

Co-aggregation and parallel aggregation of specific proteins in major mental illness

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No.	Vector backbone	Gene insert	Origin
1	pENTR1A no ccDB	(None)	Campeau et al (2009) PLOS One 4:e6529 (Addgene, clone 17398)
2	pdcdNA-FlagMyc	(None)	BCCM/LMBP Plasmid Collection, clone LMBP 4705
3	pDEST-CMV-EGFP	(None)	Agrotis et al (2019) Autophagy 15:976-997 (Addgene, clone 123215)
4	pcDNA3.1	CRMP1 Sv	Bader et al. (2012) Hum. Mol. Genet. 21:4406-4418 (gift from Carsten Korth)
5	pcDNA3.1	CRMP1 Lv	Bader et al. (2012) Hum. Mol. Genet. 21:4406-4418 (gift from Carsten Korth)
6	pENTR1A	CRMP1 Sv	Subcloned from plasmid 4 in two rounds of PCR, with primers A & C, then D & E. Restriction digested and ligated into the <i>KpnI</i> and <i>XbaI</i> sites of plasmid 1.
7	pENTR1A	CRMP1 Lv	Subcloned from plasmid 5 in two rounds of PCR, with primers B & C, then D & E. Restriction digested and ligated into the <i>KpnI</i> and <i>XbaI</i> sites of plasmid 1.
8	pENTR223	DISC1	DNASU Plasmid Repository, clone HsCD00516321
9	pENTR223.1	NPAS3	DNASU Plasmid Repository, clone HsCD00080332
10	pENTR1A	TRIOBP-1	Bradshaw et al (2017) J. Biol. Chem. 292:9583-9598 (gift from Carsten Korth)
11	pdcdNA-Flag	CRMP1 Sv	LR clonase recombination of plasmids 2 and 6
12	pdcdNA-Flag	CRMP1 Lv	LR clonase recombination of plasmids 2 and 7
13	pdcdNA-Flag	DISC1	LR clonase recombination of plasmids 2 and 8
14	pdcdNA-Flag	NPAS3	Samardžija et al (2021) J. Pers. Med. 11:1070
15	pdcdNA-Flag	TRIOBP-1	Bradshaw et al (2017) J. Biol. Chem. 292:9583-9598 (gift from Carsten Korth)
16	pdcdNA-Flag	TRIOBP-1 Δ1-59Δ333-340	Zaharija et al (2022) Int. J. Mol. Sci. 23:11048
17	pdcdNA-Flag	TRIOBP-1 1-280	Bradshaw et al (2017) J. Biol. Chem. 292:9583-9598 (gift from Carsten Korth)
18	pdcdNA-Flag	TRIOBP-1 281-555	Bradshaw et al (2017) J. Biol. Chem. 292:9583-9598 (gift from Carsten Korth)
19	pdcdNA-Flag	TRIOBP-1 556-652	Bradshaw et al (2017) J. Biol. Chem. 292:9583-9598 (gift from Carsten Korth)
20	pDEST-CMV-N-EGFP	(Empty control)	LR clonase recombination of plasmids 1 and 4
21	pDEST-CMV-N-EGFP	CRMP1 Sv	LR clonase recombination of plasmids 4 and 6
22	pDEST-CMV-N-EGFP	CRMP1 Lv	LR clonase recombination of plasmids 4 and 7
23	pDEST-CMV-N-EGFP	DISC1	LR clonase recombination of plasmids 4 and 8
24	pDEST-CMV-N-EGFP	NPAS3	LR clonase recombination of plasmids 4 and 9
25	pDEST-CMV-N-EGFP	TRIOBP-1	LR clonase recombination of plasmids 4 and 10

Table S1. Sources and generation of plasmid vectors used in this study. See table S2 for references to primers.

Label	Name	Primer
A	CRMP1-1sv-salF	GAAGTCGACATGTCGTACCAG
B	CRMP1-1lv-salF	GTAAGTCGACATGGCGGACCG
C	CRMP1-572sv-ecoR	GTAGAATTCTCATCAACCGAGGCTG
D	Extension F	GCTATAAGGATCCGGTACCTAGTCGACATG
E	Extension R	GGCACCAGCTCGAGTCTAGAATTCTCATC

Table S2. Primers used for cloning in this study. “Label” corresponds to how they are referred to in table S1.

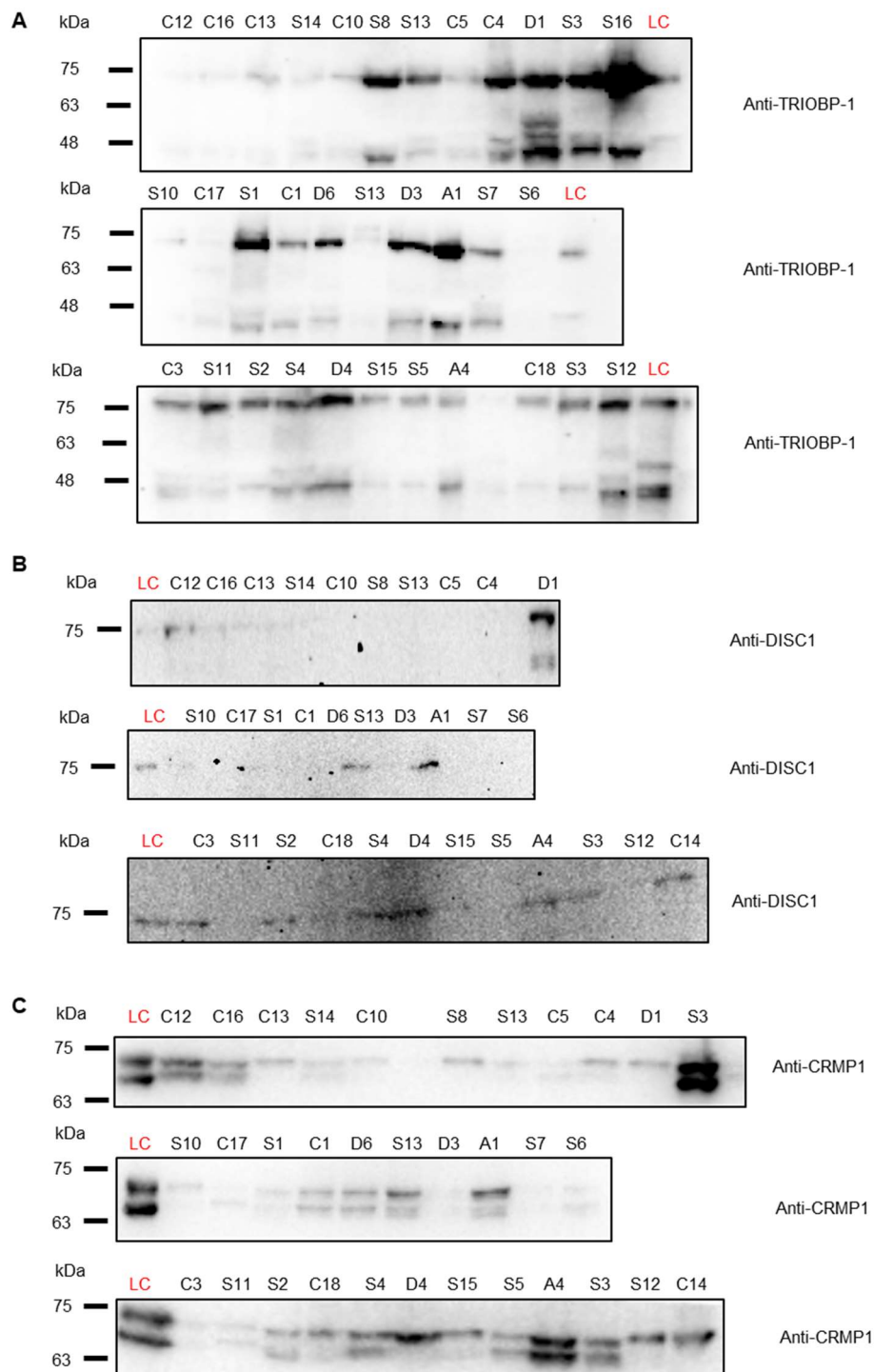


Figure S1. Western blots of the insoluble protein fractions, purified from insular cortex samples. Samples are labelled with diagnostic status (S: victim of suicide, C: control individual, D: major depressive disorder patient, A: Alzheimer's disease patient) and a unique number to allow comparison between blots in figures S1 and S2, which displays the corresponding non-purified homogenates. LC is a loading control: a standard sample loaded on all membranes to allow normalisation of signal quantification between gels.

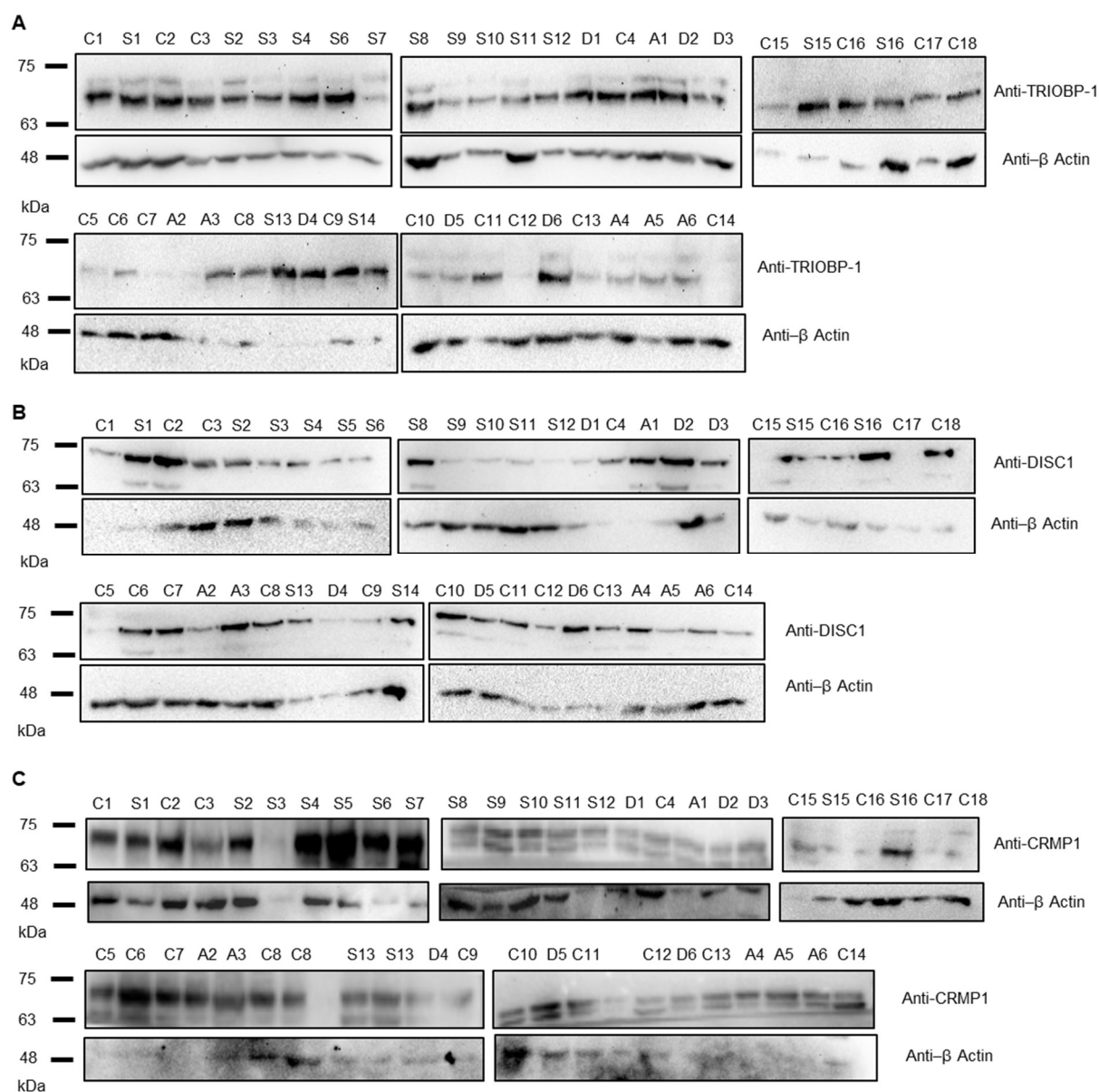


Figure S2. Western blots of insular cortex sample homogenates. Samples are labelled with diagnostic status (S: victim of suicide, C: control individual, D: major depressive disorder patient, A: Alzheimer's disease patient) and a unique number to allow comparison between blots in figures S1 and S2, which displays insoluble protein fractions, purified from these homogenates.

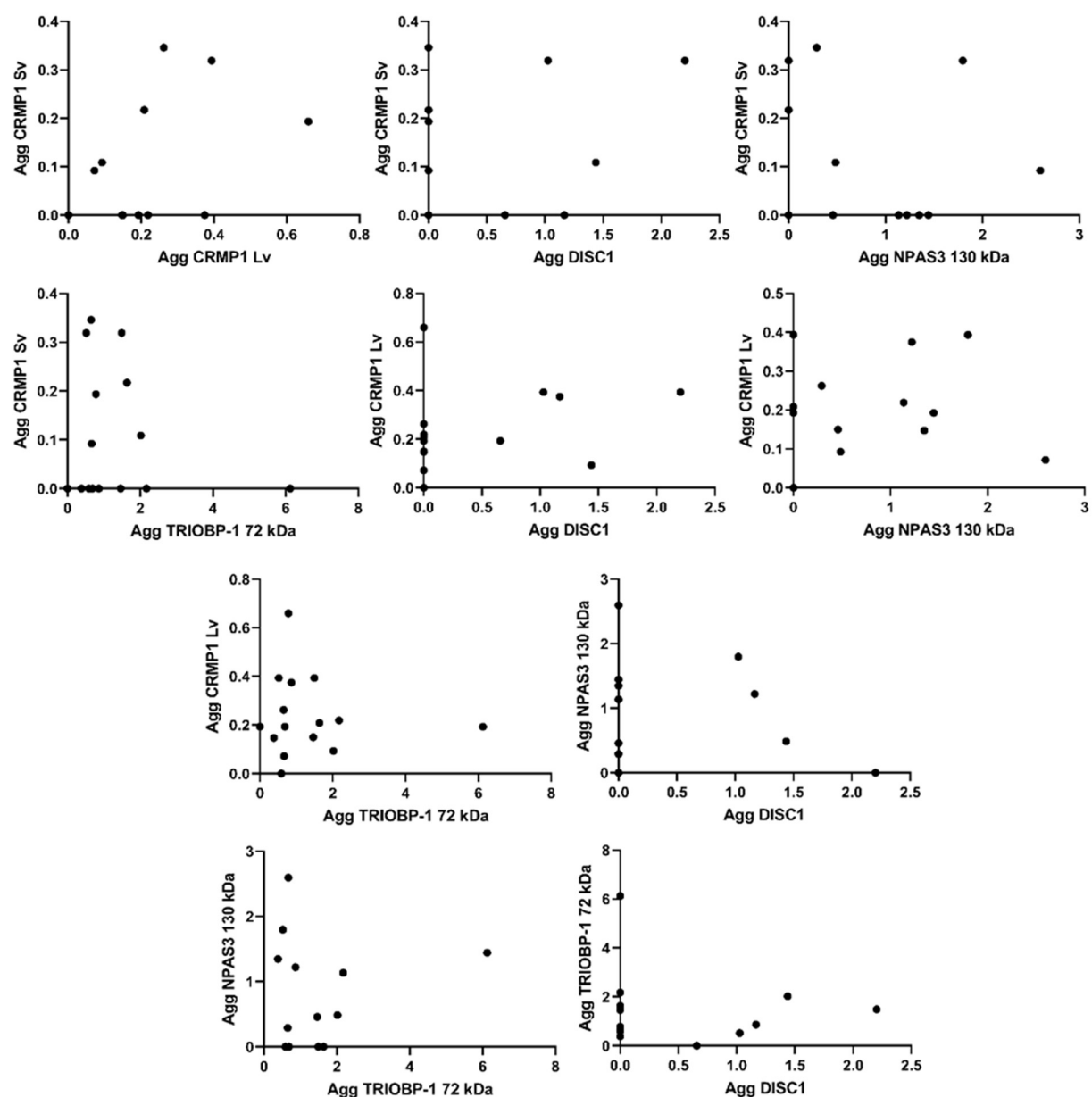


Figure S3. Comparison of levels of CRMP1 sv, CRMP1 lv, DISC1 (75kDa), NPAS3 (130kDa) and TRIOBP-1 in individuals. Based on data shown in figures 2 and S1.

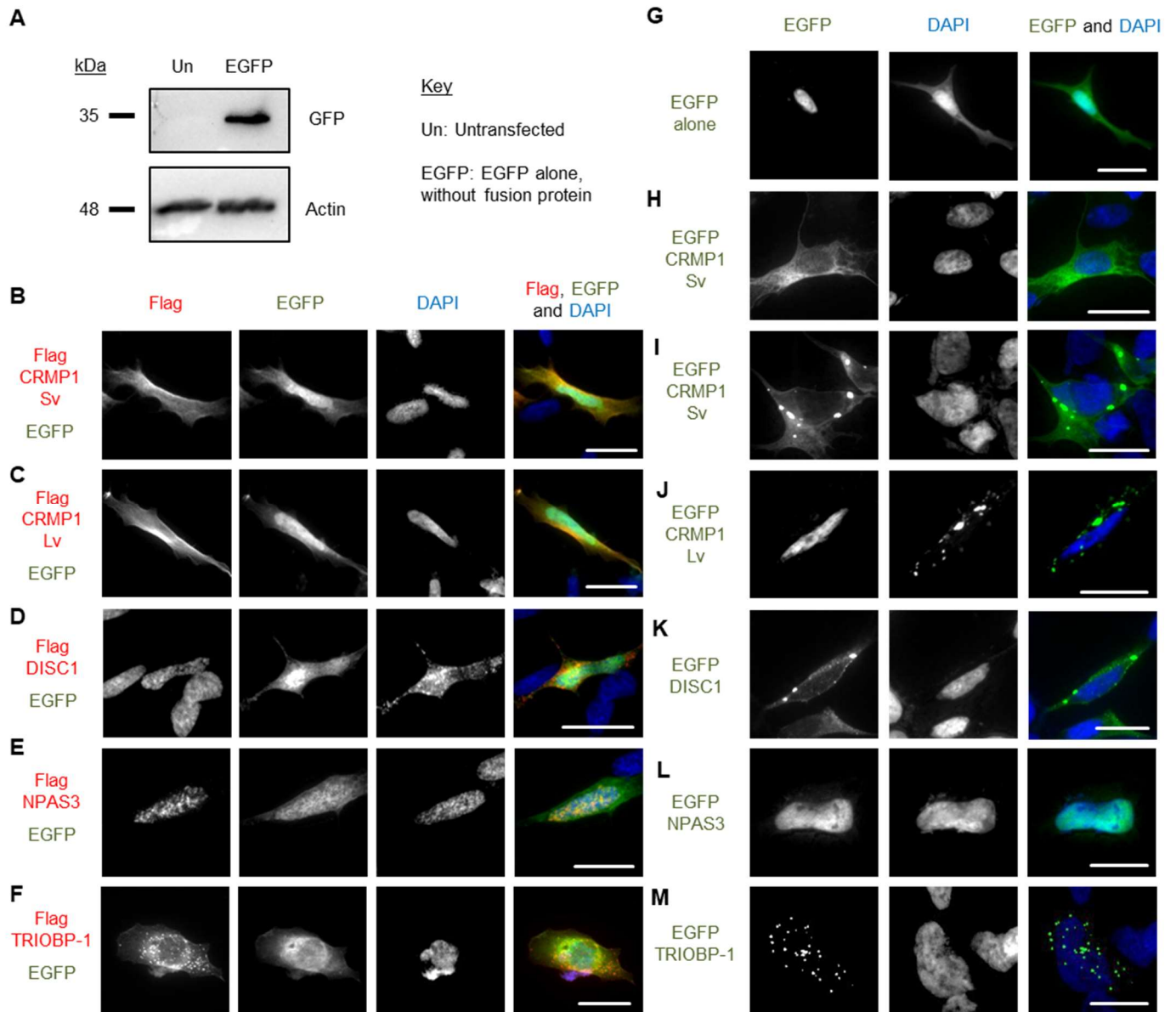


Figure S4. Expression of plasmids, in SH-SY5Y cells unless otherwise stated. **(A)** Western blot, showing expression of a construct encoding EGFP alone, with no fusion protein, in HEK293 cells. **(B-F)** Expression of Flag-tagged proteins (the same vectors as in figure 4C-G of the main text) together with EGFP alone: CRMP1 Sv (B), CRMP1 Lv (C), DISC1 (D), NPAS3 (E) and TRIOBP-1 (F). There are no obvious effects on expression patterns of the Flag tagged proteins. **(G)** Expression of EGFP alone. **(H-M)** Expression of EGFP-fused proteins, CRMP1 Sv with no aggregation (H, as seen in most cells), CRMP1 Sv with aggregation (I, minority of cells), CRMP1 Lv (J), DISC1 (K), NPAS3 (L) and TRIOBP-1 (M). Except for some EGFP-CRMP1 Sv & Lv cells showing aggregation (I, J), all constructs showed similar expression patterns to their Flag-tagged counterparts. All images are typical of three independent experiments. Scale bars represent 10 μ m.

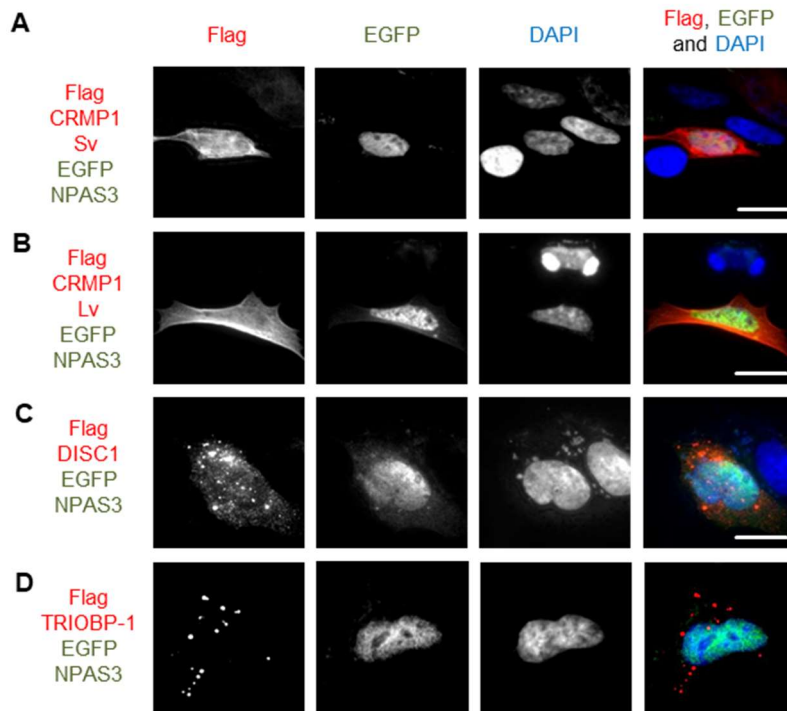


Figure S5. Expression of plasmids in SH-SY5Y cells, in experiments using reciprocal plasmid vectors from those in the main text. **(A)** Flag-tagged CRMP1 Sv and EGFP-fused NPAS3, neither aggregating, reciprocal experiment to that in figure 4H. **(B)** Flag-tagged CRMP1 Lv and EGFP-fused NPAS3, neither aggregating, reciprocal experiment to that in figure 4I. **(C)** Flag-tagged DISC1 and EGFP-fused NPAS3, only DISC1 is aggregating, reciprocal experiment to that in figure 4J. **(D)** Flag-tagged TRIOBP-1 and EGFP-fused NPAS3, only TRIOBP-1 is aggregating, reciprocal experiment to that in figure 4K. All images are typical of three independent experiments. Scale bars represent 10 μ m.

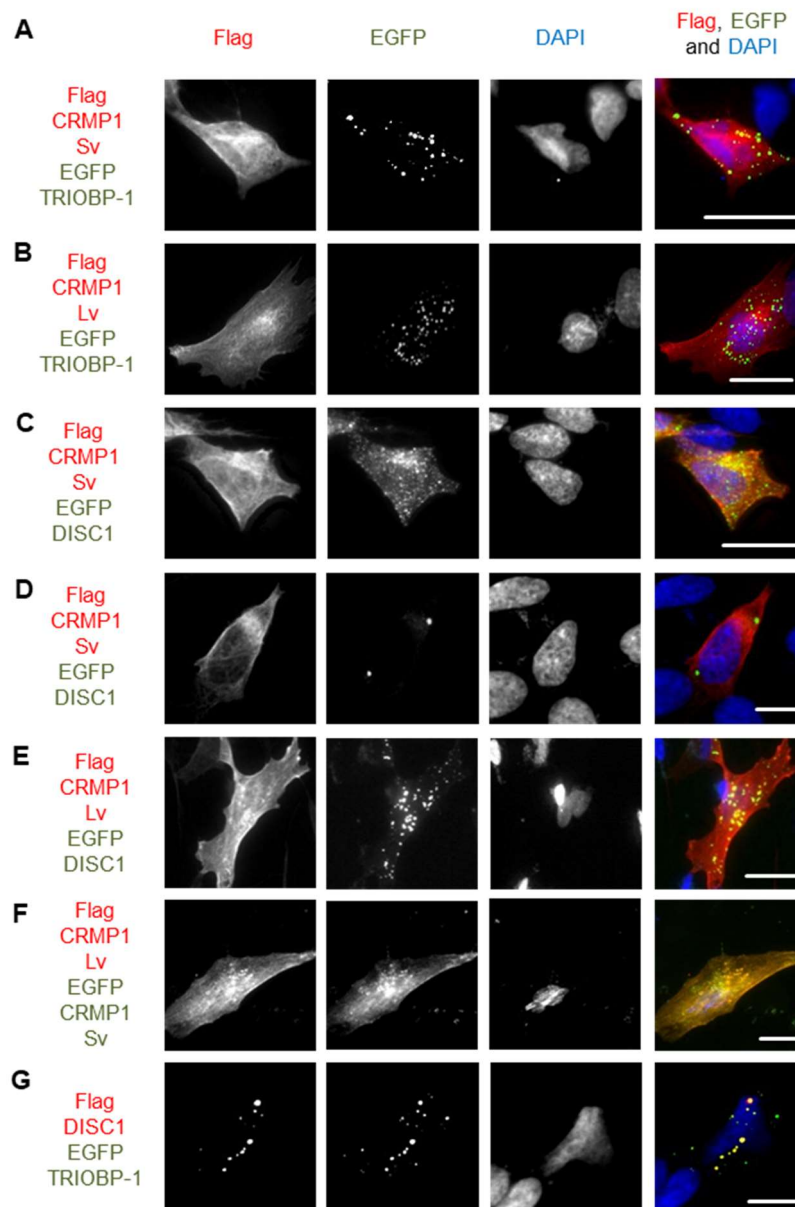


Figure S6. Expression of plasmids in SH-SY5Y cells, in experiments using reciprocal plasmid vectors from those in the main text. **(A)** Flag-tagged CRMP-1 Sv and EGFP-fused TRIOBP-1, only TRIOBP-1 aggregates, reciprocal experiment to that in figure 5A. **(B)** Flag-tagged CRMP-1 Lv and EGFP-fused TRIOBP-1, only TRIOBP-1 aggregates, reciprocal experiment to that in figure 5B. **(C-D)** Flag-tagged CRMP-1 Sv and EGFP-fused DISC1, example of cell with co-aggregation (C) and DISC1 aggregation only (D), reciprocal experiment to that in figure 5C. **(E)** Flag-tagged CRMP-1 Lv and EGFP-fused DISC1 with some co-aggregation, reciprocal experiment to that in figure 5D. **(F)** Flag-tagged CRMP1 Lv and EGFP-fused CRMP1 Sv, with co-aggregation seen, reciprocal experiment to that in figure 5E. **(G)** Flag-tagged DISC1 and EGFP-fused TRIOBP-1, with extensive co-aggregation seen, reciprocal experiment to that in figure 5F. All images are typical of three independent experiments. Scale bars represent 10 μm .

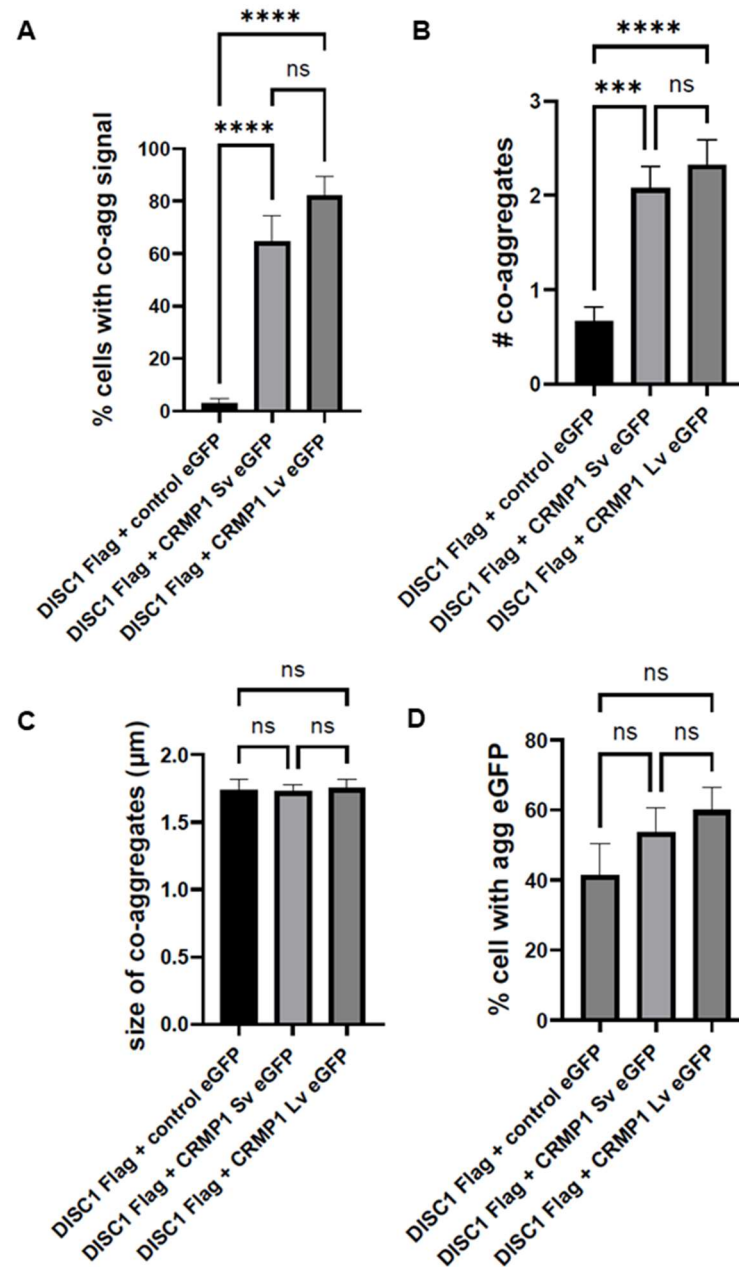


Figure S7. Additional quantification of DISC1 and CRMP1 aggregation in a co-aggregation blinded immunofluorescent microscopy assay (see figure 6). SH-SY5Y cells were transfected with Flag-DISC1 and one of EGFP, EGFP-CRMP1 Sv or EGFP-CRMP1 Lv. Results are an average of 10 coverslips per plasmid combination (9 in the case of DISC1 + EGFP), with 10 transfected cells examined per coverslip (or as many transfected cells as could be found). **(A)** Mean percentage of successfully transfected cells in which co-aggregation of Flag and EGFP seem to occur, defined as co-localisation at a punctate structure at least 1 μm in diameter. **(B)** Number of distinct co-aggregates in such cells. **(C)** Mean size of co-aggregates in such cells. **(D)** Percentage of successfully transfected cells in which aggregates of EGFP were seen (regardless of DISC1 aggregation status). All statistics are one-way ANOVA: ****: $p < 0.0001$, ***: $p < 0.001$, ns: not significant.

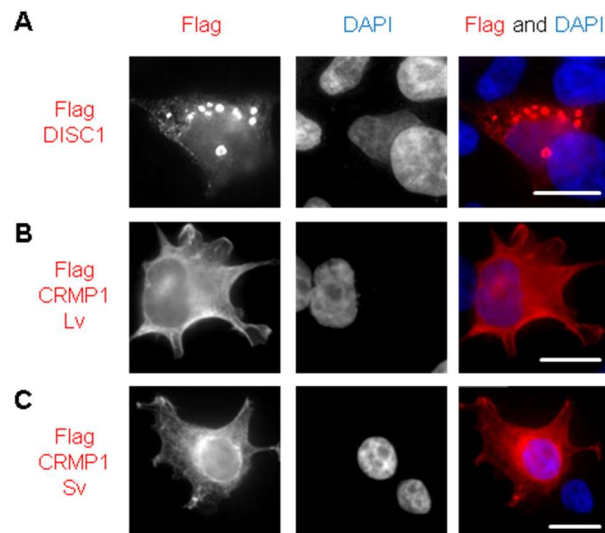


Figure S8. Expression patterns of Flag-tagged proteins expressed in HEK293 closely matches the patterns seen when the same proteins are expressed in SH-SY5Y (as shown in figure 4). **(A)** DISC1. **(B)** CRMP-1 Lv. **(C)** CRMP-1 Sv. Scale bars represent 10 μm.

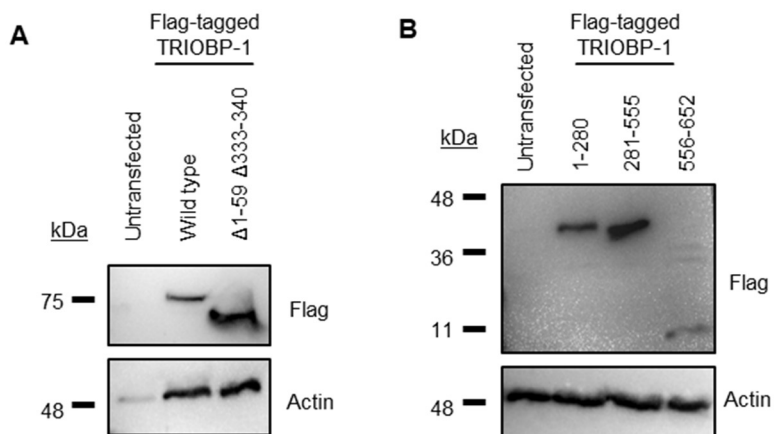


Figure S9. Western blots of HEK293 cells expressing the TRIOBP-1 constructs. **(A)** Expression of wild type (full length) TRIOBP-1 compared to a mutant version with two deletions, as used in figures 6B-C. **(B)** Expression of individual domains of TRIOBP-1, as used in figures 6D-I.

Appendix S1 - Amino acid of proteins expressed using plasmid vectors in this study

Amino acid sequences of proteins expressed from plasmid vectors in this study, as confirmed by sequencing. Numbers in brackets refer to table S1.

In all instances, amino acids listed in **blue** indicate the endogenous protein sequence, amino acids in **red** indicate Flag or c-Myc tags, amino acids in **green** indicate an EGFP fusion protein, and amino acids in black indicate other non-endogenous residues added in the cloning process.

(11) pdcDNA-Flag-CRMP1 Sv

MDYKDDDDKAAITSLYKKAGFKGTNSVDM**SYQGKKSIPHITSDRLLIKGGRI**INDDQSLYADVYLEDGLIKQIGE
NLIVPGGVKTI**EANGRMVIPGGIDVNTYLQKPSQGM**TAADDF**FQGT**RAALVGGTTMIIDHV**VPEPGSSLLTSFEK**
WHEAADTKSCCDYSLHVDITSWYDGVREELEV**LVQDKGVNSFQVY**MAYKD**VYQMSDSQ**LYEAFTFLKGLGAVILV
HAENGDLIAQE**QKRILEMGITGPEGH**ALSRPEELEAEAVFRAIT**IAGRINCPVYITKVMSKSAADI**IALARKKG**P**
LVFG**EPIAAS**LGTDGTHYWSKNWAKAAAFVTS**PPLSPDPTT**PDYLT**SLLACGDLQVTGSGHCPYSTAQKAVGKDN**
FTLI**PEGVNGIEERMTVVWDKAVATGKMDENQFVAVTSTNAAKIFNLYPRKGRI**AVGSDADV**VIWDPDKLKTITA**
KSHK**SAVEYNI**FEGMECHGS**PLVVISQ**GKIVFEDGNINVNKG**MGRFIPRKA**FP**EHLYQ**RVKIRNKV**FGLQGVSRG**
MYDGPVY**EV**PATPKYATPAPS**AKSSPSKHQPPP**IRNLHQS**NFSLSGAQID**DN**NP**RR**TG**HRIVAPP**GGRSNITSLG**
*

(12) pdcDNA-Flag-CRMP1 Lv

MDYKDDDDKAAITSLYKKAGFKGTNSVDM**ADRRRAWNT**EDDL**PVYLARPGSAAQ**TPRQKYGGMF**AAVEGAYENKT**
IDFDAYS**VGR**RSARTPR**SAGRPDAVGLPGPGG**SEDTASDVSEPSGSAVSS**PGERDERPPTLRIRRPAPRDLPLG**
RDNGQSD**RLLIKGGRI**INDDQSLYADVYLEDGLIKQIGENLIVPGGVKTI**EANGRMVIPGGIDVNTYLQKPSQGM**
TAADDF**FQGT**RAALVGGTTMIIDHV**VPEPGSSLLTSFEK**WHEAADTKSCCDYSLHVDITSWYDGVREELEV**LVQD**
KGVNS**FQVY**MAYKD**VYQMSDSQ**LYEAFTFLKGLGAVILVHAENGDLIAQE**QKRILEMGITGPEGH**ALSRPEELEA
EAVFRAIT**IAGRINCPVYITKVMSKSAADI**IALARKKG**P**LVFG**EPIAAS**LGTDGTHYWSKNWAKAAAFVTS**PPLS**
PDPTT**PDYLT**SLLACGDLQVTGSGHCPYSTAQKAVGKDNFTLI**PEGVNGIEERMTVVWDKAVATGKMDENQFVAV**
TSTNAAKIFNLYPRKGRIAVGSDADV**VIWDPDKLKTITAKSHKSAVEYNI**FEGMECHGS**PLVVISQ**GKIVFEDGN
INVNKG**MGRFIPRKA**FP**EHLYQ**RVKIRNKV**FGLQGVSRG**MYDGPVY**EV**PATPKYATPAPS**AKSSPSKHQPPP**IRN
LHQS**NFSLSGAQID**DN**NP**RR**TG**HRIVAPP**GGRSNITSLG***

(13) pdcDNA-Flag-DISC1

MDYKDDDDKAAITSLYKKAGFKGTNSVDM**PGGGPQ**GAPAAAGGGGVSHRAGSRDCL**P**PAACFRRRRLARRPGYMR
SSTG**P**GIGFLSPAVGTLFR**F**PGGVSGEESHSESRARQCGLDSRGLLVRS**P**VSKSAAAPT**V**TSVRG**TSAHF**GIQL
RGGTRL**P**DRLSWPCG**P**GSAGWQ**Q**EFAAMDSSETLDASWEAACSDGARRVRAAGSL**P**SAELSSNSC**S**PGCGPEVPP
TPPGSHSAFTSSFS**F**IRLSLGSAGERGEAEGCPPS**R**EAE**SHCQSPQ**EMGAKAASLDGPHEDPRCL**SQ**PF**S**LLATR
VSADLAQAARNSSRPERDMHSLPDMDPGSSSLDPSLAGCGGDGSSGSDAHSWD**TLLRKWEPVLRDCLLRNRRQ**
MEVISLRLKLQKLQEDAVENDDYDKAETLQQRLEDLEQEKISLHFQLPSRQPALSS**F**LGHAAQVQAALRRGATQ
QASGDDTHTPLRMEPRLLEPTAQDSLHVSITRRDWLLQEKQQLQKEIEALQARMFVLEAKDQQLRREIEEQEQQL
QWQCGDLT**PLVGQ**LSLQ**LQ**EVSKALQDTLASAGQIP**F**HAEP**PETIRSLQ**ERIKSLNLSLKEITTKVCMSEK**FCS**
TLRKKVNDIETQLPALLEAKMHAI**S**GNHFWTAKDLTEEIRSLT**S**EREGLEGLLSKLLVLSSRN**V**KKLG**SVKEDYN**
RLRREVEHQETAYETSVKENTMKYMETLKNKLC**SC**KCP**LLGKV**WEADLEACRL**L**IQSLQ**LQ**EA**RGSLSV**EDER**QM**
DDLEGAAPP**IP**PR**LH**SEDKRKT**PL**KESYILSAELGEKCEDI**G**KKLLYLE**DQLHTAIHSH**DEDL**LIQSLRRELQ**MQV**K**
ETLQAMILQ**LQ**PAKEAGEREA**AA**SCMTAGVHEAQAYPTFLYKV**VIEQKLISEEDLN***

(14) pdcDNA-Flag-NPAS3

MDYKDDDDKAAITSLYKKVGMAPT KPSFQQDPSRRERLQALRKEKSRDAARSRRGKENFEFFYELAKLLPLPAAIT
SOLDKASIIIRLTISYLKMRDFANQGDPPWNLRMEGPPPNTSVKGIQMWKSELCMRKTPCEVIGAQRRRSPSALAI
EVFEAHLGSHILQSLDGFVFALNQEGKFLYISETVSIYLGLSQVELTGSSVFDYVHPGDHVEMAEQLGMKLPPGR
GLLSQGTAE DGASSASSSSQSETPEPVESTSPSLTTDNTLERSFFIRMKSTLT KRGVHIKSSGYKVIHITGRLR
LRVSLSHGRTVPSQIMGLVVVAHALPPPTINEVRIDCHMFVTRVNMDLNIIYCENRISDYMDLTPVDIVGKRCYH
FIHAEDVEGIRHSHLDLLNKGQCVTKYRWMQKNGGYIWIQSSATIAINAKNANEKNI IWVNYLLSNPEYKDTPM
DIAQLPHLPEKTSESSETSDES DSKDTSGITEDNENSKSDEKGNQSENSEDPEDRKKSGNACDNMNCNDDGH
SSSNPDSRDSDDSFHSDFDENPKAGEDGFGALGAMQIKVERYVESESDLRLQNCESLTSDSAKSDSAGEAGAQA
SSKHQKRKKRRKRQKGG SASRRRLSSASSPGGLDAGLVEPPRLLSPPNSASVLKIKTEISEPINFDNDSSIWNYP
PNREISRNESPYSMTKPPSSEHFSPSPQGGGGGGGGGGGLHVAIPDSVLTTPPGADGAAARKTQFGASATAALAPVA
SDPLSPPLSASPRDKHPGNGGGGGGGGGGAGGGGPSASNSLLYTGDLEALQRLQAGNVVLPVHRVTGT LAATST
AAQRVYTTGTIRYAPAEVTLAMQSNLLPNAHAVNFVDVNSPGFGLDPKTPMEMLYHHVHRLNMSGPFGGAVSAAS
LTQMPAGNVFTTAEGLFSTLPFPVYSNGIHAAQTLERKEDYPTFLYKVVIEQKLISEEDLN*

(15) pdcDNA-Flag-TRIOBP-1 (wild type)

MDYKDDDDKAAITSLYKKAGFKGTNSVDMGGWKGPQGRRGKEGPEARRRAAERGGGGGGGGVPAPRSPAREPRPR
SCLLLPPPWGAAMTPDLLNFKKGWMSILDEPGEPPSPSLTTTSTSQWKKHWFVLTDS SLKYRDS TAE EADELDG
EIDLRSDTDVTEYAVQRNYGFQIHTKDAVYTLSAMTSGIRRNWIEALRKTVRPTSAPDVTKLSDSNKENALHSYS
TQKGPLKAGEQRAGSEVISRGGPRKADGQRQALDYVELSPLTQAS PQARTPARTPDR LAKQEELERDLAQRSEE
RKNWFEATDSRTPEVPAGEGPRRGLGAPLTEDQQNRLSEEIEKKWQELEKLP LRENKRVP L TALLNQSRGERRGP
PSDGHEALEKEVQALRAQLEAWRLQGEAPQSALRSQEDGHI PPGYISQEACERSLAEMESSHQQVMEELQRHHER
ELQRLQQEKEWLLAEETAATASAIEAMKKAYQEELSRELSKTRSLQQGPDGLRKQHQS DVEALKRELQVLSEQYS
QKCLEIGALMRQAEEREHTLRRCQQEGQELLRHNQELHGRLSEEIDQLRGFIASQGMGNGCGRSNERSSCELEVL
LRVKENELQYLKKEVQCLRDELQMMQKDKRFTSGKYQDVYVELSHIKTRSEREIEQLKEHLRLAMAALQEKESMR
NSLAE*

(16) pdcDNA-Flag-TRIOBP-1 Δ 1-59 Δ 333-340

MDYKDDDDKAAITSLYKKAGFKGTNSVDMTPDLLNFKKGWMSILDEPGEPPSPSLTTTSTSQWKKHWFVLTDS SL
KYRDS TAE EADELDGEIDLRSDTDVTEYAVQRNYGFQIHTKDAVYTLSAMTSGIRRNWIEALRKTVRPTSAPDV
TKLSDSNKENALHSYSTQKGPLKAGEQRAGSEVISRGGPRKADGQRQALDYVELSPLTQAS PQARTPARTPDR L
AKQEELERDLAQRSEERRKNWFEATDSRTPEVPAGEGPRRGLGAPLTEDQQNRLSEEIEKKWQELEKLP LRENKRVP
PGTRGERRGPPSDGHEALEKEVQALRAQLEAWRLQGEAPQSALRSQEDGHI PPGYISQEACERSLAEMESSHQQV
MEELQRHHERELQRLQQEKEWLLAEETAATASAIEAMKKAYQEELSRELSKTRSLQQGPDGLRKQHQS DVEALKR
ELQVLSEQYSQKCLEIGALMRQAEEREHTLRRCQQEGQELLRHNQELHGRLSEEIDQLRGFIASQGMGNGCGRSN
ERSSCELEVLLRVKENELQYLKKEVQCLRDELQMMQKDKRFTSGKYQDVYVELSHIKTRSEREIEQLKEHLRLAM
AALQEKESMRNSLAE*

(17) pdcDNA-Flag-TRIOBP-1 1-280

MDYKDDDDKAAITSLYKKAGFAATMGGWKGPQGRRGKEGPEARRRAAERGGGGGGGGVPAPRSPAREPRPR
SCLLLPPPWGAAMTPDLLNFKKGWMSILDEPGEPPSPSLTTTSTSQWKKHWFVLTDS SLKYRDS TAE EAD
ELDGEIDLRSDTDVTEYAVQRNYGFQIHTKDAVYTLSAMTSGIRRNWIEALRKTVRPTSAPDVTKLSDSNK
ENALHSYSTQKGPLKAGEQRAGSEVISRGGPRKADGQRQALDYVELSPLTQAS PQARTPARTPDR LAKQE
ELERDLAQRSEERRKNWFEAT*

(18) pdcDNA-Flag-TRIOBP-1 281-555

MDYKDDDDKAAITSLYKKAGFAATMDSRTPEVPAGEGPRRGLGAPLTEDQQNRLSEEIEKKWQELEKLPLRENKR
VPLTALLNQSRGERRGPPSDGHEALEKEVQALRAQLEAWRLQGEAPQSALRSQEDGHIIPPGYISQEACERSLAEM
ESSHQVMEELQRHHERELQRLQOEKEWLLAEETAATASAI EAMKKAYQEELSRELSKTRSLQQGPDGLRKQHQS
DVEALKRELQVLSEQYSQKCLEIGALMRQAEEREHTLRRCQQEGQELLRHNQELHGRLSEEIDQLRGFIASQGMG
★

(19) pdcDNA-Flag-TRIOBP-1 556-652

MDYKDDDDKAAITSLYKKAGFAATMNGCGRSNERSSCELEVLRLVKENELQYLKKEVQCLRDELQMMQKD
KRFTSGKYQDVYVELSHIKTRSEREIEQLKEHLRLAMAALQEKESMRNSLAE★

(20) pDEST-CMV-N-EGFP (empty control)

MVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTCLKFICTTGKLPVPWPTLVTTLTLYGVQCFSRY
PDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNSHN
VYIMADKQKNGIKVNFKIRHNIEDGSVQLADHYQONTPIGDGPVLLPDNHYLSTQSALS KDPNEKRDHMLLEFV
TAAGITHGMDELYKAVPDRKQVCTKKQALKEPIQSTGSGTEFAAALEISRPSFLVQSGDN★

(21) pDEST-CMV-N-EGFP-CRMP1 Sv

MVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTCLKFICTTGKLPVPWPTLVTTLTLYGVQCFSRY
PDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNSHN
VYIMADKQKNGIKVNFKIRHNIEDGSVQLADHYQONTPIGDGPVLLPDNHYLSTQSALS KDPNEKRDHMLLEFV
TAAGITHGMDELYKAVPDRDQTSLYKKAGFKGTNSVDGMSYQGKKSIPHITSDRLLIKGGRIINDDQSLYADVYL
EDGLIKQIGENLIVPGGVKTIEANGRMVIPGGIDVNTYLQKPSQGMATAADDFQGTRAALVGGTTMIIDHVVP
GSSLLTSFEKWHEAADTKSCCDYSLHVDITSWYDGVREELEVLVQDKGVNSFQVYMAKDVYQMSDSQLYEAFTF
LKGLGAVILVHAENGDLIAQEQKRILEMGITGPEGHALSRPEELEAEAVFRAITIAGRINCPVYITKVMKSAAAD
IALARKKGPLVFGEPIAASLGTDGTHYWSKNWAKAAAFVTSPLSPDPTTPDYLTSLACGDLQVTGSGHCPYS
TAQKAVGKDNFTLIEPGVNGIEERMTVVWDKAVATGKMDENQFVAVTSTNAAKIFNLYPRKGRIAVGSDADVVIW
DPDKLKTITAKSHKSAVEYNIFEGMECHGSPLVVISQKIVFEDGNINVNKGMGRFIPRKAFFEHLVYQVVKIRNK
VFGLQGVSRGMYDGPVYEVDPATPKYATPAPSAKSSPSKHQPPPIRNLHQSNFSLSGAQIDDNNPRRTGHRIVAPP
GGRSNITSLG★

(22) pDEST-CMV-N-EGFP-CRMP1 Lv

MVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTCLKFICTTGKLPVPWPTLVTTLTLYGVQCFSRY
PDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNSHN
VYIMADKQKNGIKVNFKIRHNIEDGSVQLADHYQONTPIGDGPVLLPDNHYLSTQSALS KDPNEKRDHMLLEFV
TAAGITHGMDELYKAVPDRDQTSLYKKAGFKGTNSVDGMADRRRAWNTEDDLPVYLARPGSAAQTPRQKYGGMFA
AVEGAYENKTIDFDAYSVGRRSARTPRSAGRPDAVGLPGPGGSEDTASDVSEPSGSAVSSPGERDERPPTLRIR
RPAPRDLPLGRDNGQSDRLLIKGGRIINDDQSLYADVYLEDGLIKQIGENLIVPGGVKTIEANGRMVIPGGIDVN
TYLQKPSQGMATAADDFQGTRAALVGGTTMIIDHVVPPEPGSSLLTSFEKWHEAADTKSCCDYSLHVDITSWYDGV
REELEVLVQDKGVNSFQVYMAKDVYQMSDSQLYEAFTFLKGLGAVILVHAENGDLIAQEQKRILEMGITGPEGH
ALSRPEELEAEAVFRAITIAGRINCPVYITKVMKSAAADIALARKKGPLVFGEPIAASLGTDGTHYWSKNWAKA
AAFVTSPLSPDPTTPDYLTSLACGDLQVTGSGHCPYSTAQKAVGKDNFTLIEPGVNGIEERMTVVWDKAVATG
KMDENQFVAVTSTNAAKIFNLYPRKGRIAVGSDADVVIWDPDKLKTITAKSHKSAVEYNIFEGMECHGSPLVVIS
QKIVFEDGNINVNKGMGRFIPRKAFFEHLVYQVVKIRNKVFGLQGVSRGMYDGPVYEVDPATPKYATPAPSAKSSP
SKHQPPPIRNLHQSNFSLSGAQIDDNNPRRTGHRIVAPPGGRSNITSLG★

(23) pDEST-CMV-N-EGFP-DISC1

MVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTCLKFICTTGKLPVPWPTLVTTLTLYGVQCFSRY
PDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNSHN
VYIMADKQKNGIKVNFKIRHNIEDGSVQLADHYQNTPIGDGPVLLPDNHYLSTQSALS KDPNEKRDHMLLEFV
TAAGITHGMDELYKAVPDRDQTSLYKKVGTMPGGGPQGAPAAAGGGGVSHRAGSRDCLPPAACFRRRRLARRPGY
MRSSTGPGIGFLSPAVGTLFRFPGGVSGEESHSESRARQCGLDSRGLLVRSVPVSKSAAAPT VTSVRGTS AHFGI
QLRGGTRL PDRLSWPCGPGSAGWQQEFAAMDSSETLDASWEAACSDGARRVRAAGSLPSAELSSNSCSPGCGPEV
PPTPPGSHSAFTSSFSFIRLSLGSAGERGEAEGCPPSREAESHCSQPQEMGAKAASLDGPHEDPRCLS QPFSLLA
TRVSADLAQAARNSSRPERDMHSLPDMDPGSSSSLDPSLAGCGGDGSSSGDAHSWDTLLRKWEPVLRDCLLRNR
RQMEVISLRKLKQLQEDAVENDDYDKAETLQQRLEDLEQEKISLHFQLPSRQPALSSFLGHLAAQVQAALRRGA
TQQASGDDTHTPLRMEPRLLEPTAQDSLHVSITRRDWLLQEKQQLQKEIEALQARMFVLEAKDQQLRREIEEQEQ
QLQWQCGDLTPLVGQLSLGQLQEVSKALQDTLASAGQIPFHAEP PETIRSLQERIKSLNLSLKEITTKVCMSEKF
CSTLRKKVNDIETQLPALLEAKMHAISGNHFWTAKDLTEEIRSLT SEREGLEGLLSKLLVLSSRN VKKLGSVKED
YNRLRREVEHQETAYETSVKENTMKYMETLKNKLCSCCKPLL GKVWEADLEACRLLIQSLQLQEQEARGSLSVEDER
QMDDLEGAAPP IPPRLHSEDKRKTP LKESYILSAELGEKCEDIGKKLLYLEDQLHTAIHSHDEDLIQSLRRELQM
VKETLQAMILQLQPAKEAGEREAAA SCMTAGVHEAQADPAFLYKVVIIIN*

(24) pDEST-CMV-N-EGFP-NPAS3

MVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTCLKFICTTGKLPVPWPTLVTTLTLYGVQCFSRY
PDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNSHN
VYIMADKQKNGIKVNFKIRHNIEDGSVQLADHYQNTPIGDGPVLLPDNHYLSTQSALS KDPNEKRDHMLLEFV
TAAGITHGMDELYKAVPDRDQTSLYKKVGTAVPDRIKQVCTKKQKGRQGPPMAPTKPSFQQDPSRRERLQALRKE
KSRDAARSRRGKENFEFYELAKLLPLPAAITSQLDKASIIRLTISYLMRDFANQGDPPWNLRMGPPPPNTSVKG
IQMWKSEL CMRKTPCEVIGAQRRRSPSALAIEVFEAHLGSHILQSLDGFVFALNQEGKFLYISETVSIYLGLSQV
ELTGSSVFDYVHPGDHVEMAEQ LGMKLP PGRGLLSQGTAE DGASSASSSSQSETPEPVESTSPSLLTDTN T LERS
FFIRMKSTLT KRGVHIKSSGYKVIHITGRLRLRVSLSHGRTVPSQIMGLVVVAHALPPPTINEVRIDCHMFVTRV
NMDLNIIYCENRISDYMDLTPVDIVGKRCYHFIHAEDVEGIRHSHLDLLNKGCQVTKYYRWMQKNGGYIWIQSSA
TIAINAKNANEKNI IWNVYLLSNPEYKDT PMDIAQLPHLPEKTSESSETSDSES DSKDTSGITEDNENSKSDEKG
NQSENSEDPEPDRKKSGNACDNMNCNDDGHSSSNPDSRSDSDSFEHSDFENPKAGEDGFGALGAMQIKVERYVE
SESDLRLQNCESLTSDSAKSDSAGEAGAQAASSKHQKRKKRRKRQKGSASRRRLSSASSPGGLDAGLVEPPRLL
SSPNASAVLKI KTEISEPINFDNDSSIWNYPNREISRNESPYSMTKPPSSEHFPS PQGGGGGGGGGGGLHVAIP
DSVLT PPGADGAAARKTQFGASATAALAPVASDPLSPPLSASPRDKHPNGGGGGGGGGGGAGGGGPSASNSLLYT
GDLEALQRLQAGNVVLPLVHRVTGT LAATSTAAQRVYTTGTIRYAPAEVTLAMQSNLLPNAHAVNFVDVNSPGFG
LDPKTPMEMLYHHVHRLNMSGPFGGAVSAASLTQMPAGNVFTTAEGLFSTLPFPVYSNGIHAAQT LERKEDDPAF
LYKVVIIIN*

(25) pDEST-CMV-N-EGFP-TRIOBP-1

MVSKGEELFTGVVPILVELDGDVNGHKFSVSGEGEGDATYGKLTCLKFICTTGKLPVPWPTLVTTLTLYGVQCFSRY
PDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNRIELKGIDFKEDGNILGHKLEYNNSHN
VYIMADKQKNGIKVNFKIRHNIEDGSVQLADHYQNTPIGDGPVLLPDNHYLSTQSALS KDPNEKRDHMLLEFV
TAAGITHGMDELYKAVPDRDQTSLYKKAGFKGTNSVDMGGWKGPQRRGKEGPEARRRAAERGGGGGGGGVPAPR
SPAREPRPRSCLLLPPPWGAAMTPDLLNFKKGWMSILDEPGEPPSPSLTTTSTSQWKHWFVLTDSSSLKYRDST
AEEADELDGEIDLRSDTVTEYAVQRNYGFIHTKDAVYTL SAMTSGIRRNWIEALRKTVRPTSAPDVTKLSDSN
KENALHSYSTQKGPLKAGEQRAGSEVISRGGRKADGQRQALDYVELSPLTQASPQRARTPARTPDRLAKQEELE
RDLAQRSEERRKWFEATDSRTPEVPAGEGPRRGLGAPLTEDQQNRLSEEIEKKWQELEKLPLRENKRVP LTALLN
QSRGERRGPPSDGHEALEKEVQALRAQLEAWRLQGEAPQSALRSQEDGHI PPGYISQEACERSLAEMESSHQVM
EELQRHHERELQRLQKEKEWLLAEETAATASAI EAMKKAYQEELSRELSKTRSLQQGPDGLRKQHQS DVEALKRE
LQVLSEQYSQKCLEIGALMRQAEEREHTLRRCQQEQELLRHNLHGR LSEEIDQLRGFIASQGMGNGCGRSNE
RSSCELEVLLRVKENELQYLKKEVQCLRDELQMMQKDKRFTSGKYQDVYVELSHIKTRSEREIEQLKEHLRLAMA
ALQEKE SMRNSLAE*