**Supplementary material**

**TOF-MS conditions**

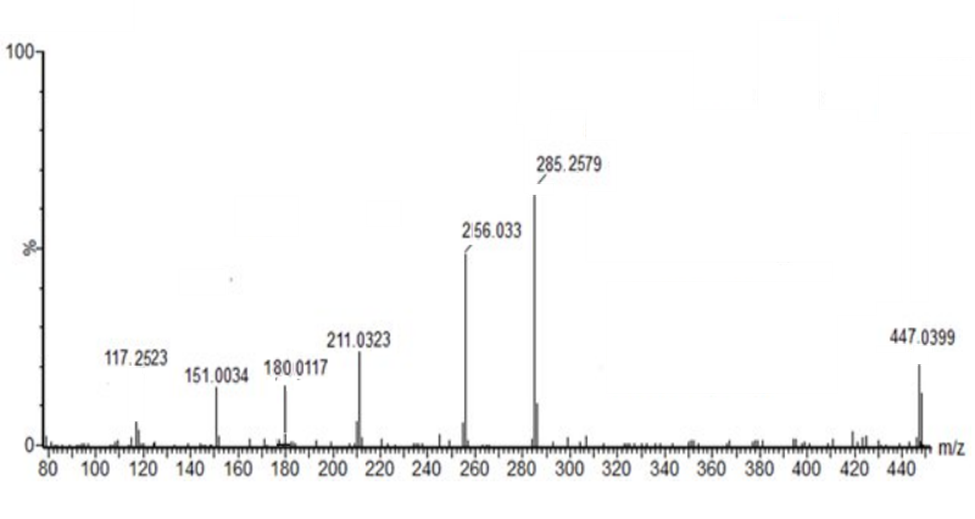
Instrument. LC-ESI-QTOF

Energy colition, 10 V

Desolvation gas flow, 600 L/H

Desolvation temperature 450 °C

Cone gas flow 50 L/h

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**Fig. S1. TOF MS of PGPF.**

**HPLC conditions**

Column, Intersil OD S80A

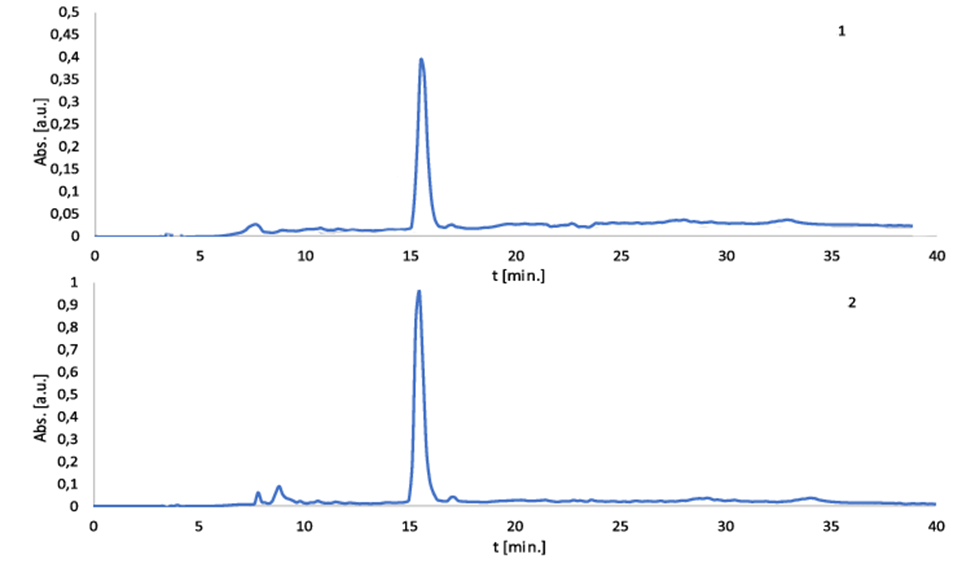
Mobil Phase: 0.5% acetic acid/acetonitrile (80/20, v/v)

Column Temperature, 25°C

Injection volume, 10 µL

Detection UV wavelength 254

Flow rate, 1 ml/min

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**Fig. S2. HPLC chromatogram of PGPF.** Chromatogram **1** represents standard, and chromatogram **2** indicates PGPF.

**Table S1.** Targets predicted for astragalin in ACID web server.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Unipro ID** | **PDB code** | [**ΔEbind**](http://chemyang.ccnu.edu.cn/ccb/server/ACID/index.php/reversedock/detail/PBTOT/1) | **Target name** |
| 1 | [O95363](http://www.uniprot.org/uniprot/O95363) | [3CMQ](http://www.rcsb.org/pdb/explore/explore.do?structureId=3CMQ) | -42.74 | Phenylalanine--tRNA ligase, mitochondrial |
| 2 | [P51812](http://www.uniprot.org/uniprot/P51812) | [4NW6](http://www.rcsb.org/pdb/explore/explore.do?structureId=4NW6) | -38.38 | Ribosomal protein S6 kinase alpha-3 |
| 3 | [Q9UK17](http://www.uniprot.org/uniprot/Q9UK17) | [1S1G](http://www.rcsb.org/pdb/explore/explore.do?structureId=1S1G) | -37.96 | Potassium voltage-gated channel subfamily D member 3 |
| 4 | [Q03181](http://www.uniprot.org/uniprot/Q03181) | [3TKM](http://www.rcsb.org/pdb/explore/explore.do?structureId=3TKM) | -36.85 | Peroxisome proliferator-activated receptor delta |
| 5 | [P22607](http://www.uniprot.org/uniprot/P22607) | [4K33](http://www.rcsb.org/pdb/explore/explore.do?structureId=4K33) | -36.28 | Fibroblast growth factor receptor 3 |
| 6 | [P08235](http://www.uniprot.org/uniprot/P08235) | [4PF3](http://www.rcsb.org/pdb/explore/explore.do?structureId=4PF3) | -36.18 | Mineralocorticoid receptor |
| 7 | [P37231](http://www.uniprot.org/uniprot/P37231) | [3B1M](http://www.rcsb.org/pdb/explore/explore.do?structureId=3B1M) | -35.89 | Peroxisome proliferator-activated receptor gamma |
| 8 | [P11511](http://www.uniprot.org/uniprot/P11511) | [3S79](http://www.rcsb.org/pdb/explore/explore.do?structureId=3S79) | -35.84 | Aromatase |
| 9 | [P10828](http://www.uniprot.org/uniprot/P10828) | [1N46](http://www.rcsb.org/pdb/explore/explore.do?structureId=1N46) | -35.62 | Thyroid hormone receptor beta |
| 10 | [P50135](http://www.uniprot.org/uniprot/P50135) | [2AOT](http://www.rcsb.org/pdb/explore/explore.do?structureId=2AOT) | -35.27 | Histamine N-methyltransferase |
| 11 | [P00734](http://www.uniprot.org/uniprot/P00734) | [4UD9](http://www.rcsb.org/pdb/explore/explore.do?structureId=4UD9) | -34.46 | Prothrombin |
| 12 | [Q9BYF1](http://www.uniprot.org/uniprot/Q9BYF1) | [1R42](http://www.rcsb.org/pdb/explore/explore.do?structureId=1R42) | -34.37 | Angiotensin-converting enzyme 2 |
| 13 | [P14618](http://www.uniprot.org/uniprot/P14618) | [3GR4](http://www.rcsb.org/pdb/explore/explore.do?structureId=3GR4) | -33.76 | Pyruvate kinase PKM |
| 14 | [P10415](http://www.uniprot.org/uniprot/P10415) | [4LXD](http://www.rcsb.org/pdb/explore/explore.do?structureId=4LXD) | -32.99 | Apoptosis regulator Bcl-2 |
| 15 | [P47895](http://www.uniprot.org/uniprot/P47895) | [5FHZ](http://www.rcsb.org/pdb/explore/explore.do?structureId=5FHZ) | -32.98 | Aldehyde dehydrogenase family 1 member A3 |
| 16 | [P07237](http://www.uniprot.org/uniprot/P07237) | [3UEM](http://www.rcsb.org/pdb/explore/explore.do?structureId=3UEM) | -32.97 | Protein disulfide-isomerase |
| 17 | [Q99835](http://www.uniprot.org/uniprot/Q99835) | [4JKV](http://www.rcsb.org/pdb/explore/explore.do?structureId=4JKV) | -32.89 | Smoothened homolog |
| 18 | [P05091](http://www.uniprot.org/uniprot/P05091) | [1O04](http://www.rcsb.org/pdb/explore/explore.do?structureId=1O04) | -32.65 | Aldehyde dehydrogenase, mitochondrial |
| 19 | [O15111](http://www.uniprot.org/uniprot/O15111) | [3BRT](http://www.rcsb.org/pdb/explore/explore.do?structureId=3BRT) | -32.5 | Inhibitor of nuclear factor kappa-B kinase subunit alpha |
| 20 | [P49327](http://www.uniprot.org/uniprot/P49327) | [3TJM](http://www.rcsb.org/pdb/explore/explore.do?structureId=3TJM) | -32.43 | Fatty acid synthase |
| 21 | [Q07912](http://www.uniprot.org/uniprot/Q07912) | [3EQR](http://www.rcsb.org/pdb/explore/explore.do?structureId=3EQR) | -32.25 | Activated CDC42 kinase 1 |
| 22 | [P30041](http://www.uniprot.org/uniprot/P30041) | [1PRX](http://www.rcsb.org/pdb/explore/explore.do?structureId=1PRX) | -32.08 | Peroxiredoxin-6 |
| 23 | [P02768](http://www.uniprot.org/uniprot/P02768) | [4L8U](http://www.rcsb.org/pdb/explore/explore.do?structureId=4L8U) | -31.99 | Albumin |
| 24 | [P11021](http://www.uniprot.org/uniprot/P11021) | [5F0X](http://www.rcsb.org/pdb/explore/explore.do?structureId=5F0X) | -31.94 | Endoplasmic reticulum chaperone BiP |
| 25 | [P11473](http://www.uniprot.org/uniprot/P11473) | [3B0T](http://www.rcsb.org/pdb/explore/explore.do?structureId=3B0T) | -31.87 | Vitamin D3 receptor |
| 26 | [P09874](http://www.uniprot.org/uniprot/P09874) | [5WS1](http://www.rcsb.org/pdb/explore/explore.do?structureId=5WS1) | -31.76 | Poly [ADP-ribose] polymerase 1 |
| 27 | [O43525](http://www.uniprot.org/uniprot/O43525) | [5J03](http://www.rcsb.org/pdb/explore/explore.do?structureId=5J03) | -31.68 | Potassium voltage-gated channel subfamily KQT member 3 |
| 28 | [P16435](http://www.uniprot.org/uniprot/P16435) | [3QFS](http://www.rcsb.org/pdb/explore/explore.do?structureId=3QFS) | -31.6 | NADPH--cytochrome P450 reductase |
| 29 | [O15530](http://www.uniprot.org/uniprot/O15530) | [5LVO](http://www.rcsb.org/pdb/explore/explore.do?structureId=5LVO) | -31.58 | 3-phosphoinositide-dependent protein kinase 1 |
| 30 | [Q6TGC4](http://www.uniprot.org/uniprot/Q6TGC4) | [4DAT](http://www.rcsb.org/pdb/explore/explore.do?structureId=4DAT) | -31.55 | Protein-arginine deiminase type-6 |
| 31 | [Q02750](http://www.uniprot.org/uniprot/Q02750) | [3EQC](http://www.rcsb.org/pdb/explore/explore.do?structureId=3EQC) | -31.51 | Dual specificity mitogen-activated protein kinase kinase 1 |
| 32 | [P05177](http://www.uniprot.org/uniprot/P05177) | [2HI4](http://www.rcsb.org/pdb/explore/explore.do?structureId=2HI4) | -31.48 | Cytochrome P450 1A2 |
| 33 | [P33261](http://www.uniprot.org/uniprot/P33261) | [4GQS](http://www.rcsb.org/pdb/explore/explore.do?structureId=4GQS) | -31.46 | Cytochrome P450 2C19 |
| 34 | [O76054](http://www.uniprot.org/uniprot/O76054) | [4OMJ](http://www.rcsb.org/pdb/explore/explore.do?structureId=4OMJ) | -31.42 | SEC14-like protein 2 |
| 35 | [P09455](http://www.uniprot.org/uniprot/P09455) | [5HBS](http://www.rcsb.org/pdb/explore/explore.do?structureId=5HBS) | -31.4 | Retinol-binding protein 1 |
| 36 | [P08686](http://www.uniprot.org/uniprot/P08686) | [4Y8W](http://www.rcsb.org/pdb/explore/explore.do?structureId=4Y8W) | -31.31 | Steroid 21-hydroxylase |
| 37 | [P24530](http://www.uniprot.org/uniprot/P24530) | [5GLI](http://www.rcsb.org/pdb/explore/explore.do?structureId=5GLI) | -31.18 | Endothelin receptor type B |
| 38 | [O14842](http://www.uniprot.org/uniprot/O14842) | [4PHU](http://www.rcsb.org/pdb/explore/explore.do?structureId=4PHU) | -31.15 | Free fatty acid receptor 1 |
| 39 | [O75746](http://www.uniprot.org/uniprot/O75746) | [4P5X](http://www.rcsb.org/pdb/explore/explore.do?structureId=4P5X) | -31.15 | Calcium-binding mitochondrial carrier protein Aralar1 |
| 40 | [P55789](http://www.uniprot.org/uniprot/P55789) | [3U5S](http://www.rcsb.org/pdb/explore/explore.do?structureId=3U5S) | -31.14 | FAD-linked sulfhydryl oxidase ALR |
| 41 | [Q9UGM6](http://www.uniprot.org/uniprot/Q9UGM6) | [5EKD](http://www.rcsb.org/pdb/explore/explore.do?structureId=5EKD) | -31.1 | Tryptophan--tRNA ligase, mitochondrial |
| 42 | [Q9UM73](http://www.uniprot.org/uniprot/Q9UM73) | [4Z55](http://www.rcsb.org/pdb/explore/explore.do?structureId=4Z55) | -30.95 | ALK tyrosine kinase receptor |
| 43 | [P27986](http://www.uniprot.org/uniprot/P27986) | [4JPS](http://www.rcsb.org/pdb/explore/explore.do?structureId=4JPS) | -30.89 | Phosphatidylinositol 3-kinase regulatory subunit alpha |
| 44 | [O95831](http://www.uniprot.org/uniprot/O95831) | [5FS8](http://www.rcsb.org/pdb/explore/explore.do?structureId=5FS8) | -30.86 | Apoptosis-inducing factor 1, mitochondrial |
| 45 | [P10826](http://www.uniprot.org/uniprot/P10826) | [4DM6](http://www.rcsb.org/pdb/explore/explore.do?structureId=4DM6) | -30.79 | Retinoic acid receptor beta |
| 46 | [O00763](http://www.uniprot.org/uniprot/O00763) | [3GID](http://www.rcsb.org/pdb/explore/explore.do?structureId=3GID) | -30.77 | Acetyl-CoA carboxylase 2 |
| 47 | [P10721](http://www.uniprot.org/uniprot/P10721) | [1T46](http://www.rcsb.org/pdb/explore/explore.do?structureId=1T46) | -30.77 | Mast/stem cell growth factor receptor Kit |
| 48 | [P24941](http://www.uniprot.org/uniprot/P24941) | [4EK4](http://www.rcsb.org/pdb/explore/explore.do?structureId=4EK4) | -30.76 | Cyclin-dependent kinase 2 |
| 49 | [Q13131](http://www.uniprot.org/uniprot/Q13131) | [5EZV](http://www.rcsb.org/pdb/explore/explore.do?structureId=5EZV) | -30.75 | 5'-AMP-activated protein kinase catalytic subunit alpha-1 |
| 50 | [P07814](http://www.uniprot.org/uniprot/P07814) | [4HVC](http://www.rcsb.org/pdb/explore/explore.do?structureId=4HVC) | -30.57 | Bifunctional glutamate/proline--tRNA ligase |
| 51 | [P21554](http://www.uniprot.org/uniprot/P21554) | [5U09](http://www.rcsb.org/pdb/explore/explore.do?structureId=5U09) | -30.54 | Cannabinoid receptor 1 |
| 52 | [P06239](http://www.uniprot.org/uniprot/P06239) | [1QPC](http://www.rcsb.org/pdb/explore/explore.do?structureId=1QPC) | -30.46 | Tyrosine-protein kinase Lck |
| 53 | [P26639](http://www.uniprot.org/uniprot/P26639) | [4HWT](http://www.rcsb.org/pdb/explore/explore.do?structureId=4HWT) | -30.35 | Threonine--tRNA ligase 1, cytoplasmic |
| 54 | [P22455](http://www.uniprot.org/uniprot/P22455) | [4XCU](http://www.rcsb.org/pdb/explore/explore.do?structureId=4XCU) | -30.32 | Fibroblast growth factor receptor 4 |
| 55 | [P08581](http://www.uniprot.org/uniprot/P08581) | [4R1V](http://www.rcsb.org/pdb/explore/explore.do?structureId=4R1V) | -30.27 | Hepatocyte growth factor receptor |
| 56 | [Q96RI1](http://www.uniprot.org/uniprot/Q96RI1) | [4QE6](http://www.rcsb.org/pdb/explore/explore.do?structureId=4QE6) | -30.17 | Bile acid receptor |
| 57 | [P29474](http://www.uniprot.org/uniprot/P29474) | [4D1P](http://www.rcsb.org/pdb/explore/explore.do?structureId=4D1P) | -30.11 | Nitric oxide synthase, endothelial |
| 58 | [P47989](http://www.uniprot.org/uniprot/P47989) | [2E1Q](http://www.rcsb.org/pdb/explore/explore.do?structureId=2E1Q) | -30.06 | Xanthine dehydrogenase/oxidase |
| 59 | [Q8IWT1](http://www.uniprot.org/uniprot/Q8IWT1) | [4MZ2](http://www.rcsb.org/pdb/explore/explore.do?structureId=4MZ2) | -30.06 | Sodium channel subunit beta-4 |
| 60 | [P40261](http://www.uniprot.org/uniprot/P40261) | [2IIP](http://www.rcsb.org/pdb/explore/explore.do?structureId=2IIP) | -29.98 | Nicotinamide N-methyltransferase |
| 61 | [Q16760](http://www.uniprot.org/uniprot/Q16760) | [3BQ7](http://www.rcsb.org/pdb/explore/explore.do?structureId=3BQ7) | -29.74 | Diacylglycerol kinase delta |
| 62 | [O14646](http://www.uniprot.org/uniprot/O14646) | [4O42](http://www.rcsb.org/pdb/explore/explore.do?structureId=4O42) | -29.68 | Beta-1,4-galactosyltransferase 1 |
| 63 | [P08473](http://www.uniprot.org/uniprot/P08473) | [1R1H](http://www.rcsb.org/pdb/explore/explore.do?structureId=1R1H) | -29.63 | Chromodomain-helicase-DNA-binding protein 1 |
| 64 | [P15291](http://www.uniprot.org/uniprot/P15291) | [2FYB](http://www.rcsb.org/pdb/explore/explore.do?structureId=2FYB) | -29.62 | Neprilysin |
| 65 | [Q8N1Q1](http://www.uniprot.org/uniprot/Q8N1Q1) | [4KNN](http://www.rcsb.org/pdb/explore/explore.do?structureId=4KNN) | -29.6 | Carbonic anhydrase 13 |
| 66 | [Q08345](http://www.uniprot.org/uniprot/Q08345) | [4BKJ](http://www.rcsb.org/pdb/explore/explore.do?structureId=4BKJ) | -29.4 | Epithelial discoidin domain-containing receptor 1 |
| 67 | [Q07869](http://www.uniprot.org/uniprot/Q07869) | [3VI8](http://www.rcsb.org/pdb/explore/explore.do?structureId=3VI8) | -29.31 | Peroxisome proliferator-activated receptor alpha |
| 68 | [P35968](http://www.uniprot.org/uniprot/P35968) | [2XIR](http://www.rcsb.org/pdb/explore/explore.do?structureId=2XIR) | -29.14 | Vascular endothelial growth factor receptor 2 |
| 69 | [P41594](http://www.uniprot.org/uniprot/P41594) | [4OO9](http://www.rcsb.org/pdb/explore/explore.do?structureId=4OO9) | -29.13 | Metabotropic glutamate receptor 5 |
| 70 | [Q9H244](http://www.uniprot.org/uniprot/Q9H244) | [4PXZ](http://www.rcsb.org/pdb/explore/explore.do?structureId=4PXZ) | -29.08 | P2Y purinoceptor 12 |
| 71 | [Q13085](http://www.uniprot.org/uniprot/Q13085) | [2YL2](http://www.rcsb.org/pdb/explore/explore.do?structureId=2YL2) | -29.01 | Acetyl-CoA carboxylase 1 |
| 72 | [P29317](http://www.uniprot.org/uniprot/P29317) | [5I9Y](http://www.rcsb.org/pdb/explore/explore.do?structureId=5I9Y) | -28.95 | Ephrin type-A receptor 2 |
| 73 | [P27361](http://www.uniprot.org/uniprot/P27361) | [4QTB](http://www.rcsb.org/pdb/explore/explore.do?structureId=4QTB) | -28.92 | Mitogen-activated protein kinase 3 |
| 74 | [P21964](http://www.uniprot.org/uniprot/P21964) | [3BWY](http://www.rcsb.org/pdb/explore/explore.do?structureId=3BWY) | -28.84 | Catechol O-methyltransferase |
| 75 | [Q9UDX3](http://www.uniprot.org/uniprot/Q9UDX3) | [4TLG](http://www.rcsb.org/pdb/explore/explore.do?structureId=4TLG) | -28.82 | SEC14-like protein 4 |
| 76 | [O60674](http://www.uniprot.org/uniprot/O60674) | [3UGC](http://www.rcsb.org/pdb/explore/explore.do?structureId=3UGC) | -28.73 | Tyrosine-protein kinase JAK2 |
| 77 | [P69905](http://www.uniprot.org/uniprot/P69905) | [1IRD](http://www.rcsb.org/pdb/explore/explore.do?structureId=1IRD) | -28.62 | Hemoglobin subunit alpha |
| 78 | [Q13126](http://www.uniprot.org/uniprot/Q13126) | [1CB0](http://www.rcsb.org/pdb/explore/explore.do?structureId=1CB0) | -28.52 | S-methyl-5'-thioadenosine phosphorylase |
| 79 | [Q9UHC9](http://www.uniprot.org/uniprot/Q9UHC9) | [3QNT](http://www.rcsb.org/pdb/explore/explore.do?structureId=3QNT) | -28.52 | NPC1-like intracellular cholesterol transporter 1 |
| 80 | [P19793](http://www.uniprot.org/uniprot/P19793) | [2P1T](http://www.rcsb.org/pdb/explore/explore.do?structureId=2P1T) | -28.48 | Retinoic acid receptor RXR-alpha |
| 81 | [P30085](http://www.uniprot.org/uniprot/P30085) | [1TEV](http://www.rcsb.org/pdb/explore/explore.do?structureId=1TEV) | -28.48 | UMP-CMP kinase |
| 82 | [Q9NZD2](http://www.uniprot.org/uniprot/Q9NZD2) | [3RZN](http://www.rcsb.org/pdb/explore/explore.do?structureId=3RZN) | -28.35 | Glycolipid transfer protein |
| 83 | [P17900](http://www.uniprot.org/uniprot/P17900) | [2AG4](http://www.rcsb.org/pdb/explore/explore.do?structureId=2AG4) | -28.33 | Ganglioside GM2 activator |
| 84 | [P25116](http://www.uniprot.org/uniprot/P25116) | [3VW7](http://www.rcsb.org/pdb/explore/explore.do?structureId=3VW7) | -28.31 | Proteinase-activated receptor 1 |
| 85 | [P62508](http://www.uniprot.org/uniprot/P62508) | [2E2R](http://www.rcsb.org/pdb/explore/explore.do?structureId=2E2R) | -28.23 | Estrogen-related receptor gamma |
| 86 | [P00374](http://www.uniprot.org/uniprot/P00374) | [1KMV](http://www.rcsb.org/pdb/explore/explore.do?structureId=1KMV) | -28.21 | Dihydrofolate reductase |
| 87 | [P00749](http://www.uniprot.org/uniprot/P00749) | [4JNI](http://www.rcsb.org/pdb/explore/explore.do?structureId=4JNI) | -28.1 | Urokinase-type plasminogen activator |
| 88 | [Q16620](http://www.uniprot.org/uniprot/Q16620) | [4AT5](http://www.rcsb.org/pdb/explore/explore.do?structureId=4AT5) | -28.05 | BDNF/NT-3 growth factors receptor |
| 89 | [P00742](http://www.uniprot.org/uniprot/P00742) | [2JKH](http://www.rcsb.org/pdb/explore/explore.do?structureId=2JKH) | -28.04 | Coagulation factor X |
| 90 | [P11802](http://www.uniprot.org/uniprot/P11802) | [2W96](http://www.rcsb.org/pdb/explore/explore.do?structureId=2W96) | -28.02 | Cyclin-dependent kinase 4 |
| 91 | [P48728](http://www.uniprot.org/uniprot/P48728) | [1WSV](http://www.rcsb.org/pdb/explore/explore.do?structureId=1WSV) | -28.01 | Aminomethyltransferase, mitochondrial |
| 92 | [P14061](http://www.uniprot.org/uniprot/P14061) | [1I5R](http://www.rcsb.org/pdb/explore/explore.do?structureId=1I5R) | -27.91 | 17-beta-hydroxysteroid dehydrogenase type 1 |
| 93 | [Q96FI4](http://www.uniprot.org/uniprot/Q96FI4) | [5ITQ](http://www.rcsb.org/pdb/explore/explore.do?structureId=5ITQ) | -27.83 | Endonuclease 8-like 1 |
| 94 | [P22830](http://www.uniprot.org/uniprot/P22830) | [3HCN](http://www.rcsb.org/pdb/explore/explore.do?structureId=3HCN) | -27.71 | Ferrochelatase, mitochondrial |
| 95 | [Q9UIC8](http://www.uniprot.org/uniprot/Q9UIC8) | [3IEI](http://www.rcsb.org/pdb/explore/explore.do?structureId=3IEI) | -27.69 | Leucine carboxyl methyltransferase 1 |
| 96 | [O43447](http://www.uniprot.org/uniprot/O43447) | [1MZW](http://www.rcsb.org/pdb/explore/explore.do?structureId=1MZW) | -27.65 | Peptidyl-prolyl cis-trans isomerase H |
| 97 | [P36544](http://www.uniprot.org/uniprot/P36544) | [5AFN](http://www.rcsb.org/pdb/explore/explore.do?structureId=5AFN) | -27.65 | Neuronal acetylcholine receptor subunit alpha-7 |
| 98 | [Q10588](http://www.uniprot.org/uniprot/Q10588) | [1ISI](http://www.rcsb.org/pdb/explore/explore.do?structureId=1ISI) | -27.64 | ADP-ribosyl cyclase/cyclic ADP-ribose hydrolase 2 |
| 99 | [P09110](http://www.uniprot.org/uniprot/P09110) | [2IIK](http://www.rcsb.org/pdb/explore/explore.do?structureId=2IIK) | -27.63 | 3-ketoacyl-CoA thiolase, peroxisomal |
| 100 | [Q15046](http://www.uniprot.org/uniprot/Q15046) | [4YCU](http://www.rcsb.org/pdb/explore/explore.do?structureId=4YCU) | -27.63 | Lysine--tRNA ligase |
| 101 | [P11310](http://www.uniprot.org/uniprot/P11310) | [4P13](http://www.rcsb.org/pdb/explore/explore.do?structureId=4P13) | -27.49 | Medium-chain specific acyl-CoA dehydrogenase, mitochondrial |
| 102 | [P23921](http://www.uniprot.org/uniprot/P23921) | [2WGH](http://www.rcsb.org/pdb/explore/explore.do?structureId=2WGH) | -27.49 | Ribonucleoside-diphosphate reductase large subunit |
| 103 | [Q14289](http://www.uniprot.org/uniprot/Q14289) | [3FZS](http://www.rcsb.org/pdb/explore/explore.do?structureId=3FZS) | -27.37 | Protein-tyrosine kinase 2-beta |
| 104 | [P17252](http://www.uniprot.org/uniprot/P17252) | [4RA4](http://www.rcsb.org/pdb/explore/explore.do?structureId=4RA4) | -27.36 | Protein kinase C alpha type |
| 105 | [P12532](http://www.uniprot.org/uniprot/P12532) | [1QK1](http://www.rcsb.org/pdb/explore/explore.do?structureId=1QK1) | -27.31 | Creatine kinase U-type, mitochondrial |
| 106 | [P27695](http://www.uniprot.org/uniprot/P27695) | [4QHE](http://www.rcsb.org/pdb/explore/explore.do?structureId=4QHE) | -27.28 | DNA-(apurinic or apyrimidinic site) endonuclease |
| 107 | [P04278](http://www.uniprot.org/uniprot/P04278) | [1D2S](http://www.rcsb.org/pdb/explore/explore.do?structureId=1D2S) | -27.2 | Sex hormone-binding globulin |
| 108 | [Q8TED1](http://www.uniprot.org/uniprot/Q8TED1) | [3KIJ](http://www.rcsb.org/pdb/explore/explore.do?structureId=3KIJ) | -27.2 | Probable glutathione peroxidase 8 |
| 109 | [P55263](http://www.uniprot.org/uniprot/P55263) | [1BX4](http://www.rcsb.org/pdb/explore/explore.do?structureId=1BX4) | -27.13 | Adenosine kinase |
| 110 | [Q7LG56](http://www.uniprot.org/uniprot/Q7LG56) | [4DJN](http://www.rcsb.org/pdb/explore/explore.do?structureId=4DJN) | -27.09 | Ribonucleoside-diphosphate reductase subunit M2 B |
| 111 | [P08631](http://www.uniprot.org/uniprot/P08631) | [2HK5](http://www.rcsb.org/pdb/explore/explore.do?structureId=2HK5) | -27.07 | Tyrosine-protein kinase HCK |
| 112 | [P04049](http://www.uniprot.org/uniprot/P04049) | [3IQV](http://www.rcsb.org/pdb/explore/explore.do?structureId=3IQV) | -27.05 | RAF proto-oncogene serine/threonine-protein kinase |
| 113 | [P27169](http://www.uniprot.org/uniprot/P27169) | [1V04](http://www.rcsb.org/pdb/explore/explore.do?structureId=1V04) | -27.04 | Serum paraoxonase/arylesterase 1 |
| 114 | [Q92731](http://www.uniprot.org/uniprot/Q92731) | [3OLL](http://www.rcsb.org/pdb/explore/explore.do?structureId=3OLL) | -26.99 | Estrogen receptor beta |
| 115 | [P15056](http://www.uniprot.org/uniprot/P15056) | [5ITA](http://www.rcsb.org/pdb/explore/explore.do?structureId=5ITA) | -26.96 | Serine/threonine-protein kinase B-raf |
| 116 | [P37023](http://www.uniprot.org/uniprot/P37023) | [3MY0](http://www.rcsb.org/pdb/explore/explore.do?structureId=3MY0) | -26.84 | Serine/threonine-protein kinase receptor R3 |
| 117 | [P24752](http://www.uniprot.org/uniprot/P24752) | [2IB8](http://www.rcsb.org/pdb/explore/explore.do?structureId=2IB8) | -26.8 | Acetyl-CoA acetyltransferase, mitochondrial |
| 118 | [O00329](http://www.uniprot.org/uniprot/O00329) | [5DXU](http://www.rcsb.org/pdb/explore/explore.do?structureId=5DXU) | -26.73 | Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit delta isoform |
| 119 | [P10827](http://www.uniprot.org/uniprot/P10827) | [3ILZ](http://www.rcsb.org/pdb/explore/explore.do?structureId=3ILZ) | -26.68 | Thyroid hormone receptor alpha |
| 120 | [P35462](http://www.uniprot.org/uniprot/P35462) | [3PBL](http://www.rcsb.org/pdb/explore/explore.do?structureId=3PBL) | -26.67 | D(3) dopamine receptor |
| 121 | [P10109](http://www.uniprot.org/uniprot/P10109) | [3N9Z](http://www.rcsb.org/pdb/explore/explore.do?structureId=3N9Z) | -26.65 | Adrenodoxin, mitochondrial |
| 122 | [P49588](http://www.uniprot.org/uniprot/P49588) | [4XEM](http://www.rcsb.org/pdb/explore/explore.do?structureId=4XEM) | -26.65 | Alanine--tRNA ligase, cytoplasmic |
| 123 | [P25963](http://www.uniprot.org/uniprot/P25963) | [1IKN](http://www.rcsb.org/pdb/explore/explore.do?structureId=1IKN) | -26.62 | NF-kappa-B inhibitor alpha |
| 124 | [Q01668](http://www.uniprot.org/uniprot/Q01668) | [3LV3](http://www.rcsb.org/pdb/explore/explore.do?structureId=3LV3) | -26.62 | Voltage-dependent L-type calcium channel subunit alpha-1D |
| 125 | [P50336](http://www.uniprot.org/uniprot/P50336) | [3NKS](http://www.rcsb.org/pdb/explore/explore.do?structureId=3NKS) | -26.6 | Protoporphyrinogen oxidase |
| 126 | [P04629](http://www.uniprot.org/uniprot/P04629) | [4PMP](http://www.rcsb.org/pdb/explore/explore.do?structureId=4PMP) | -26.57 | High affinity nerve growth factor receptor |
| 127 | [P53667](http://www.uniprot.org/uniprot/P53667) | [3S95](http://www.rcsb.org/pdb/explore/explore.do?structureId=3S95) | -26.56 | LIM domain kinase 1 |
| 128 | [P17707](http://www.uniprot.org/uniprot/P17707) | [1JL0](http://www.rcsb.org/pdb/explore/explore.do?structureId=1JL0) | -26.55 | S-adenosylmethionine decarboxylase proenzyme |
| 129 | [P31153](http://www.uniprot.org/uniprot/P31153) | [5A1I](http://www.rcsb.org/pdb/explore/explore.do?structureId=5A1I) | -26.55 | S-adenosylmethionine synthase isoform type-2 |
| 130 | [P01375](http://www.uniprot.org/uniprot/P01375) | [2AZ5](http://www.rcsb.org/pdb/explore/explore.do?structureId=2AZ5) | -26.54 | Tumor necrosis factor |
| 131 | [P11388](http://www.uniprot.org/uniprot/P11388) | [1ZXM](http://www.rcsb.org/pdb/explore/explore.do?structureId=1ZXM) | -26.5 | DNA topoisomerase 2-alpha |
| 132 | [Q9Y3R4](http://www.uniprot.org/uniprot/Q9Y3R4) | [2F25](http://www.rcsb.org/pdb/explore/explore.do?structureId=2F25) | -26.5 | Sialidase-2 |
| 133 | [P05164](http://www.uniprot.org/uniprot/P05164) | [4DL1](http://www.rcsb.org/pdb/explore/explore.do?structureId=4DL1) | -26.41 | Myeloperoxidase |
| 134 | [P51800](http://www.uniprot.org/uniprot/P51800) | [2PFI](http://www.rcsb.org/pdb/explore/explore.do?structureId=2PFI) | -26.28 | Chloride channel protein ClC-Ka |
| 135 | [P08174](http://www.uniprot.org/uniprot/P08174) | [1H03](http://www.rcsb.org/pdb/explore/explore.do?structureId=1H03) | -26.27 | Complement decay-accelerating factor |
| 136 | [P01579](http://www.uniprot.org/uniprot/P01579) | [1FYH](http://www.rcsb.org/pdb/explore/explore.do?structureId=1FYH) | -26.26 | Interferon gamma |
| 137 | [O14717](http://www.uniprot.org/uniprot/O14717) | [1G55](http://www.rcsb.org/pdb/explore/explore.do?structureId=1G55) | -26.25 | tRNA (cytosine(38)-C(5))-methyltransferase |
| 138 | [P10276](http://www.uniprot.org/uniprot/P10276) | [3KMR](http://www.rcsb.org/pdb/explore/explore.do?structureId=3KMR) | -26.22 | Retinoic acid receptor alpha |
| 139 | [P29274](http://www.uniprot.org/uniprot/P29274) | [5IU4](http://www.rcsb.org/pdb/explore/explore.do?structureId=5IU4) | -26.19 | Adenosine receptor A2a |
| 140 | [P08709](http://www.uniprot.org/uniprot/P08709) | [4YLQ](http://www.rcsb.org/pdb/explore/explore.do?structureId=4YLQ) | -26.17 | Coagulation factor VII |
| 141 | [P14868](http://www.uniprot.org/uniprot/P14868) | [4J15](http://www.rcsb.org/pdb/explore/explore.do?structureId=4J15) | -26.01 | Aspartate--tRNA ligase, cytoplasmic |
| 142 | [P04070](http://www.uniprot.org/uniprot/P04070) | [1LQV](http://www.rcsb.org/pdb/explore/explore.do?structureId=1LQV) | -26 | Vitamin K-dependent protein C |
| 143 | [Q92736](http://www.uniprot.org/uniprot/Q92736) | [4JKQ](http://www.rcsb.org/pdb/explore/explore.do?structureId=4JKQ) | -25.97 | Ryanodine receptor 2 |
| 144 | [P04040](http://www.uniprot.org/uniprot/P04040) | [1DGF](http://www.rcsb.org/pdb/explore/explore.do?structureId=1DGF) | -25.95 | Catalase |
| 145 | [P99999](http://www.uniprot.org/uniprot/P99999) | [3ZOO](http://www.rcsb.org/pdb/explore/explore.do?structureId=3ZOO) | -25.95 | Cytochrome c |
| 146 | [P04150](http://www.uniprot.org/uniprot/P04150) | [4UDD](http://www.rcsb.org/pdb/explore/explore.do?structureId=4UDD) | -25.89 | Glucocorticoid receptor |
| 147 | [P10636](http://www.uniprot.org/uniprot/P10636) | [4Y32](http://www.rcsb.org/pdb/explore/explore.do?structureId=4Y32) | -25.89 | Microtubule-associated protein tau |
| 148 | [P26447](http://www.uniprot.org/uniprot/P26447) | [3KO0](http://www.rcsb.org/pdb/explore/explore.do?structureId=3KO0) | -25.87 | Protein S100-A4 |
| 149 | [P14207](http://www.uniprot.org/uniprot/P14207) | [4KN0](http://www.rcsb.org/pdb/explore/explore.do?structureId=4KN0) | -25.86 | Folate receptor beta |
| 150 | [Q02763](http://www.uniprot.org/uniprot/Q02763) | [3BEA](http://www.rcsb.org/pdb/explore/explore.do?structureId=3BEA) | -25.86 | Angiopoietin-1 receptor |

**Table S2.** Results from functional enrichment analysis in STRING server.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Functional enrichment** | **Identification** | **Description** | **Proteins\* (TP)** | ***p*-value** |
| DISEASES | DOID:162 | Cancer | 28 (895) | 3.46e-07 |
| KEGG Pathways | hsa05200 | Pathways in cancer | 31 (517) | 6.55e-16 |
| WikiPathways | WP4262 | Breast cancer pathway | 10 (153) | 1.71e-0.5 |
| TISSUES | BTO:0000180 | Cervical carcinoma cell | 12 (271) | 0.00018 |

\*Proteins identified as astragalin targets; TP, total proteins with the description asigned.