The extended PP1 toolkit: designed to create specificity

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Table S1. Validated vertebrate PIPs[1,2].

Protein	Gene	Docking motif			IDP[3]	Function[4]	Reference
		RVxF	SILK	MyPhoNE			
AKAP149	*AKAP1*	+			+	T	[S1]
AKAP220	*AKAP11*	+			+	T	[S2]
AKAP450	*AKAP9*	+			-	T	[S3]
APC	*APC*	+			+	?	[S4]
Aurora-A	*AURKA*	+			+	S	[S5]
Aurora-B	*AURKB*	+			-	?	[S6]
AXIN	*AXIN1*	-				S	[S7]
BCL2	*BCL2*	+			-	T	[S8]
BCL-w	*BCL2L2*	+			-	T	[S9]
BCL-x	*BCL2L1*	+			-	T	[S9]
BRCA1	*BRCA1*	+			+	S	[S10]
CASC1	*CASC1*	+			-	?	[S11]
CASC5	*CASC5*	+	+		+	?	[S11]
Caspase 9	*CASP9*	-				S	[S12]
Caspase 2[5]	*CASP2*	+				S	[S13]
Chapsyn110	*DLG2*	+			-	?	[S11]
CCDC8	*CCDC8*	+			+	?	[S11]
CCDC128	*CCDC128*	+			+	?	[S11]
CD2BP2	*CD2BP2*	+			+	?	[S11]
CDC25C[5]	*CDC25C*	+				S	[S14]
CENPE	*CENPE*	+			-	?	[S11]
CEP192	*CEP192*	+			+	?	[S11]
CHCHD3	*CHCHD3*	+			+	?	[S11]
CHCHD6	*CHCHD6*	+			+	?	[S11]
CLC7	*CLCN7*	+			+	?	[S4]
Consortin	*CNST*	+	+		+	?	[S11]
CPI-17	*PPP1R14A*	-				I	[S15]
CSMD1	*CSMD1*	+			+	?	S11]
DARPP32	*PPP1R1B*	+			+[7]	I	[S16]
dead box31	*DDX31*	+			+	?	[S11]
DNApolIIp68	*POLD3*	+			+	S	[S17]
DRIM BP	*KIAA0649*	+			+	?	[S11]
DYSFIP1	*DYSFIP1*	+			-	?	[S11]
DZIP3	*DZIP3*	+			+	?	[S11]
eIF2β	*EIF2S2*	+			+	?	[S18]
ELFN1	*ELFN1*	+			+	?	[S11]
ELFN2	*ELFN2*	+			-	?	[S11]
ELL1	*ELL*	+			-	?	[S11]
Endofin	*ZFYVE16*	+			+	T	[S19]
Endophilin B1t	*SH3GLB1*	+[6]			-	?	[S20]
FAK	*PTK2*	-				S	[S21]
FAM130A1	*FAM130A1*	+	+		+	?	[S11]
FAM130A2	*FAM130A2*	+	+		+	?	[S11]
FER kinase	*FER*	+			-	?	[S22]
FERM	*FARP1*	+			+	?	[S11]
FK506BP15	*FKBP15*	+			+	?	[S11]
FLJ14744	*PPP1R15B*	+			-	?	[S23]
14-3-3gamma	*YWHAG*	-				?	[S24]
GADD34	*PPP1R15A*	+			+	T	[S25]
GBPI-1	*PPP1R14D*	+			+	I	[S26]
GL	*PPP1R3B*	+			-	T	[S27]
GM	*PPP1R3A*	+			+	T	[S28]
GPATCH2	*GPATCH2*	+			+	?	[S11]
GPR12	*GPR12*	+			-	?	[S11]
Glutaredoxin	*GRXCR1*	+			+	?	[S11]
G-substrate	*C7orf16*	-				I	[S29]

Protein	Gene	Docking motif			IDP[3]	Function[4]	Reference
		RVxF	SILK	MyPhoNE			
HB2E	*PPP1R3F*	+			+	T	[S23]
HCF1	*HCF1*	-				?	[S30]
HDAC6	*HDAC6*	-				?	[S31]
HYDIN	*HYDIN*	+			+	?	[S11]
IIIG9	*C11orf66*	+			+	?	[S11]
Ikaros	*IKZF1*	+			+	S	[S32]
Inhibitor-1	*PPP1R1A*	+			+	I	[S33]
Inhibitor-2	*PPP1R2*	+	+		+[7]	I, S	[S34]
Inhibitor-3	*PPP1R11*	+			+	I	[S35]
Integrin αIIB	*ITGA2B*	+			+	T	[S36]
IP3R1	*ITPR1*	+			-	?	[S4]
IP3R3	*ITPR3*	+			-	?	[S4]
IPP5	*PPP1R1C*	+			+	I	[S37]
IRBIT	*AHCYL1*	+			+	S	[S38]
JARID1B	*JARID1B*	+			-	?	[S11]
KCNA6	*KCNA6*	+			-	?	[S4]
KCNK10	*KCNK10*	+			-	?	[S11]
KEPI	*PPP1R14C*	+			+	I	[S39]
KIAA1244	*KIAA1244*	+			-	?	[S11]
KIAA1443	*PPP1R3E*	+			+	T?	[S23]
KPI-2	*LMTK2*	+			+	?	[S40]
L5	*RPL5*	-				?	[S41]
LIMKAIN b1	*KIAA0430*	+			-	?	[S11]
LMTK1	*AATK*	+			+	T	[S42]
LMTK3	*LMTK3*	+			+	?	[S11]
LOC221908	*C7orf47*	+			+	?	[S11]
LOC145376	*C14orf50*	+			-	?	[S11]
LRRC68	*LRRC68*	+			+	?	[S11]
MAP1B	*MAP1B*	+			+	?	[S11]
MCM7	*MCM7*	+			-	?	[S11]
mGlu1	*GRM1*	+			+	?	[S43]
mGlu5	*GRM5*	+			+	?	[S43]
mGlu7	*GRM7*	+			-	?	[S43]
MKI67	*MKI67*	+			+	?	[S11]
MPHOSPH10	*MPHOSPH10*	+			+	?	[S11]
MYPT 1	*PPP1R12A*	+		+	+	T	[S44]
MYPT 2	*PPP1R12B*	+		+	+	T	[S45]
MYPT 3	*PPP1R16A*	+		+	+	T	[S46]
myosin1D	*MYO1D*	+			-	?	[S11]
MYR 8	*MYO16*	+		+	-	T	[S47]
N-Cor	*NCOR1*	+			+	S	[S48]
NEK2a	*NEK2*	+			+	S,T	[S49]
neurabin-I	*PPP1R9A*	+			+	T	[S50]
neurofilament L	*NEFL*	-				T?	[S51]
NEZHa2	*KIAA1543*	+			+	?	[S11]
NHE1	*SLC9A1*	-				T	[S52]
NIPP1	*PPP1R8*	+			+	?	[S53]
NIR	*NOC2L*	+			+	S	[S30]
NKCCl	*SLC12A2*	+			+	T	[S54]
NOM1	*NOM1*	+			+	S	[S55]
Occludin	*OCLN*	-				?	[S56]
Opsin 3	*OPN3*	+			-	?	[S4]
ORC5L	*ORC5L*	+			-	?	[S11]
p53BP2	*PPP1R13A*	+			+	?	[S57]
p53BP2like	*PPP1R13B*	+			+	T	[S23]
p84	*PPP1R12C*	+			+	S	[S58]

Protein	Gene	Docking motif			IDP[3]	Function[4]	Reference[5]
		RVxF	SILK	MyPhoNE			
PAR-3	*PARD3*	+			+	S	[S59]
PCIF1	*PCIF1*	+			-	?	[S11]
PFK-1	*PFKM*	-				?	[S60]
PHACTR1-4	*PHACTR4*	-				?	[S61]
PHI-1	*PPP1R14B*	+[6]			+	I	[S62]
Phostensin	*KIAA1949*	+			+	T	[S63]
PHRF1	*PHRF1*	+			+	?	[S11]
PITK	*ANKRD28*	+			-	T	[S64]
PKMYT1	*PKMYT1*	+			+	?	[S11]
PKR	*EIF2AK2*	-				S	[S65]
PMP22cd	*PMP22CD*	+			-	?	[S11]
PNUTS	*PPP1R10*	+			+	T	[S66]
pREX2	*DEPDC2*	+			-	?	[S11]
PRIP-1	*PLCL1*	+			+	?	[S67]
Protocadherin 7	*PCDH7*	+			+	?	[S68]
Protocadherin11x	*PCDH11X*	+			+	?	[S11]
PSF	*SFPQ*	+			+	?	[S69]
PTG	*PPP1R3C*	+			-	T	[S70]
R6	*PPP1R3D*	+			+	T	[S71]
RB	*RB1*	+			+	S	[S72]
RB1CC1	*RB1CC1*	+			-	?	[S4]
RBM26	*RBM26*	+			+	?	[S11]
Repo-man	*CDCA2*	+			+	T	[S73]
RIMBP2	*RIMBP2*	+			-	?	[S11]
RPGRIP1L	*RPGRIP1L*	+			+	?	[S11]
RRP1B	*RRP1B*	+			+	?	[S11]
Ryanodine receptor	*RYR1*	+			-	S	[S74]
SACSIN	*SACS*	+			-	?	[S11]
SARA	*ZFYVE9*	+			-	T	[S75]
SARP	*ANKDR42*	+			+	?	[S76]
Scapinin	*PHACTR3*	-				?	[S77]
SDS22	*PPP1R7*	-				?	[S78]
SFI1	*SFI1*	+			+	?	[S11]
SH2D4A	*SH2D4A*	+		+	+	?	[S11]
SH3RF2	*SH3RF2*	+			+	?	[S11]

Protein	Gene	Docking motif			IDP[3]	Function[4]	Reference[5]
		RVxF	SILK	MyPhoNE			
SIPP1	*WBP11*	+	+		+	?	[S79]
SNF5	*SMARCB1*	+[6]			-	?	[S80]
Solute carrier 7-14	*SLC7A14*	+			-	?	[S11]
SPATA2	*SPATA2*	+			-	?	[S11]
Spinophilin	*PPPR9B*	+			+[7]	T	[S81]
SPOCD1	*SPOCD1*	+			+	?	[S11]
SPRED1	*SPRED1*	+			+	?	[S11]
SPZ1	*SPZ1*	-				?	[S82]
SRp38	*SFRS13*	-				S	[S83]
Staufen	*STAU*	+			+	?	[S84]
SAP102	*DLG3*	+			-	?	[S11]
SYTL2	*SYTL2*	+	+		+	?	[S11]
TAU	*MAPT*	-				S	[S85]
Tensin 1	*TNS1*	+			+	?	[S86]
TIMAP	*PPP1R16B*	+		+	-	T	[S87]
TMEM132C	*TMEM132C*	+			+	?	[S11]
TMEM132D	*TMEM132D*	+			-	?	[S11]
TRA-2BETA	*TRA2B*	+			+	?	[S88]
TRIM42	*TRIM42*	+			-	?	[S11]
TRPC4AP	*TRPC4AP*	+			-	?	[S11]
TRP5	*TRPC5*	+			+	?	[S4]
TSC2	*TSC2*	+			+	?	[S11]
TSKS	*TSKS*	+			+	?	[S11]
Ubinuclein 1	*UBN1*	+			+	?	[S11]
URI	*C19orf2*	-				T	[S89]
Vitamin D receptor	*VDR*	-				?	[S90]
VPS54	*VPS54*	+			+	?	[S11]
WDR81	*WDR81*	+			+	?	[S11]
WNK1	*WNK1*	+			+	?	[S11]
ZAP3	*YLPM1*	+			+	T	[S91]
ZBTB38	*ZBTB38*	+			+	?	[S11]
ZCCHC9	*ZCCHC9*	+			-	?	[S11]
ZFYVE1	*ZFYVE1*	+			-	?	[S11]
ZSWIM3	*ZSWIM3*	+			-	?	[S11]

[1]Several additional vertebrate proteins have been found to co-purify or co-immunoprecipitate with PP1 but the available data do not allow distinguishing between direct and indirect interactors. These include the proteins ALK1, androgen receptor, C9orf75, caveolin, clathrin light chain b, EWS, GRP78, HDAC1, HDAC8, HOX11, integrin α3A, LCP1, MEF2A, myopalladin, NCAM, PDE6B, RIF1, SUR8, SRC3, TERA and TMEM113.

[2]The list excludes paralogues of known PP1 interactors with a conserved RVxF motif that have not yet been validated as PIPs. A list of these paralogues is given in Ref. [S11].

[3]Taking the available structures and biophysical data of unbound and bound PP1 regulatory proteins as a boundary blueprint, an average score from IUPRED (ASI) for ± 100 residues surrounding the F/W of the RVxF/W motif was calculated. PIPs with ASI values >0.45 were considered to be disordered (+); PIPs with ASI values <0.45 are marked as structured (–).

[4]Abbreviations. I, inhibitory PIP; IDP, intrinsically disordered protein; PIP, PP1-interacting protein; S, substrate PIP; T, targeting PIP; ?, unknown

[5]The validated PP1-docking motif present in the *Xenopus* or mouse isoforms is not conserved in humans.

[6]PIP isoforms with a conserved RVxF motif that have not been validated.

[7]PIPs that were experimentally confirmed as IDPs.

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