |
| Reproductive System Disease                          | PGK1,ANK3,CKB,SEPT8,NDUFS1,APOB,CCT5,GFAP,SPTAN1,PDCD6IP,PURA,CA1           |
| Skeletal and Muscular Disorders                      | CKB,PGK1,HNRNPA1,GFAP,PURA,CA1,PRDX2  |
| Small Molecule Biochemistry                          | PGK1,CKB,DPYSL2,NDUFS1,APOB,TKT,GFAP,PDCD6IP,ALDH5A1,PRDX2                  |
| Tissue Development                                   | ANK3,DPYSL2,APOB,FSCN1,GFAP,SPTAN1,PDCD6IP,PURA                             |
| Hematological System Development and Function        | DPYSL2,HYOU1,PURA,PRDX2   |
| Hematopoiesis  | PURA,PRDX2  |
| Cardiovascular Disease                               | PGK1,APOB,TKT,HYOU1,CA1,ALDH5A1,PRDX2                                       |
| Amino Acid Metabolism                                | CKB,DPYSL2,ALDH5A1  |
| Cardiovascular System Development and Function       | ANK3,APOB,TKT,HYOU1,GFAP,PRDX2  |
| Hepatic System Development and Function              | APOB,TKT  |
| Lipid Metabolism                                     | APOB,PDCD6IP,ALDH5A1,PRDX2  |
| Molecular Transport                                  | DPYSL2,NDUFS1,APOB,GFAP,PDCD6IP,PRDX2                                       |
| Tumor Morphology                                     | HNRNPA1,HYOU1   |
| Cell Cycle   | SPTAN1,PURA   |
| Connective Tissue Development and Function           | APOB,TKT,PURA   |
| Embryonic Development                                | DPYSL2,ANK3,APOB,FSCN1,PDCD6IP,PURA   |
| Free Radical Scavenging                              | NDUFS1,APOB,PRDX2   |
| Protein Trafficking                                  | ANK3,APOB   |

|   |   |
|---|---|
| Visual System Development and Function                | APOB,TKT  |
| Inflammatory Response                                 | DPYSL2,CKB,APOB,TKT,HYOU1,GFAP,CA1                                    |
| Cellular Growth and Proliferation                     | DPYSL2,PGK1,ANK3,TAGLN3,HNRNPA1,FSCN1,<br>CCT5,GFAP,SPTAN1,PURA,PRDX2 |
| DNA Replication, Recombination, and Repair            | HNRNPA1,STAG3,PURA  |
| RNA Post-Transcriptional Modification                 | HNRNPA1   |
| Nutritional Disease                                   | APOB,HNRNPA1,CA1,ALDH5A1,PRDX2  |
| Reproductive System Development and Function          | APOB,CCT5   |
| Respiratory Disease                                   | TKT,CA1,PRDX2   |
| Gastrointestinal Disease                              | DPYSL2,ANK3,APOB,HNRNPA1,PRDX2  |
| Hepatic System Disease                                | APOB  |
| Ophthalmic Disease                                    | GFAP,CA1  |
| Immunological Disease                                 | PGK1,HNRNPA1,TKT,GFAP,CA1,PRDX2                                       |
| Dermatological Diseases and Conditions                | FSCN1,CCT5,SPTAN1   |
| Organismal Survival                                   | ANK3,APOB,TKT,FSCN1,HYOU1,GFAP,PURA,<br>ALDH5A1                       |
| Respiratory System Development and Function           | PDCD6IP   |
| Organismal Functions                                  | ANK3,PURA   |
| Cellular Movement                                     | DPYSL2,ANK3,APOB,FSCN1,HYOU1,GFAP,PRDX2                               |
| Organ Development                                     | ANK3,APOB,GFAP  |
| Endocrine System Disorders                            | HYOU1,CA1,PRDX2   |
| Skeletal and Muscular System Development and Function | ANK3,APOB   |
| Behavior  | CKB   |
| Protein Synthesis                                     | APOB,ALDH5A1  |

|   |                        |
|---|------------------------|
| Renal and Urological Disease              | CA1                    |
| Post-Translational Modification           | GFAP                   |
| Cell Signaling                            | APOB                   |
| Hair and Skin Development and Function    | FSCN1,PDCD6IP          |
| Lymphoid Tissue Structure and Development | PURA,PRDX2             |
| Vitamin and Mineral Metabolism            | APOB                   |
| Digestive System Development and Function | APOB                   |
| Immune Cell Trafficking                   | DPYSL2,APOB,HYOU1,GFAP |
| Cell-mediated Immune Response             | DPYSL2,HYOU1           |
| Gene Expression                           | HNRNPA1                |
| RNA Damage and Repair                     | HNRNPA1                |

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**Table 5 Functional classification of differentially expressed proteins in rat hippocampal treated with *M. fragrans* from IPA analysis.**

| Category                           | Molecules  |
|------------------------------------|--|
| Amino Acid Metabolism              | CKB,DDAH1,GLUD1,ME1,ALDH5A1  |
| Small Molecule Biochemistry        | PGK1,CA2,PDIA3,HYOU1,ADH1C,VIM,GLUD1,<br>HSPD1,ME1,GSN,APRT,HSPA8,CKB,NSF,PRPS1,DL<br>AT,DDAH1,DLD,ACACA,ALDH5A1<br>DPYSL2,Nefm,PDIA3,VIM,SH3GL2,SEPT11,HSPD1, |
| Cell Morphology                    | GSN,BIN1,CKB,UCHL1,NSF,FSCN1,DDAH1,DLD,<br>ARHGEF28,ACACA,ARHGDI<br>A  |
| Cellular Assembly and Organization | DPYSL2,Nefm,PDIA3,VIM,SH3GL2,SEPT11,GSN,<br>BIN1,CKB,UCHL1,HSPA8,NSF,FSCN1,DDAH1,<br>ARHGEF28,ACACA,ARHGDI,TMOD2   |
| Cellular Function and Maintenance  | DPYSL2,CA2,Nefm,PDIA3,HYOU1,VIM,SH3GL2,  |

|   |  |
|---|--|
|   | SEPT11,HSPD1,ME1,GSN,BIN1,CKB,HSPA8,<br>UCHL1,NSF,FSCN1,DDAH1,DLD,ARHGEF28,<br>ACACA,ARHGDIA,TMOD2                               |
| Organismal Injury and Abnormalities     | PGK1,CA2,Nefm,ADH1C,HYOU1,VIM,SH3GL2,<br>GSN,BIN1,APRT,CKB,UCHL1,PRPS1,DLD,<br>ARHGDIA, CA1,ALDH5A1                              |
| Reproductive System Disease             | UCHL1,CKB,CA2,CA1  |
| Cellular Movement                       | HSPA8,DPYSL2,NSF,PDIA3,FSCN1,HYOU1,VIM,<br>SEPT11,SH3GL2,HSPD1,GSN,BIN1  |
| Nervous System Development and Function | DPYSL2,Nefm,PDIA3,VIM,SEPT11,SH3GL2,GSN,<br>BIN1,HSPA8,CKB,UCHL1,NSF,FSCN1,DDAH1,<br>ARHGEF28,TMOD2                              |
| Lipid Metabolism                        | HSPA8,PDIA3,DLAT,DLD,ADH1C,VIM,ACACA,<br>ME1,GSN,ALDH5A1   |
| Nucleic Acid Metabolism                 | PGK1,DPYSL2,HSPA8,NSF,PRPS1,DLAT,DLD,<br>ACACA,HSPD1,ME1,APRT  |
| Neurological Disease                    | TUFM,PGK1,DPYSL2,CA2,Nefm,PDIA3,ADH1C,<br>HYOU1,VIM,ME1,SH3GL2,HSPD1,GSN,BIN1,<br>HSPA8,CKB,UCHL1,NSF,PRPS1,DLAT,CA1,<br>ALDH5A1 |
| Renal and Urological Disease            | CA2,DLD,ARHGDIA,CA1,APRT   |
| Cellular Development                    | DPYSL2,CA2,Nefm,PDIA3,VIM,ME1,SEPT11,<br>HSPD1,GSN,BIN1,UCHL1,HSPA8,FSCN1,DDAH1,<br>ARHGEF28,ACACA                               |
| Tissue Development                      | UCHL1,DPYSL2,NSF,Nefm,PDIA3,FSCN1,DDAH1,<br>VIM,ARHGEF28,ARHGDIA,ACACA,SEPT11,   |

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|  | GSN,BIN1  |
| Developmental Disorder                 | CA2,PRPS1,DLD,VIM,GLUD1,ARHGDIA,ACACA,<br>GSN,BIN1,CA1,APRT,ALDH5A1   |
| Hereditary Disorder                    | TUFM,PGK1,CA2,GLUD1,VIM,HSPD1,GSN,BIN1,<br>APRT,HSPA8,CKB,UCHL1,PRPS1,DLAT,DLD,<br>ACACA,ARHGDIA,CA1,ALDH5A1  |
| Skeletal and Muscular Disorders        | PGK1,CA2,NONO,PDIA3,ADH1C,VIM,HSPD1,<br>SH3GL2,GSN,BIN1,UCHL1,CKB,HSPA8,PRPS1,CA1   |
| Psychological Disorders                | DPYSL2,PGK1,CA2,ADH1C,VIM,ME1,SH3GL2,<br>HSPD1,GSN,BIN1,HSPA8,CKB,UCHL1,NSF,DLAT,<br>CA1,ALDH5A1  |
| Metabolic Disease                      | TUFM,DPYSL2,CA2,HYOU1,GLUD1,VIM,SH3GL2,<br>HSPD1,GSN,BIN1,APRT,UCHL1,NSF,PRPS1,DLAT,<br>DDAH1,DLD,ARHGDIA,ACACA,CA1,ALDH5A1   |
| Cellular Compromise                    | DPYSL2,Nefm,HYOU1,VIM,SH3GL2,SEPT11,<br>HSPD1,GSN,BIN1,UCHL1,DLD,ARHGEF28,<br>ARHGDIA,CA1   |
| Cell-To-Cell Signaling and Interaction | DPYSL2,Nefm,PDIA3,VIM,HSPD1,SH3GL2,GSN,<br>BIN1,UCHL1,CKB,NSF,ARHGDIA,TMOD2,<br>ALDH5A1   |
| Cancer                                 | DPYSL2,CA2,PDIA3,HYOU1,ADH1C,ME1,SH3GL2,<br>BIN1,UCHL1,CKB,NSF,PRPS1,DDAH1,CA1,<br>ALDH5A1,PGK1,NONO,GLUD1,VIM,HSPD1,GSN,<br>HNRNPM,HSPA8,DLAT,FSCN1,DLD,ARHGEF28,<br>ARHGDIA,ACACA |
| Gastrointestinal Disease               | DPYSL2,PGK1,CA2,ADH1C,HYOU1,GLUD1,VIM,<br>HSPD1,SH3GL2,ME1,GSN,BIN1,HNRNPM,HSPA8,   |

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|   | UCHL1,NSF,PRPS1,FSCN1,DLAT,DDAH1,DLD,<br>ARHGEF28,ARHGDIA,ACACA,CA1  |
| Hepatic System Disease                                  | PGK1,CA2,ADH1C,GLUD1,VIM,ACACA,SH3GL2,<br>BIN1   |
| Cell Signaling  | DDAH1,HYOU1,HSPD1,GSN,CAPZA1   |
| Post-Translational Modification                         | HSPA8,PDIA3,DLD,GLUD1,ACACA,ME1,HSPD1,<br>CAPZA1,GSN,ALDH5A1   |
| Protein Synthesis                                       | TUFM,UCHL1,PDIA3,DLD,ARHGDIA,ACACA,<br>SEPT11,ME1,HSPD1,CAPZA1,GSN,ALDH5A1                                       |
| Tissue Morphology                                       | DPYSL2,CKB,Nefm,FSCN1,HYOU1,VIM,ARHGDIA,<br>SH3GL2,GSN,BIN1  |
| Inflammatory Disease                                    | PGK1,CA2,NONO,PDIA3,VIM,HSPD1,GSN,APRT,<br>UCHL1,HSPA8,CKB,ARHGDIA,CA1   |
| Cellular Growth and Proliferation                       | DPYSL2,PGK1,Nefm,PDIA3,VIM,HSPD1,SH3GL2,<br>GSN,BIN1,HNRNPM,HSPA8,UCHL1,FSCN1,<br>DDAH1,DLD,ARHGDIA,ACACA,CAPZA1 |
| Organ Morphology  | VIM,ARHGDIA,GSN,APRT   |
| Renal and Urological System Development<br>and Function | ARHGDIA,ALDH5A1,APRT   |
| Infectious Disease                                      | CA2,PRPS1,FSCN1,HSPD1,CA1,ALDH5A1,<br>HNRNPM   |
| Ophthalmic Disease                                      | CA2,HSPD1,GSN,CA1  |
| Nutritional Disease                                     | CA2,VIM,CA1  |
| Immunological Disease                                   | HSPA8,PGK1,CA2,NONO,PDIA3,VIM,HSPD1,<br>GSN,CA1  |
| Respiratory Disease                                     | CKB,CA2,ADH1C,VIM,HSPD1,GSN,CA1  |
| Cardiovascular Disease                                  | PGK1,CA2,HYOU1,VIM,ARHGDIA,ACACA,HSPD1,  |

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|  | GSN,BIN1,CA1,ALDH5A1   |
| Organismal Development                         | UCHL1,PGK1,DDAH1,DLD,VIM,ACACA,<br>ARHGDIA,GSN,BIN1,APRT   |
| Protein Folding                                | HSPA8,HSPD1  |
| Connective Tissue Disorders                    | HSPA8,PGK1,CA2,NONO,PDIA3,VIM,HSPD1,<br>GSN,CA1  |
| Organismal Survival                            | PDIA3,ADH1C,HYOU1,VIM,SH3GL2,GSN,BIN1,<br>APRT,FSCN1,DDAH1,DLD,ARHGDIA,ACACA,<br>ALDH5A1               |
| Inflammatory Response                          | DPYSL2,CKB,CA2,PDIA3,HYOU1,VIM,ARHGDIA,<br>HSPD1,GSN,BIN1,CA1,APRT                                     |
| Cell Death and Survival                        | TUFM,Nefm,PDIA3,HYOU1,GLUD1,VIM,HSPD1,SH<br>3GL2,GSN,BIN1,APRT,UCHL1,HSPA8,NSF,PRPS1,A<br>RHGDIA,ACACA |
| Endocrine System Disorders                     | UCHL1,CKB,CA2,NSF,DDAH1,HYOU1,GLUD1,<br>VIM,ACACA,HSPD1,CA1  |
| Hematological Disease                          | PGK1,CA2,NONO,VIM,GLUD1,ARHGDIA,GSN,CA1  |
| Protein Trafficking                            | ARHGDIA,GSN  |
| Cardiovascular System Development and Function | PGK1,NSF,DDAH1,HYOU1,VIM,ARHGDIA,HSPD1,<br>GSN,BIN1  |
| Auditory Disease                               | PRPS1  |
| DNA Replication, Recombination, and Repair     | PDIA3,VIM  |
| Drug Metabolism                                | HSPA8,PGK1,NSF,PDIA3,ADH1C,GSN   |
| Molecular Transport                            | HSPA8,NSF,CA2,ADH1C,VIM,ACACA,GSN,APRT   |
| Reproductive System Development and Function   | NSF  |

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| Tumor Morphology                                      | UCHL1, HYOU1, VIM   |
| Embryonic Development                                 | UCHL1, DPYSL2, Nefm, PDIA3, FSCN1, DLD, VIM, ACACA, SEPT11, GSN, BIN1 |
| Dermatological Diseases and Conditions                | HSPA8, FSCN1, VIM, ARHGDIA, ME1, GSN                                  |
| Hematological System Development and Function         | HSPA8, DPYSL2, HYOU1, HSPD1, GSN, BIN1                                |
| Connective Tissue Development and Function            | VIM, ACACA, ARHGDIA, ME1, GSN   |
| Carbohydrate Metabolism                               | PGK1, PRPS1, Tpi1 (includes others), GSN                              |
| Cell Cycle  | VIM   |
| Digestive System Development and Function             | VIM, ACACA  |
| Energy Production                                     | ADH1C, ACACA, HSPD1, ME1  |
| Organ Development                                     | UCHL1, VIM, GSN, BIN1   |
| Skeletal and Muscular System Development and Function | UCHL1, NSF, VIM, GSN, BIN1  |
| Vitamin and Mineral Metabolism                        | HSPA8, ADH1C, VIM   |
| Organismal Functions                                  | HYOU1, VIM, GSN   |
| Free Radical Scavenging                               | GSN   |
| Protein Degradation                                   | UCHL1, PDIA3, DLD, HSPD1, GSN   |
| Hepatic System Development and Function               | ACACA   |
| Humeral Immune Response                               | HSPD1   |
| Immune Cell Trafficking                               | DPYSL2, HYOU1, HSPD1  |
| Cell-mediated Immune Response                         | DPYSL2, HYOU1, HSPD1  |
| RNA Post-Transcriptional Modification                 | APRT  |
| Lymphoid Tissue Structure and Development             | ARHGDIA   |
| Endocrine System Development and Function             | UCHL1, VIM  |

Hair and Skin Development and Function      VIM,APRT

Behavior      CKB

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