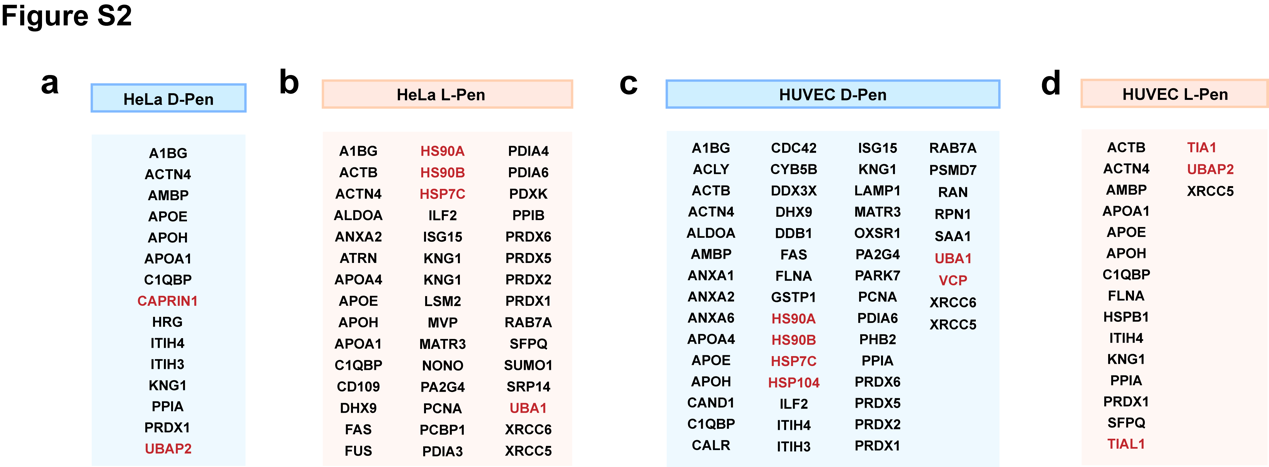
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**Supplementary Figure S1.** Fluorescence graphs of HeLa cells under various stress conditions. Here, Cys, As, 5-FU and Sor stands for cysteine, sodium arsenite, 5-fluorouracil and sorbitol in their meso-forms, respectively.



**Supplementary Figure S2**. A list of stress granule-related proteins identified in the etched-assisted proximity labeling corona. Proteins absorbed only in (**a**) D-Pen modified and (**b**) L-Pen modified material surface in HeLa and HUVEC cells (**c** and **d**).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
| Supplementary Table S1. The full list of proteins identified in the etched-assisted proximity labeling corona in HeLa and HUVEC cells following incubation with D/L-Pen modified nanomaterials. | | | | | | |
|  |
|  |
|  |
|  |  |  |  |  |  |  |  |
| HeLa | | |  | HUVEC | | |  |
| Only D-Pen | Only L-Pen | D-Pen AND L-Pen |  | Only D-Pen | Only L-Pen | D-Pen AND L-Pen |  |
| UBAP2 | XRCC6 | VTNC |  | YBOX3 | VDAC1 | XRCC5 |  |
| THRB | XRCC5 | VTDB |  | XRCC6 | UBAP2 | VTNC |  |
| TBB4A | XPO2 | TTHY |  | VCP | TPR | VTDB |  |
| TBB2A | VIME | TRFE |  | UBA1 | TIAL1 | VIME |  |
| TBA3D | UBA1L | TPM4 |  | TRXR1 | TIA1 | TRFE |  |
| SEPP1 | UBA1 | TPM3 |  | TPM1 | TCPQ | TPM4 |  |
| ROA2 | U2AF2 | SF3B3 |  | TOM20 | TBB3 | TPM3 |  |
| PPIA | TWF1 | SET |  | TNPO1 | SODM | THRB |  |
| PCYOX | TUFT1 | SAA4 |  | TMOD3 | SFPQ | TCP4 |  |
| PCLO | TRAP1 | RET4 |  | TLN1 | SF3B3 | TBA1A |  |
| NAL14 | TPR | PTBP1 |  | TKT | RALY | SMD2 |  |
| LUM | TPIS | PROS |  | TIF1B | RA1L2 | SERPH |  |
| KCNH5 | TMOD3 | PRDX1 |  | THIO | PTMS | S10A6 |  |
| KAIN | THIO | PON1 |  | THIC | PSMA8 | RUVB1 |  |
| IGHG2 | TCPZ | PLMN |  | TERA | PSB6 | RSSA |  |
| HNRPU | TCPQ | PGRP2 |  | TCPZ | PON1 | ROA2 |  |
| CO3 | TCPH | PDIA1 |  | TCPD | MGN | RLA2 |  |
| CO2 | TCPG | NUCL |  | TCPB | K2C8 | RL8 |  |
| CHSP1 | TCPB | MYL9 |  | TBB5 | K2C7 | RL7A |  |
| CDV3 | TCPA | MYL6 |  | TBB4A | K1C14 | RL7 |  |
| CDC23 | TBB5 | LMNA |  | TBA1C | K1C10 | RL40 |  |
| CAPRIN1 | TBB4B | LEG1 |  | TALDO | INADL | RL4 |  |
| CADH2 | TBA1A | KPYM |  | TAGL2 | IGJ | RL35 |  |
| ARP5L | TAGL2 | KNG1 |  | TAGL | IGHM | RL27 |  |
| APOC1 | SUMO1 | ITIH4 |  | SYYC | IGHA2 | RL13 |  |
| A1AT | ST134 | ITIH3 |  | SURF4 | HSPB1 | RBMX |  |
| A1AG2 | SSBP | ITIH2 |  | SUMO3 | HNRPQ | RAGP1 |  |
|  | SRSF7 | ITIH1 |  | SUMO1 | FYV1 | PTMA |  |
|  | SRP14 | IGM |  | STON2 | FBLN1 | PTBP1 |  |
|  | SRC8 | IGKC |  | STIP1 | ELAV1 | PROS |  |
|  | SODM | IGHA2 |  | ST134 | EF1D | PRDX1 |  |
|  | SMD2 | IGHA1 |  | SRSF1 | DREB | PPIA |  |
|  | SMD1 | IC1 |  | SODC | DLRB2 | PLMN |  |
|  | SHBG | HRG |  | SNRPA | DLDH | PDIA1 |  |
|  | SFPQ | HPT |  | SERA | CPN2 | NUCL |  |
|  | SF3B6 | HNRPC |  | SEPP1 | COPZ1 | NDKA |  |
|  | S10AB | HEP2 |  | SAR1A | CO3A1 | MYL9 |  |
|  | S10A6 | HEMO |  | SAHH | CFAB | LMNA |  |
|  | S10A4 | H2B2E |  | SAA4 | CERU | LEG1 |  |
|  | RUVB2 | H2A2C |  | SAA1 | C1R | KPYM |  |
|  | RU2A | H13 |  | S10A4 | BAF | KNG1 |  |
|  | RSSA | GRP75 |  | RUXE | APOA1 | K2C1 |  |
|  | RSMB | GELS |  | RUVB2 | AATM | ITIH4 |  |
|  | RS9 | GALE |  | RSMB | A2MG | ITIH2 |  |
|  | RS7 | G3P |  | RS9 |  | ITIH1 |  |
|  | RS5 | FINC |  | RS7 |  | ITB1 |  |
|  | RS15A | FIBG |  | RS6 |  | IGKC |  |
|  | RS14 | FIBA |  | RS3A |  | IGHG4 |  |
|  | RS12 | FETUA |  | RS25 |  | IGHA1 |  |
|  | RPB3 | FBLN1 |  | RS24 |  | IC1 |  |
|  | RPB2 | ENPL |  | RS20 |  | HNRPU |  |
|  | ROA3 | DSA2D |  | RS2 |  | HNRPK |  |
|  | RLA2 | CPN2 |  | RS15A |  | HNRPC |  |
|  | RLA0 | CO8G |  | RS13 |  | HEMO |  |
|  | RL9 | CO8B |  | RS12 |  | H4 |  |
|  | RL8 | CO8A |  | RPN1 |  | H33 |  |
|  | RL7A | CO7 |  | ROAA |  | H2B2E |  |
|  | RL6 | CO6 |  | RLA1 |  | H2A2C |  |
|  | RL40 | CO5 |  | RLA0 |  | H15 |  |
|  | RL4 | CO4B |  | RL9 |  | H13 |  |
|  | RL30 | CO3A1 |  | RL6 |  | GRP75 |  |
|  | RL19 | CH60 |  | RL36 |  | GELS |  |
|  | RL18 | CFAI |  | RL18 |  | G3P |  |
|  | RL17 | CFAH |  | RL14 |  | FLNA |  |
|  | RL12 | CFAB |  | RL13A |  | FINC |  |
|  | RL11 | CERU |  | RL12 |  | FIBG |  |
|  | RL10A | CBPB2 |  | RL11 |  | FIBB |  |
|  | RECQ1 | CALM3 |  | RL10 |  | FIBA |  |
|  | RCC1 | C4BPA |  | RD23B |  | FETUA |  |
|  | RALY | C1S |  | RBM3 |  | FAK1 |  |
|  | RAI3 | C1R |  | RBBP4 |  | FA12 |  |
|  | RAGP1 | C1QBP |  | RAN |  | ERH |  |
|  | RADI | C1QB |  | RAB7A |  | ENPL |  |
|  | RAB7A | C1QA |  | RAB10 |  | ENOA |  |
|  | RA1L2 | BIP |  | PYR1 |  | EF1A2 |  |
|  | PTMS | BAF |  | PUR6 |  | DDB1 |  |
|  | PTMA | ATPB |  | PUR2 |  | CO9 |  |
|  | PSA4 | APOH |  | PSME1 |  | CO8A |  |
|  | PROF1 | APOE |  | PSMD7 |  | CO6 |  |
|  | PRDX6 | APOC3 |  | PSMD5 |  | CO5 |  |
|  | PRDX5 | APOB |  | PSB2 |  | CO4A |  |
|  | PRDX2 | APOA4 |  | PSAL |  | CO3 |  |
|  | PPIB | APOA2 |  | PSA7 |  | CLUS |  |
|  | PPAC | APOA1 |  | PSA4 |  | CH60 |  |
|  | PP4R4 | ANXA5 |  | PROF1 |  | CH10 |  |
|  | PLST | ANT3 |  | PRDX6 |  | CFAI |  |
|  | PGK1 | ANGT |  | PRDX5 |  | CFAH |  |
|  | PGAM4 | AMBP |  | PRDX2 |  | CAZA1 |  |
|  | PDXK | ALBU |  | PNPH |  | CATD |  |
|  | PDIA6 | AFAM |  | PLST |  | CALM3 |  |
|  | PDIA4 | ACTN4 |  | PLAK |  | C4BPA |  |
|  | PDIA3 | ACTG |  | PHB2 |  | C1S |  |
|  | PCNA | AACT |  | PHB |  | C1QBP |  |
|  | PCBP1 | A2MG |  | PGRP2 |  | C1QA |  |
|  | PAIRB | A2AP |  | PGK1 |  | BIP |  |
|  | PABP3 | A1BG |  | PGAM4 |  | ATPB |  |
|  | PABP2 |  |  | PEBP1 |  | APOH |  |
|  | PA2G4 |  |  | PDIA6 |  | APOE |  |
|  | NUP93 |  |  | PCNA |  | APOC3 |  |
|  | NUP62 |  |  | PCBP3 |  | APOB |  |
|  | NPM3 |  |  | PARK7 |  | ANXA5 |  |
|  | NPM |  |  | PA2G4 |  | ANXA2 |  |
|  | NONO |  |  | PA1B2 |  | ANT3 |  |
|  | NDKA |  |  | P5CS |  | AMBP |  |
|  | MYH9 |  |  | OXSR1 |  | ALBU |  |
|  | MVP |  |  | OST48 |  | AFAM |  |
|  | MGN2 |  |  | ODPB |  | ACTN4 |  |
|  | MATR3 |  |  | NPM |  | ACTG |  |
|  | LSM8 |  |  | NP1L4 |  | ACTB |  |
|  | LSM2 |  |  | NP1L1 |  | 4F2 |  |
|  | LMNB1 |  |  | MYL6 |  | 1433E |  |
|  | LDHB |  |  | MYH9 |  |  |  |
|  | LDHA |  |  | MSH2 |  |  |  |
|  | LAP2A |  |  | MPCP |  |  |  |
|  | KV320 |  |  | MOT4 |  |  |  |
|  | K2C8 |  |  | MOES |  |  |  |
|  | K2C7 |  |  | MCA3 |  |  |  |
|  | K2C1 |  |  | MATR3 |  |  |  |
|  | K22E |  |  | MAT2B |  |  |  |
|  | K1C9 |  |  | LRC59 |  |  |  |
|  | K1C10 |  |  | LEG3 |  |  |  |
|  | ISG15 |  |  | LDHB |  |  |  |
|  | IQGA1 |  |  | LDHA |  |  |  |
|  | IMDH2 |  |  | LAT1 |  |  |  |
|  | IMB1 |  |  | LAMP1 |  |  |  |
|  | ILF3 |  |  | LA |  |  |  |
|  | ILF2 |  |  | KYNU |  |  |  |
|  | IGJ |  |  | KCY |  |  |  |
|  | IGHG4 |  |  | KAD2 |  |  |  |
|  | IGHG1 |  |  | K1C9 |  |  |  |
|  | IF5AL |  |  | ITIH3 |  |  |  |
|  | HSP7C |  |  | ISG15 |  |  |  |
|  | HS90B |  |  | IQGA1 |  |  |  |
|  | HS90A |  |  | IPO5 |  |  |  |
|  | HS71B |  |  | IMDH2 |  |  |  |
|  | HPTR |  |  | IMB1 |  |  |  |
|  | HNRPK |  |  | IMA1 |  |  |  |
|  | HNRPF |  |  | ILF3 |  |  |  |
|  | HNRL2 |  |  | ILF2 |  |  |  |
|  | HNRH3 |  |  | IF5AL |  |  |  |
|  | HNRH1 |  |  | IF4A1 |  |  |  |
|  | HMGA1 |  |  | IF2B2 |  |  |  |
|  | HDGF |  |  | HTRA1 |  |  |  |
|  | HBA |  |  | HSP104 |  |  |  |
|  | H4 |  |  | HSP7C |  |  |  |
|  | H3PS2 |  |  | HS90B |  |  |  |
|  | H15 |  |  | HS90A |  |  |  |
|  | GYS1 |  |  | HS71B |  |  |  |
|  | GSTP1 |  |  | HRG |  |  |  |
|  | GDE |  |  | HPT |  |  |  |
|  | GCN1 |  |  | HMGB1 |  |  |  |
|  | G3BP2 |  |  | HDGF |  |  |  |
|  | FUS |  |  | H2A1A |  |  |  |
|  | FUBP1 |  |  | GT251 |  |  |  |
|  | FOLR1 |  |  | GSTP1 |  |  |  |
|  | FLNA |  |  | GNA1 |  |  |  |
|  | FIBB |  |  | GANAB |  |  |  |
|  | FAS |  |  | GALE |  |  |  |
|  | FA12 |  |  | G6PI |  |  |  |
|  | F13B |  |  | FUBP1 |  |  |  |
|  | ENOA |  |  | FOLR1 |  |  |  |
|  | ELAV1 |  |  | FLNB |  |  |  |
|  | EIF3L |  |  | FBLL1 |  |  |  |
|  | EFHD2 |  |  | FAS |  |  |  |
|  | EF2 |  |  | EF2 |  |  |  |
|  | EF1D |  |  | EF1G |  |  |  |
|  | EF1A1 |  |  | EF1B |  |  |  |
|  | DX39A |  |  | EF1A1 |  |  |  |
|  | DLRB2 |  |  | DX39A |  |  |  |
|  | DHX9 |  |  | DUT |  |  |  |
|  | DEK |  |  | DNJC7 |  |  |  |
|  | DDX17 |  |  | DHX9 |  |  |  |
|  | DDB1 |  |  | DDX3X |  |  |  |
|  | CXCL7 |  |  | CYC |  |  |  |
|  | CRP |  |  | CYB5B |  |  |  |
|  | COR1C |  |  | CXCL7 |  |  |  |
|  | COF1 |  |  | CPSM |  |  |  |
|  | CO4A |  |  | COX5A |  |  |  |
|  | CLUS |  |  | COPG1 |  |  |  |
|  | CLIC1 |  |  | COF1 |  |  |  |
|  | CLH1 |  |  | CLH1 |  |  |  |
|  | CD5L |  |  | CHRC1 |  |  |  |
|  | CD59 |  |  | CDC42 |  |  |  |
|  | CD109 |  |  | CDC23 |  |  |  |
|  | CBX5 |  |  | CD5L |  |  |  |
|  | CBX3 |  |  | CAPZB |  |  |  |
|  | CBPN |  |  | CAND1 |  |  |  |
|  | CAZA2 |  |  | CALX |  |  |  |
|  | CAZA1 |  |  | CALR |  |  |  |
|  | CATD |  |  | BASP1 |  |  |  |
|  | CARL1 |  |  | BASI |  |  |  |
|  | CAPZB |  |  | BAG2 |  |  |  |
|  | CALX |  |  | ATX10 |  |  |  |
|  | CAD13 |  |  | ATPA |  |  |  |
|  | C4BPB |  |  | ARPC4 |  |  |  |
|  | C1RL |  |  | ARF3 |  |  |  |
|  | BAG2 |  |  | APOA4 |  |  |  |
|  | ATRN |  |  | APOA2 |  |  |  |
|  | ATPA |  |  | APOA |  |  |  |
|  | ARPC4 |  |  | ANXA6 |  |  |  |
|  | ARP3B |  |  | ANXA3 |  |  |  |
|  | ARF3 |  |  | ANXA1 |  |  |  |
|  | APOA |  |  | ALDR |  |  |  |
|  | ANXA2 |  |  | ALDOA |  |  |  |
|  | AMPN |  |  | AGRL1 |  |  |  |
|  | ALDOA |  |  | ADT2 |  |  |  |
|  | ACTB |  |  | ACTH |  |  |  |
|  | A1AG1 |  |  | ACLY |  |  |  |
|  | 6PGD |  |  | AAAT |  |  |  |
|  | 4F2 |  |  | A2AP |  |  |  |
|  | 2AAA |  |  | A1BG |  |  |  |
|  | 1433Z |  |  | 6PGD |  |  |  |
|  | 1433E |  |  | 2AAA |  |  |  |
|  |  |  |  | 1433Z |  |  |  |