**Cendrowski et al. SUPPLEMENTARY TABLES**

**Table 1. The ranked list of proteins detected in BioID using BMP2K-L as bait.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Rank** | **Protein name** | **Gene symbol** | **Uniprot ID** | **Subtracted score C-tag** | **Subtracted score N-tag** | **Mean score** |
| N/A | BMP-2-inducible protein kinase | BMP2K | Q9NSY1 | 14142.3 | 10216.0 | 12179.1 |
| 1 | E3 SUMO-protein ligase RanBP2 | RANBP2 | P49792 | 1908.5 | 1004.5 | 1456.5 |
| 2 | Histone H1.4 | HIST1H1E | P10412 | 682.8 | 807.0 | 744.9 |
| 3 | Epidermal growth factor receptor substrate 15-like 1 | EPS15R | Q9UBC2 | 573.8 | 422.5 | 498.1 |
| 4 | Histone H1.2 | HIST1H1C | P16403 | 199.0 | 740.5 | 469.8 |
| 5 | 40S ribosomal protein S30 | FAU | P62861 | 411.5 | 260.8 | 336.1 |
| 6 | MKL/myocardin-like protein 2 | MKL2 | Q9ULH7 | 304.8 | 265.3 | 285.0 |
| 7 | Guanine nucleotide-binding protein-like 3 | GNL3 | Q9BVP2 | 364.0 | 176.3 | 270.1 |
| 8 | 60S ribosomal protein L6 | RPL6 | Q02878 | 438.0 | 77.0 | 257.5 |
| 9 | RalBP1-associated Eps domain-containing protein 1 | REPS1 | Q96D71 | 115.5 | 307.3 | 211.4 |
| 10 | Transcription termination factor 1 | TTF1 | Q15361 | 178.0 | 209.0 | 193.5 |
| 11 | RANBP2-like and GRIP domain-containing protein 1 | RGPD1 | P0DJD0 | 206.8 | 177.8 | 192.3 |
| 12 | 40S ribosomal protein S8 | RPS8 | P62241 | 311.8 | 60.5 | 186.1 |
| 13 | Nucleolar protein of 40 kDa | ZCCHC17 | Q9NP64 | 252.3 | 50.5 | 151.4 |
| 14 | Arf-GAP domain and FG repeat-containing protein 1 | AGFG1 | P52594 | 145.3 | 147.3 | 146.3 |
| 15 | 60S ribosomal protein L26 | RPL26 | P61254 | 199.0 | 88.3 | 143.6 |
| 16 | Protein numb homolog | NUMB | P49757 | 146.5 | 127.0 | 136.8 |
| 17 | pre-rRNA processing protein FTSJ3 | FTSJ3 | Q8IY81 | 187.0 | 70.8 | 128.9 |
| 18 | Phosphatidylinositol-binding clathrin assembly protein | PICALM | Q13492 | 63.0 | 128.8 | 95.9 |
| 19 | 60S ribosomal protein L32 | RPL32 | P62910 | 117.8 | 67.8 | 92.8 |

**Table 2. The ranked list of proteins detected in BioID using BMP2K-S as bait.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Rank** | **Protein name** | **Gene symbol** | **Uniprot ID** | **Subtracted score C-tag** | **Subtracted score N-tag** | **Mean score** |
| N/A | BMP-2-inducible protein kinase | BMP2K | Q9NSY1 | 24769.3 | 6273.3 | 15521.3 |
| 1 | E3 SUMO-protein ligase RanBP2 | RANBP2 | P49792 | 7906.3 | 3021.3 | 5463.8 |
| 2 | Protein PRRC2C | PRRC2C | Q9Y520 | 2433.0 | 2461.5 | 2447.3 |
| 3 | Protein transport protein Sec16A | SEC16A | O15027 | 3005.8 | 1667.5 | 2336.6 |
| 4 | Ubiquitin-associated protein 2-like | UBAP2L | Q14157 | 2202.3 | 1675.5 | 1938.9 |
| 5 | Ataxin-2-like protein | ATXN2L | Q8WWM7 | 1231.8 | 974.5 | 1103.1 |
| 6 | Protein PRRC2A | PRRC2A | P48634 | 1187.3 | 901.8 | 1044.5 |
| 7 | Ankyrin repeat and KH domain-containing protein 1 | ANKHD1 | Q8IWZ3 | 1087.8 | 955.8 | 1021.8 |
| 8 | Double-strand break repair protein MRE11A | MRE11A | P49959 | 1739.3 | 51.5 | 895.4 |
| 9 | Protein PRRC2B | PRRC2B | Q5JSZ5 | 1092.5 | 573.5 | 833.0 |
| 10 | Nuclear fragile X mental retardation-interacting protein 2 | NUFIP2 | Q7Z417 | 443.0 | 1174.8 | 808.9 |
| 11 | RANBP2-like and GRIP domain-containing protein 1 | RGPD1 | P0DJD0 | 1063.5 | 548.8 | 806.1 |
| 12 | Ankyrin repeat domain-containing protein 17 | ANKRD17 | O75179 | 1245.3 | 351.3 | 798.3 |
| 13 | Epidermal growth factor receptor substrate 15-like 1 | EPS15R | Q9UBC2 | 1070.5 | 342.0 | 706.3 |
| 14 | Nuclear pore complex protein Nup214 | NUP214 | P35658 | 951.5 | 333.3 | 642.4 |
| 15 | RANBP2-like and GRIP domain-containing protein 8 | RGPD8 | O14715 | 960.5 | 277.8 | 619.1 |
| 16 | Phosphatidylinositol-binding clathrin assembly protein | PICALM | Q13492 | 551.5 | 668.5 | 610.0 |
| 17 | Eukaryotic translation initiation factor 4 gamma 1 | EIF4G1 | Q04637 | 807.8 | 406.3 | 607.0 |
| 18 | Ubiquitin-associated protein 2 | UBAP2 | Q5T6F2 | 823.8 | 356.0 | 589.9 |
| 19 | Clathrin interactor 1 | CLINT1 | Q14677 | 735.5 | 365.8 | 550.6 |
| 20 | Histone H1.4 | HIST1H1E | P10412 | 764.8 | 258.8 | 511.8 |
| 21 | Probable JmjC domain-containing histone demethylation protein 2C | JMJD1C | Q15652 | 615.8 | 298.3 | 457.0 |
| 22 | Tight junction protein ZO-1 | TJP1 | Q07157 | 748.5 | 147.3 | 447.9 |
| 23 | PERQ amino acid-rich with GYF domain-containing protein 2 | GIGYF2 | Q6Y7W6 | 590.3 | 303.3 | 446.8 |
| 24 | Trinucleotide repeat-containing gene 6B protein | TNRC6B | Q9UPQ9 | 356.3 | 501.5 | 428.9 |
| 25 | MKL/myocardin-like protein 2 | MKL2 | Q9ULH7 | 757.8 | 95.8 | 426.8 |
| 26 | 5'-3' exoribonuclease 1 | XRN1 | Q8IZH2 | 540.8 | 248.3 | 394.5 |
| 27 | Pericentriolar material 1 protein | PCM1 | Q15154 | 383.0 | 359.8 | 371.4 |
| 28 | Arf-GAP domain and FG repeat-containing protein 1 | AGFG1 | P52594 | 550.5 | 191.3 | 370.9 |
| 29 | Polyadenylate-binding protein 1 | PABPC1 | P11940 | 652.0 | 87.5 | 369.8 |
| 30 | Propionyl-CoA carboxylase alpha chain, mitochondrial | PCCA | P05165 | 432.5 | 289.8 | 361.1 |
| 31 | Eukaryotic translation initiation factor 4 gamma 3 | EIF4G3 | O43432 | 392.5 | 311.8 | 352.1 |
| 32 | Eukaryotic translation initiation factor 4E transporter | EIF4ENIF1 | Q9NRA8 | 291.8 | 345.5 | 318.6 |
| 33 | Segment polarity protein dishevelled homolog DVL-2 | DVL2 | O14641 | 491.3 | 78.5 | 284.9 |
| 34 | Segment polarity protein dishevelled homolog DVL-3 | DVL3 | Q92997 | 477.0 | 86.5 | 281.8 |
| 35 | Cold shock domain-containing protein E1 | CSDE1 | O75534 | 400.3 | 158.3 | 279.3 |
| 36 | Protein LAP2 | ERBB2IP | Q96RT1 | 287.3 | 257.5 | 272.4 |
| 37 | Alstrom syndrome protein 1 | ALMS1 | Q8TCU4 | 253.0 | 259.5 | 256.3 |
| 38 | Trinucleotide repeat-containing gene 6A protein | TNRC6A | Q8NDV7 | 148.0 | 352.0 | 250.0 |
| 39 | Pumilio homolog 1 | PUM1 | Q14671 | 172.5 | 305.8 | 239.1 |
| 40 | YTH domain-containing family protein 3 | YTHDF3 | Q7Z739 | 261.8 | 173.8 | 217.8 |
| 41 | CCR4-NOT transcription complex subunit 1 | CNOT1 | A5YKK6 | 290.3 | 137.8 | 214.0 |
| 42 | Guanine nucleotide-binding protein-like 3 | GNL3 | Q9BVP2 | 155.8 | 269.0 | 212.4 |
| 43 | Protein numb homolog | NUMB | P49757 | 214.0 | 205.3 | 209.6 |
| 44 | Probable helicase with zinc finger domain | HELZ | P42694 | 239.8 | 149.0 | 194.4 |
| 45 | Nucleolar protein of 40 kDa | ZCCHC17 | Q9NP64 | 273.0 | 102.3 | 187.6 |
| 46 | Ataxin-2 | ATXN2 | Q99700 | 193.0 | 172.0 | 182.5 |
| 47 | 60S ribosomal protein L36 | RPL36 | Q9Y3U8 | 300.5 | 52.3 | 176.4 |
| 48 | Protein SMG7 | SMG7 | Q92540 | 263.8 | 80.3 | 172.0 |
| 49 | YTH domain-containing family protein 1 | YTHDF1 | Q9BYJ9 | 62.3 | 252.5 | 157.4 |
| 50 | HAUS augmin-like complex subunit 6 | HAUS6 | Q7Z4H7 | 251.5 | 56.8 | 154.1 |
| 51 | Utrophin | UTRN | P46939 | 246.0 | 54.0 | 150.0 |
| 52 | Protein transport protein Sec24B | SEC24B | O95487 | 232.3 | 55.3 | 143.8 |
| 53 | ELKS/Rab6-interacting/CAST family member 1 | ERC1 | Q8IUD2 | 233.5 | 52.5 | 143.0 |
| 54 | YTH domain-containing family protein 2 | YTHDF2 | Q9Y5A9 | 130.5 | 150.5 | 140.5 |
| 55 | Nuclear pore complex protein Nup133 | NUP133 | Q8WUM0 | 195.8 | 82.5 | 139.1 |
| 56 | 60S ribosomal protein L35 | RPL35 | P42766 | 164.8 | 105.5 | 135.1 |
| 57 | Methylcrotonoyl-CoA carboxylase subunit alpha, mitochondrial | MCCC1 | Q96RQ3 | 53.8 | 209.5 | 131.6 |
| 58 | Roquin-1 | RC3H1 | Q5TC82 | 153.8 | 106.0 | 129.9 |
| 59 | R3H domain-containing protein 1 | R3HDM1 | Q15032 | 60.0 | 176.0 | 118.0 |
| 60 | Insulin-like growth factor 2 mRNA-binding protein 2 | IGF2BP2 | Q9Y6M1 | 115.3 | 120.0 | 117.6 |
| 61 | Far upstream element-binding protein 3 | FUBP3 | Q96I24 | 70.3 | 164.8 | 117.5 |
| 62 | Intersectin-1 | ITSN1 | Q15811 | 152.8 | 75.0 | 113.9 |
| 63 | BCL-6 corepressor | BCOR | Q6W2J9 | 80.0 | 117.0 | 98.5 |
| 64 | Pumilio homolog 2 | PUM2 | Q8TB72 | 97.5 | 88.3 | 92.9 |
| 65 | Transcription termination factor 1 | TTF1 | Q15361 | 116.8 | 55.3 | 86.0 |
| 66 | Roquin-2 | RC3H2 | Q9HBD1 | 71.0 | 98.8 | 84.9 |
| 67 | Epidermal growth factor receptor substrate 15 | EPS15 | P42566 | 56.5 | 112.5 | 84.5 |
| 68 | mRNA-decapping enzyme 1A | DCP1A | Q9NPI6 | 108.0 | 57.3 | 82.6 |
| 69 | Adenomatous polyposis coli protein | APC | P25054 | 80.8 | 81.8 | 81.3 |
| 70 | OTU domain-containing protein 4 | OTUD4 | Q01804 | 89.0 | 60.8 | 74.9 |
| 71 | WASH complex subunit FAM21C | FAM21C | Q9Y4E1 | 67.8 | 80.5 | 74.1 |
| 72 | ADP-ribosylation factor GTPase-activating protein 1 | ARFGAP1 | Q8N6T3 | 83.0 | 50.8 | 66.9 |
| 73 | Poly(rC)-binding protein 2 | PCBP2 | Q15366 | 72.5 | 53.0 | 62.8 |

**Table 3. shRNAs used for depletion of all or specific BMP2K splicing variants**

|  |  |  |
| --- | --- | --- |
| **shRNA name** | **Target sequence** | **Targeted location on mRNA** |
| shBMP2K | GACTGTGCTGTTAATTCAATT | exon 3 of BMP2K-L and BMP2K-S, CDS |
| shBMP2K-L | CATCCGTGCTGATCACAAT | exon 16 of BMP2K-L, CDS |
| shBMP2K-L#2 | GCACTGCAAACCCTATCAA | exon 16 of BMP2K-L, CDS |
| shBMP2K-S | GTAGCTATTAAACCCAATA | exon 14 of BMP2K-S, 3’ UTR  |
| shBMP2K-S#2 | GCTTGATAGTAGCTATTAA | exon 14 of BMP2K-S, 3’ UTR |

**Table 4. gRNAs used for CRISPR/Cas9-mediated gene inactivation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **gRNA name** | **Target sequence** | **Chromosomal Position of Base After Cut** | **Strand** | **Targeted location on gene** |
| gCtr#1 | ACGGGCGGCTATCGCTGACT | - | - | - |
| gCtr#2 | CGCTTCCGCGGCCCGTTCAA | - | - | - |
| gBMP2K#1 | GTAACGAGAATTGTCTGGGA | 78851015 (*chr4*) | antisense | exon 7 |
| gBMP2K#2 | GAAATGATCAACCTTTATGG | 78847233 (*chr4*) | sense | exon 6 |

**Table 5. Sequences of primers used for qRT-PCR**

|  |  |  |
| --- | --- | --- |
| **Transcript name** | **Forward primer** | **Reverse primer** |
| ANK1 (human) | TACTCGCTGTCACCCTC | GTACTGGTCTGCACGTAG |
| BMP2K-L (mouse) | CAGATAAGACTGTAGACCTGC | TCGCTGATCTTTACATAGTGG |
| BMP2K-S (mouse) | TAGTGGACTCTTCTTACGGT | AATAAGCCTTCAAGTGTCCC |
| GAPDH (human) | CATGTTCGTCATGGGTGTGAACCA | GTGATGGCATGGACTGTGGTCAT |
| GYPA (human) | AGTTACATCTCATCACAGACA | TTCCTCTTCTGGAGGGTAAA |
| HBA1 (human) | GGACCCGGTCAACTTCAA | TAACGGTATTTGGAGGTCAG |
| HBB (human) | GGAGAAGTCTGCCGTTAC | GATCCCCAAAGGACTCAAAG |
| HBE1 (human) | ACTTCCTTTGGAGATGCTATTA | AGAATAATCACCATCACGTTAC |
| p62/SQSTM1 (human) | GAATCAGCTTCTGGTCCATCGG | GCTTCTTTTCCCTCCGTGCT |
| RPL19 (mouse) | AGGCATATGGGCATAGGGAAGAG | TTGACCTTCAGGTACAGGCTGTG |
| SEC16A (human) | GACTCAGTCAGCCAGGA | AATGGGCCGTCAGGG |
| TFRC (human) | ACGTCGCTTATATTGGGATG | TCACGAGGGACATATGAATTT |
| TFRC (mouse) | TTAAATTCAGCAAAGTCTGGC | CTCCACTGGGTCTAAGTTAC |
| TFR2 (human) | ACTTCCTTTGGAGATGCTATTA | AGAATAATCACCATCACGTTAC |