

Supplementary Information

**Selective detection of tyrosine-containing proximally phosphorylated motifs using  
an antenna-free Tb<sup>3+</sup> luminescent sensor**

Supplementary Information

Eugenia Duodu<sup>a</sup>, Dziyana Kraskouskaya<sup>a</sup>, Joshua Campbell<sup>a</sup>, Gustavo Graca-Lima<sup>a</sup>, and  
Patrick T. Gunning<sup>a</sup>

<sup>a</sup>University of Toronto Mississauga, 3359 Mississauga Road North, Mississauga,  
Ontario, Canada, L5L 1C6.  
patrick.gunning@utoronto.ca

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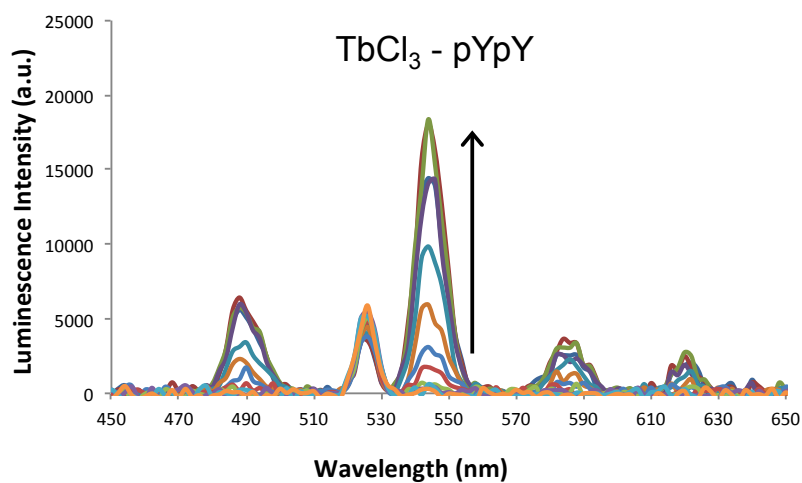
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**Supplementary notes**

Supplementary note 1: biophysical experiments

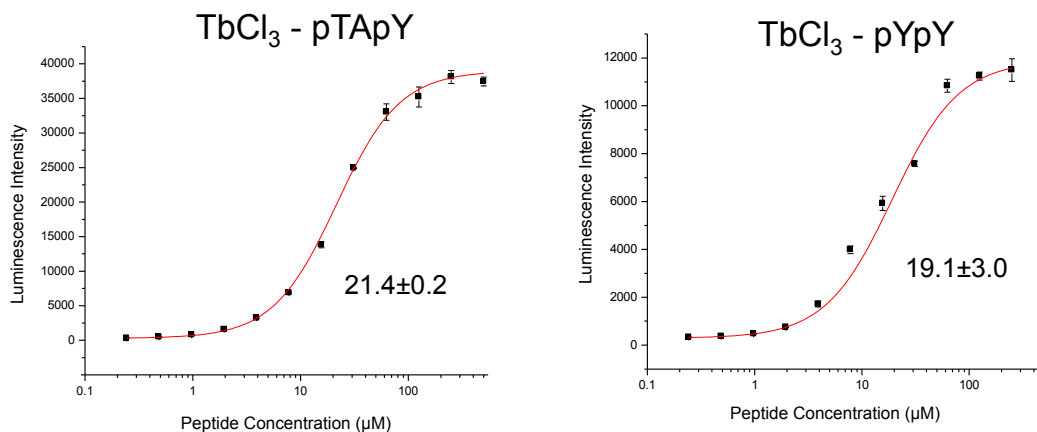
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**Figure S1: luminescence emission spectra of  $Tb^{3+}$  with target di-phosphorylated peptide**



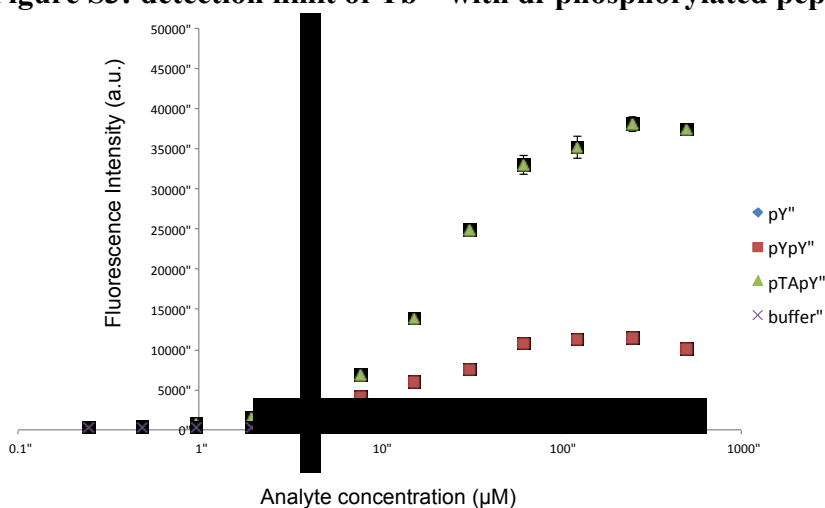
50  $\mu M$  of  $TbCl_3$  was titrated with 500-0.244  $\mu M$  of peptide and incubated for 30 min at r.t. Following incubation, the sample was excited at 263 nm and luminescence intensity was recorded from 450 nm to 650 nm in 2 nm steps (delay time = 60  $\mu s$ , integration time = 1.5 ms). The arrow on the graphs indicates increasing signal intensity with increasing peptide concentration. All samples were dissolved in 50 mM HEPES, 50 mM NaCl, pH 7.5 buffer.

**Figure S2: titration of  $Tb^{3+}$  with di-phosphorylated peptides.**



50  $\mu M$  of  $TbCl_3$  was titrated with 500-0.244  $\mu M$  of peptides and incubated for 30 min at r.t. Following incubation, samples were excited at 263 nm (10 nm bandwidth); the resultant luminescence intensity was recorded at 544 nm (20 nm bandwidth, 60  $\mu s$  delay time, 1.5 ms integration time). The titration data were fit to the Hill equation using Origin Software to derive apparent dissociation constants (displayed at the bottom of each graph in  $\mu M$ ). All samples were dissolved in 50 mM HEPES, 50 mM NaCl, pH 7.5 buffer.

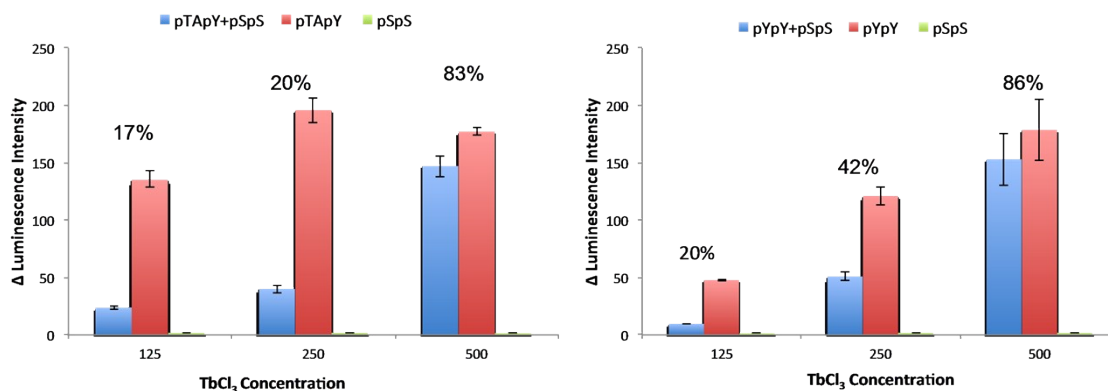
**Figure S3: detection limit of  $Tb^{3+}$  with di-phosphorylated peptides.**



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50  $\mu\text{M}$  of  $\text{TbCl}_3$  was titrated with 500-0.244  $\mu\text{M}$  of peptides and incubated for 30 min at r.t. Following incubation, samples were excited at 263 nm (10 nm bandwidth); the resultant luminescence intensity was recorded at 544 nm (20 nm bandwidth, 60  $\mu\text{s}$  delay time, 1.5 ms integration time). Dashed lines indicates the  $\text{Tb}^{3+}$  ion limit of detection for target peptides, pTApY and pYpY as compared to the off-target mono-phosphorylated pY. All samples were dissolved in 50 mM HEPES, 50 mM NaCl, pH 7.5 buffer

**Figure S4:  $\text{Tb}^{3+}$  sensitivity towards target peptide in the presence of off-target competing phosphorylated species**



Variable concentrations of  $\text{TbCl}_3$  were added to peptide solutions (100  $\mu\text{M}$  of pTApY/pYpY; 200  $\mu\text{M}$  of pSpS) and incubated for 30 min at r.t. Following incubation, samples were excited at 263 nm (10 nm bandwidth); the resultant luminescence intensity was recorded at 544 nm (20 nm bandwidth, 60  $\mu\text{s}$  delay time, 1.5 ms integration time). Mean  $\Delta$  luminescence intensity (calculated as ratios of  $\text{Tb}^{3+}$  signal in the presence of analytes over  $\text{Tb}^{3+}$  signal in the absence of analytes) is reported with error bars representing  $\pm$  s.d. In order to quantify the effect of competing off-target species on the luminescence signal, we calculated the ratios of  $\Delta$  luminescence intensity for pTApY/pYpY alone and in the presence of the pSpS competing peptide (ratios are

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expressed as percentages on the graph).

### Supplementary tables

**Table S1: list of human proteins containing pYpY motif**

	Protein	GeneSymbol	Accession	MW	Start	End	Modification Sites
1	14-3-3 eta	YWHAH	UP:Q04917	28219	130	131	Y130-p, Y131-p
2	14-3-3 gamma	YWHAG	UP:P61981	28303	130	131	Y130-p, Y131-p
3	14-3-3 sigma	SFN	UP:P31947	27774	127	128	Y127-p, Y128-p
4	14-3-3 zeta	YWHAZ	UP:P63104	27745	125	126	Y125-p, Y126-p
5	5-HT(1F)	HTR1F	UP:P30939	41709	201	202	Y201-p, Y202-p
6	AADAC	AADAC	UP:P22760	45734	17	18	Y17-p, Y18-p
7	ABCD3	ABCD3	UP:P28288	75476	635	636	Y635-p, Y636-p
8	ABHD1	ABHD1	UP:Q965E0	45207	304	305	Y304-p, Y305-p
9	ACADSB	ACADSB	UP:P45954	47485	198	199	Y198-p, Y199-p
10	ACADSB	ACADSB	UP:P45954	47485	372	373	Y372-p, Y373-p
11	Ack	TNK2	UP:Q07912	114569	859	860	Y859-p, Y860-p
12	ACP1	ACP1	UP:P24666	18042	132	133	Y132-p, Y133-p
13	ACSBG1	ACSBG1	UP:Q96GR2	81290	138	139	Y138-p, Y139-p
14	ACSF3	ACSF3	UP:Q4G176	64130	303	304	Y303-p, Y304-p
15	ACTN4	ACTN4	UP:O43707	104854	485	486	Y485-p, Y486-p
16	ADA	ADA	UP:P00813	40764	29	30	Y29-p, Y30-p
17	ADAMTS18	ADAMTS18	UP:Q8TE60	135167	764	765	Y764-p, Y765-p
18	ADFP	PLIN2	UP:Q99541	48075	216	217	Y216-p, Y217-p
19	ADPRH	ADPRH	UP:P54922	39507	19	20	Y19-p, Y20-p
20	Afadin	MLLT4	UP:P55196	206804	1656	1657	Y1656-p, Y1657-p
21	AFAP	EQTN	UP:Q9NQ60	32840	61	62	Y61-p, Y62-p
22	AFAP	AFAP1	UP:Q8N556	80725	93	94	Y93-p, Y94-p
23	AFAP1L1	AFAP1L1	UP:Q8TED9	86432	158	159	Y158-p, Y159-p
24	AGO3	AGO3	UP:Q9H9G7	97360	682	683	Y682-p, Y683-p
25	AIDA-1b iso2	ANKS1B	UP:Q7Z6G8-7	47104	14	15	Y14-p, Y15-p
26	AIP	AIP	UP:O00170	37636	247	248	Y247-p, Y248-p
27	AIP1	MAGI2	UP:Q86UL8	158754	365	366	Y365-p, Y366-p
28	AIP1	AIP1	UP:Q9NZN9	43903	267	268	Y267-p, Y268-p
29	AK2	AK2	UP:P54819	26478	200	201	Y200-p, Y201-p
30	AK5	AK5	UP:Q9Y6K8	63333	521	522	Y521-p, Y522-p
31	AK7	AK7	UP:Q96M32	82658	390	391	Y390-p, Y391-p
32	AKAP11	AKAP11	UP:Q9UKA4	210512	485	486	Y485-p, Y486-p
33	AKAP9	AKAP9	UP:Q99996	453667	1225	1226	Y1225-p, Y1226-p
34	Akt2	AKT2	UP:P31751	55769	177	178	Y177-p, Y178-p
35	ALDH2	ALDH2	UP:P05091	56381	148	149	Y148-p, Y149-p
36	ALK	ALK	UP:Q9UM73	176442	1282	1283	Y1282-p, Y1283-p
37	ALMS1	ALMS1	UP:Q8TCU4	460965	1939	1940	Y1939-p, Y1940-p
38	ALMS1	ALMS1	UP:Q8TCU4	460965	3276	3277	Y3276-p, Y3277-p
39	ALOX12B	ALOX12B	UP:O75342	80356	496	497	Y496-p, Y497-p
40	alphaSNBP(A)	LSM14A	UP:Q8ND56	50530	362	363	Y362-p, Y363-p
41	ALS2CR11 iso4	ALS2CR11	UP:Q53TS8-4	209056	1436	1437	Y1436-p, Y1437-p
42	AMICA1	AMICA1	UP:Q86YT9	44339	73	74	Y73-p, Y74-p
43	AMOTL1	AMOTL1	UP:Q8IY63	106574	218	219	Y218-p, Y219-p
44	AMPKA1	PRKAA1	UP:Q13131	64009	441	442	Y441-p, Y442-p
45	ANKLE2	ANKLE2	UP:Q86XL3	104114	199	200	Y199-p, Y200-p
46	ANKLE2	ANKLE2	UP:Q86XL3	104114	476	477	Y476-p, Y477-p
47	ANKRD11	ANKRD11	UP:Q6UB99	297913	213	214	Y213-p, Y214-p
48	ANKRD12	ANKRD12	UP:Q6UB98	235652	1863	1864	Y1863-p, Y1864-p
49	ANKRD31	ANKRD31	UP:Q8N7Z5	210816	681	682	Y681-p, Y682-p
50	ANTXR1	ANTXR1	UP:Q9H6X2	62789	132	133	Y132-p, Y133-p
51	ANTXR1	ANTXR1	UP:Q9H6X2	62789	382	383	Y382-p, Y383-p
52	ANTXR2	ANTXR2	UP:P58335	53666	380	381	Y380-p, Y381-p
53	ANXA2	ANXA2	UP:P07355	38604	316	317	Y316-p, Y317-p

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54	ANXA2	ANXA2	UP:P07355	38604	317	318	Y317-p, Y318-p
55	ANXA5	ANXA5	UP:P08758	35937	256	257	Y256-p, Y257-p
56	ANXA7	ANXA7	UP:P20073	52739	426	427	Y426-p, Y427-p
57	ANXA8	ANXA8	UP:P13928	36881	263	264	Y263-p, Y264-p
58	ANXA8L1	ANXA8L1	UP:Q5T2P8	36881	263	264	Y263-p, Y264-p
59	ANXA8L2	ANXA8L1	UP:Q5VT79	36865	263	264	Y263-p, Y264-p
60	AP2B1	AP2B1	UP:P63010	104553	276	277	Y276-p, Y277-p
61	AP4E1	AP4E1	UP:Q9UPM8	127287	830	831	Y830-p, Y831-p
62	APAF	APAF1	UP:Q14727	141840	382	383	Y382-p, Y383-p
63	APBA2	APBA2	UP:Q99767	82512	196	197	Y196-p, Y197-p
64	APOB	APOB	UP:P04114	515605	4025	4026	Y4025-p, Y4026-p
65	APOBEC3G	APOBEC3G	UP:Q9HC16	46408	181	182	Y181-p, Y182-p
66	AR	AR	UP:P10275	98989	362	363	Y362-p, Y363-p
67	ARAF	ARAF	UP:P10398	67585	301	302	Y301-p, Y302-p
68	ARHGAP1	ARHGAP1	UP:Q07960	50436	64	65	Y64-p, Y65-p
69	ARHGAP12	ARHGAP12	UP:Q8IWW6	96254	375	376	Y375-p, Y376-p
70	ARHGAP12	ARHGAP12	UP:Q8IWW6	96254	376	377	Y376-p, Y377-p
71	ARHGAP2	CHN1	UP:P15882	53172	45	46	Y45-p, Y46-p
72	ARHGEF33	ARHGEF33	UP:A8MVX0	94633	420	421	Y420-p, Y421-p
73	ARIH2	ARIH2	UP:Q95376	57819	337	338	Y337-p, Y338-p
74	ARIH2	ARIH2	UP:Q95376	57819	432	433	Y432-p, Y433-p
75	ARMETL1	CDNF	UP:Q49AH0	20964	83	84	Y83-p, Y84-p
76	ARPC3	ARPC3	UP:Q15145	20547	47	48	Y47-p, Y48-p
77	ARS2	SRRT	UP:Q9BXP5	100666	624	625	Y624-p, Y625-p
78	AS3MT	AS3MT	UP:Q9HBK9	41748	16	17	Y16-p, Y17-p
79	ASPM	ASPM	UP:Q8IZT6	409800	461	462	Y461-p, Y462-p
80	ASPM	ASPM	UP:Q8IZT6	409800	2675	2676	Y2675-p, Y2676-p
81	ASPRV1	ASPRV1	UP:Q53RT3	36991	196	197	Y196-p, Y197-p
82	ATAD2	ATAD2	UP:Q6PL18	158554	304	305	Y304-p, Y305-p
83	ATG4B	ATG4B	UP:Q9Y4P1	44294	122	123	Y122-p, Y123-p
84	ATP12A	ATP12A	UP:P54707	115511	1038	1039	Y1038-p, Y1039-p
85	ATP1A3	ATP1A3	UP:P13637	111749	548	549	Y548-p, Y549-p
86	ATP6V1A	ATP6V1A	UP:P38606	68304	464	465	Y464-p, Y465-p
87	ATP6V1E1	ATP6V1E1	UP:P36543	26145	56	57	Y56-p, Y57-p
88	ATP6V1E2	ATP6V1E2	UP:Q96A05	26074	56	57	Y56-p, Y57-p
89	ATP8B4	ATP8B4	UP:Q8TF62	135868	364	365	Y364-p, Y365-p
90	ATP9B	ATP9B	UP:Q43861	129304	25	26	Y25-p, Y26-p
91	ATP9B iso2	ATP9B	UP:Q43861-2	128198	25	26	Y25-p, Y26-p
92	ATRX	ATRX	UP:P46100	282586	203	204	Y203-p, Y204-p
93	axin 1	AXIN1	UP:Q15169	95635	787	788	Y787-p, Y788-p
94	AXL	AXL	UP:P30530	98336	702	703	Y702-p, Y703-p
95	BAG4	BAG4	UP:Q95429	49594	72	73	Y72-p, Y73-p
96	BAZ2B	BAZ2B	UP:Q9UIF8	240459	772	773	Y772-p, Y773-p
97	Bcl-3	BCL3	UP:P20749	47584	83	84	Y83-p, Y84-p
98	BCLAF1	BCLAF1	UP:Q9NYF8	106122	80	81	Y80-p, Y81-p
99	BICD1	BICD1	UP:Q96G01	110750	537	538	Y537-p, Y538-p
100	BICD2	BICD2	UP:Q8TD16	93533	424	425	Y424-p, Y425-p
101	BICD2	BICD2	UP:Q8TD16	93533	556	557	Y556-p, Y557-p
102	BLK	BLK	UP:P51451	57706	187	188	Y187-p, Y188-p
103	BMI1	BMI1	UP:P35226	36949	203	204	Y203-p, Y204-p
104	BRDT	BRDT	UP:Q58F21	107954	309	310	Y309-p, Y310-p
105	BTBD11	BTBD11	UP:A6QL63	120884	981	982	Y981-p, Y982-p
106	BTBD14A	NACC2	UP:Q96BF6	62837	223	224	Y223-p, Y224-p
107	Btk	BTK	UP:Q06187	76281	344	345	Y344-p, Y345-p
108	BTNL8	BTNL8	UP:Q6UX41	56748	121	122	Y121-p, Y122-p
109	C21orf59	C21orf59	UP:P57076	33224	245	246	Y245-p, Y246-p
110	C5orf49	C5orf49	UP:A4QMS7	16991	43	44	Y43-p, Y44-p
111	C5orf49	C5orf49	UP:A4QMS7	16991	44	45	Y44-p, Y45-p
112	C6orf132	C6orf132	UP:Q5T0Z8	124034	52	53	Y52-p, Y53-p
113	C6orf183	C6orf183	UP:Q5T699	46784	108	109	Y108-p, Y109-p
114	CACNA1G iso13	CACNA1G	UP:Q43497-13	250972	1575	1576	Y1575-p, Y1576-p
115	CACNA1S	CACNA1S	UP:Q13698	212350	971	972	Y971-p, Y972-p
116	CACNA1S	CACNA1S	UP:Q13698	212350	972	973	Y972-p, Y973-p
117	CACNA2D1	CACNA2D1	UP:P54289	124568	217	218	Y217-p, Y218-p
118	CALCOCO2	CALCOCO2	UP:Q13137	52254	104	105	Y104-p, Y105-p
119	calpain 10	CAPN10	UP:Q9HC96	74952	465	466	Y465-p, Y466-p
120	calponin 1	CNN1	UP:P51911	33170	293	294	Y293-p, Y294-p

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121	calponin 2	CNN2	UP:Q99439	33697	302	303	Y302-p, Y303-p
122	calsequestrin 2	CASQ2	UP:O14958	46436	178	179	Y178-p, Y179-p
123	CAMK1D	CAMK1D	UP:Q8IU85	42914	152	153	Y152-p, Y153-p
124	CAPN7	CAPN7	UP:Q9Y6W3	92652	619	620	Y619-p, Y620-p
125	CASK	CASK	UP:O14936	105123	788	789	Y788-p, Y789-p
126	CASP5	CASP5	UP:P51878	49736	103	104	Y103-p, Y104-p
127	CBX4	CBX4	UP:O00257	61368	150	151	Y150-p, Y151-p
128	CBX4	CBX4	UP:O00257	61368	151	152	Y151-p, Y152-p
129	CCDC135	CCDC135	UP:Q8IY82	103497	551	552	Y551-p, Y552-p
130	CCDC174	CCDC174	UP:Q6PII3	53958	462	463	Y462-p, Y463-p
131	CCDC42	CCDC42	UP:Q96M95	38019	149	150	Y149-p, Y150-p
132	CCDC45	CEP95	UP:Q96GE4	95297	669	670	Y669-p, Y670-p
133	CCDC45	CEP95	UP:Q96GE4	95297	735	736	Y735-p, Y736-p
134	CCDC50	CCDC50	UP:Q8IVM0-2	56340	144	145	Y144-p, Y145-p
135	CCDC50	CCDC50	UP:Q8IVM0-2	56340	145	146	Y145-p, Y146-p
136	CCDC50 iso2	CCDC50	UP:Q8IVM0	35822	144	145	Y144-p, Y145-p
137	CCDC50 iso2	CCDC50	UP:Q8IVM0	35822	145	146	Y145-p, Y146-p
138	CCDC6	CCDC6	UP:Q16204	53291	392	393	Y392-p, Y393-p
139	CCDC99	SPDL1	UP:Q96EA4	70172	366	367	Y366-p, Y367-p
140	CD34	CD34	UP:P28906	40716	329	330	Y329-p, Y330-p
141	CD59	CD59	UP:P13987	14177	86	87	Y86-p, Y87-p
142	CDAN1	CDAN1	UP:Q8IWY9	134120	712	713	Y712-p, Y713-p
143	CDC23	CDC23	UP:Q9UJX2	68834	340	341	Y340-p, Y341-p
144	CDC27	CDC27	UP:P30260	91867	645	646	Y645-p, Y646-p
145	CDH1	CDH1	UP:P12830	97456	753	754	Y753-p, Y754-p
146	CDH1	CDH1	UP:P12830	97456	754	755	Y754-p, Y755-p
147	CDH10	CDH10	UP:Q9Y6N8	88451	360	361	Y360-p, Y361-p
148	CDH23	CDH23	UP:Q9H251	369494	3089	3090	Y3089-p, Y3090-p
149	CDH3	CDH3	UP:P22223	91418	700	701	Y700-p, Y701-p
150	CELSR1	CELSR1	UP:Q9NYQ6	329486	282	283	Y282-p, Y283-p
151	CENPF	CENPF	UP:P49454	367764	158	159	Y158-p, Y159-p
152	CEP152	CEP152	UP:O94986	195626	1314	1315	Y1314-p, Y1315-p
153	CEP78	CEP78	UP:Q5JTW2	76396	376	377	Y376-p, Y377-p
154	CGI-09	TRMT6	UP:Q9UJA5	55799	172	173	Y172-p, Y173-p
155	ChaK2	TRPM6	UP:Q9BX84	231708	782	783	Y782-p, Y783-p
156	CHD-2	CHD2	UP:O14647	211344	728	729	Y728-p, Y729-p
157	CHD-2	CHD2	UP:O14647	211344	1715	1716	Y1715-p, Y1716-p
158	CHD-6	CHD6	UP:Q8TD26	305412	1237	1238	Y1237-p, Y1238-p
159	CHD-7	CHD7	UP:Q9P2D1	335927	1217	1218	Y1217-p, Y1218-p
160	CHD-9	CHD9	UP:Q3L8U1	326022	1635	1636	Y1635-p, Y1636-p
161	CHD1L	CHD1L	UP:Q86WJ1	100984	289	290	Y289-p, Y290-p
162	CHGB	CHGB	UP:P05060	78276	525	526	Y525-p, Y526-p
163	CHST9	CHST9	UP:Q7L155	52055	429	430	Y429-p, Y430-p
164	CIRBP	CIRBP	UP:Q14011	18648	141	142	Y141-p, Y142-p
165	CKB	CKB	UP:P12277	42644	173	174	Y173-p, Y174-p
166	CKM	CKM	UP:P06732	43101	173	174	Y173-p, Y174-p
167	CKMT2	CKMT2	UP:P17540	47504	207	208	Y207-p, Y208-p
168	CKS1	CKS1B	UP:P61024	9660	7	8	Y7-p, Y8-p
169	CKS2	CKS2	UP:P33552	9860	7	8	Y7-p, Y8-p
170	Claudin-11	CLDN11	UP:O75508	21993	191	192	Y191-p, Y192-p
171	Claudin-2	CLDN2	UP:P57739	24549	194	195	Y194-p, Y195-p
172	Claudin-23	CLDN23	UP:Q96B33	31915	223	224	Y223-p, Y224-p
173	CLK3	CLK3	UP:P49761	73515	231	232	Y231-p, Y232-p
174	CLTA	CLTA	UP:P09496	27077	83	84	Y83-p, Y84-p
175	CLTC	CLTC	UP:Q00610	191615	899	900	Y899-p, Y900-p
176	CMSS1	CMSS1	UP:Q9BQ75	31884	102	103	Y102-p, Y103-p
177	CNBD1	CNBD1	UP:Q8NA66	50224	322	323	Y322-p, Y323-p
178	CNGA3	CNGA3	UP:Q16281	78838	168	169	Y168-p, Y169-p
179	CNNM2	CNNM2	UP:Q9H8M5	96623	712	713	Y712-p, Y713-p
180	CNNM2 iso4	CNNM2	UP:Q9H8M5-2	94341	712	713	Y712-p, Y713-p
181	CNNM4	CNNM4	UP:Q6P4Q7	86607	596	597	Y596-p, Y597-p
182	COL24A1	COL24A1	UP:Q17RW2	175496	472	473	Y472-p, Y473-p
183	COL24A1	COL24A1	UP:Q17RW2	175496	473	474	Y473-p, Y474-p
184	COP56	COP56	UP:Q7L5N1	36163	105	106	Y105-p, Y106-p
185	CPPED1	CPPED1	UP:Q9BRF8	35548	219	220	Y219-p, Y220-p

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186	CPSF6	CPSF6	UP:Q16630	59210	520	521	Y520-p, Y521-p
187	CSPP1	CSPP1	UP:Q1MSJ5	145522	554	555	Y554-p, Y555-p
188	CST1	CST1	UP:P01037	16388	63	64	Y63-p, Y64-p
189	CTGLF3	AGAP6	UP:Q5VW22	73127	292	293	Y292-p, Y293-p
190	CTNND1	CTNND1	UP:O60716	108170	334	335	Y334-p, Y335-p
191	CTNND1 iso3	CTNND1	UP:O60716-3	104977	334	335	Y334-p, Y335-p
192	CTNND1 iso4	CTNND1	UP:O60716-4	105779	334	335	Y334-p, Y335-p
193	CYBA	CYBA	UP:P13498	21013	87	88	Y87-p, Y88-p
194	CYP7A1	CYP7A1	UP:P22680	57661	432	433	Y432-p, Y433-p
195	DAPK1	DAPK1	UP:P53355	160046	12	13	Y12-p, Y13-p
196	DAPK1	DAPK1	UP:P53355	160046	490	491	Y490-p, Y491-p
197	DDR1	DDR1	UP:Q08345	101128	796	797	Y796-p, Y797-p
198	DDR2	DDR2	UP:Q16832	96736	740	741	Y740-p, Y741-p
199	DDX26B	DDX26B	UP:Q5JSJ4	96673	426	427	Y426-p, Y427-p
200	DDX6	DDX6	UP:P26196	54417	312	313	Y312-p, Y313-p
201	DDX9	DHX9	UP:Q08211	140958	148	149	Y148-p, Y149-p
202	Desmoplakin	DSP	UP:P15924	331774	41	42	Y41-p, Y42-p
203	DHX36	DHX36	UP:Q9H2U1	114760	1006	1007	Y1006-p, Y1007-p
204	Diminuto	DHCR24	UP:Q15392	60101	299	300	Y299-p, Y300-p
205	DLG5	DLG5	UP:Q8TDM6	213868	1077	1078	Y1077-p, Y1078-p
206	DNAH1	DNAH1	UP:Q9P2D7	493953	1525	1526	Y1525-p, Y1526-p
207	DNAH3	DNAH3	UP:Q8TD57	470771	2639	2640	Y2639-p, Y2640-p
208	DNAH5	DNAH5	UP:Q8TE73	529021	83	84	Y83-p, Y84-p
209	DNAH6	DNAH6	UP:Q9C0G6	475983	2660	2661	Y2660-p, Y2661-p
210	DNAJA1	DNAJA1	UP:P31689	44868	7	8	Y7-p, Y8-p
211	DNAJA3	DNAJA3	UP:Q96EY1	52489	113	114	Y113-p, Y114-p
212	DNAJC7	DNAJC7	UP:Q99615	56441	50	51	Y50-p, Y51-p
213	DNMBP	DNMBP	UP:Q6XZF7	177347	429	430	Y429-p, Y430-p
214	DOCK10	DOCK10	UP:Q96BY6	249531	1853	1854	Y1853-p, Y1854-p
215	DOCK2	DOCK2	UP:Q92608	211948	481	482	Y481-p, Y482-p
216	DPP10	DPP10	UP:Q8N608	90888	319	320	Y319-p, Y320-p
217	DPP6	DPP6	UP:P42658	97588	263	264	Y263-p, Y264-p
218	DPY19L4	DPY19L4	UP:Q7Z388	83756	99	100	Y99-p, Y100-p
219	DSCAML1	DSCAML1	UP:Q8TD84	224463	533	534	Y533-p, Y534-p
220	DUSP7	DUSP7	UP:Q16829	44957	169	170	Y169-p, Y170-p
221	dynactin 4	DCTN4	UP:Q9UJW0	52337	107	108	Y107-p, Y108-p
222	DYNC2H1	DYNC2H1	UP:Q8NCM8	492622	799	800	Y799-p, Y800-p
223	DYNC2H1	DYNC2H1	UP:Q8NCM8	492622	2230	2231	Y2230-p, Y2231-p
224	DYRK1A	DYRK1A	UP:Q13627	85584	111	112	Y111-p, Y112-p
225	DYRK1B	DYRK1B	UP:Q9Y463	69198	63	64	Y63-p, Y64-p
226	E2A	TCF3	UP:P15923	67600	149	150	Y149-p, Y150-p
227	EDEM3	EDEM3	UP:Q9BZQ6	104664	295	296	Y295-p, Y296-p
228	EDRF1	C10orf137	UP:Q3B7T1	138528	696	697	Y696-p, Y697-p
229	eEF1A1	EEF1A1	UP:P68104	50141	85	86	Y85-p, Y86-p
230	eEF2K	EEF2K	UP:O00418	82144	59	60	Y59-p, Y60-p
231	EFCAB13	EFCAB13	UP:Q8IY85	110129	345	346	Y345-p, Y346-p
232	EFG1	GFM1	UP:Q96RP9	83471	68	69	Y68-p, Y69-p
233	EFHB	EFHB	UP:Q8N7U6	93802	697	698	Y697-p, Y698-p
234	EFNB1	EFNB1	UP:P98172	38007	343	344	Y343-p, Y344-p
235	EFNB2	EFNB2	UP:P52799	36923	330	331	Y330-p, Y331-p
236	EFNB3	EFNB3	UP:Q15768	35835	337	338	Y337-p, Y338-p
237	EGFR	EGFR	UP:P00533	134277	112	113	Y112-p, Y113-p
238	EHHADH	EHHADH	UP:Q08426	79495	682	683	Y682-p, Y683-p
239	eIF2A	EIF2A	UP:Q9BY44	64990	250	251	Y250-p, Y251-p
240	eIF3S6IP	EIF3L	UP:Q9Y262	66727	287	288	Y287-p, Y288-p
241	eIF4G	EIF4G1	UP:Q04637	175491	103	104	Y103-p, Y104-p
242	ELMO2	ELMO2	UP:Q96JJ3	82615	48	49	Y48-p, Y49-p
243	ELTD1	ELTD1	UP:Q9HBW9	77811	301	302	Y301-p, Y302-p
244	emerin	EMD	UP:P50402	28994	94	95	Y94-p, Y95-p
245	emerin	EMD	UP:P50402	28994	181	182	Y181-p, Y182-p
246	EPC2	EPC2	UP:Q52LR7	91095	408	409	Y408-p, Y409-p
247	EphA3	EPHA3	UP:P29320	110131	123	124	Y123-p, Y124-p
248	EphA7	EPHA7	UP:Q15375	112097	201	202	Y201-p, Y202-p
249	EphB6	EPHB6	UP:O15197	110700	644	645	Y644-p, Y645-p
250	ephexin-1	NGEF	UP:Q8N5V2	82496	288	289	Y288-p, Y289-p



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251	eplin	LIMA1	UP:Q9UHB6	85226	751	752	Y751-p, Y752-p
252	ERK3	MAPK6	UP:Q16659	82681	467	468	Y467-p, Y468-p
253	EST1A	SMG6	UP:Q86US8	160462	508	509	Y508-p, Y509-p
254	EST1A	SMG6	UP:Q86US8	160462	788	789	Y788-p, Y789-p
255	esterase D	ESD	UP:P10768	31463	262	263	Y262-p, Y263-p
256	ESYT1	ESYT1	UP:Q9BSJ8	122856	981	982	Y981-p, Y982-p
257	EXOC4	EXOC4	UP:Q96A65	110498	898	899	Y898-p, Y899-p
258	FAK	PTK2	UP:Q05397	119233	576	577	Y576-p, Y577-p
259	FALZ	BPTF	UP:Q12830	338262	2985	2986	Y2985-p, Y2986-p
260	FAM111B	FAM111B	UP:Q6SJ93	84674	348	349	Y348-p, Y349-p
261	FAM120A	FAM120A	UP:Q9NZB2	121888	327	328	Y327-p, Y328-p
262	FAM120A	FAM120A	UP:Q9NZB2	121888	1003	1004	Y1003-p, Y1004-p
263	FAM177A1	FAM177A1	UP:Q8N128	23757	139	140	Y139-p, Y140-p
264	FAM44A	BOD1L1	UP:Q8NFC6	330466	480	481	Y480-p, Y481-p
265	FAM82A1	FAM82A1	UP:Q96LZ7	47399	306	307	Y306-p, Y307-p
266	FAM84A	FAM84A	UP:Q96KN4	32491	243	244	Y243-p, Y244-p
267	FASN	FASN	UP:P49327	273427	2424	2425	Y2424-p, Y2425-p
268	FBP1	FUBP1	UP:Q96AE4	67560	589	590	Y589-p, Y590-p
269	FBP1	FUBP1	UP:Q96AE4	67560	618	619	Y618-p, Y619-p
270	FBP1	FUBP1	UP:Q96AE4	67560	625	626	Y625-p, Y626-p
271	FBXO9	FBXO9	UP:Q9UK97	52329	296	297	Y296-p, Y297-p
272	FCGR1A	FCGR1A	UP:P12314	42632	137	138	Y137-p, Y138-p
273	FcRL3	FCRL3	UP:Q96P31	80856	133	134	Y133-p, Y134-p
274	Fer	FER	UP:P16591	94638	199	200	Y199-p, Y200-p
275	FFR	VPSS1	UP:Q9UID3	86042	40	41	Y40-p, Y41-p
276	FGFR1	FGFR1	UP:P11362	91868	653	654	Y653-p, Y654-p
277	FGFR2	FGFR2	UP:P21802	92025	656	657	Y656-p, Y657-p
278	FGFR3	FGFR3	UP:P22607	87710	647	648	Y647-p, Y648-p
279	FGFR4	FGFR4	UP:P22455	87954	642	643	Y642-p, Y643-p
280	FGG	FGG	UP:P02679	51512	374	375	Y374-p, Y375-p
281	Fgr	FGR	UP:P09769	59479	208	209	Y208-p, Y209-p
282	FH	FH	UP:P07954	54637	67	68	Y67-p, Y68-p
283	FHL1 iso1	FHL1	UP:Q13642-1	31895	207	208	Y207-p, Y208-p
284	FIP1L1	FIP1L1	UP:Q6UN15	66526	453	454	Y453-p, Y454-p
285	FLG	FLG	UP:P20930	435170	85	86	Y85-p, Y86-p
286	Fli1	FLI1	UP:Q01543	50982	451	452	Y451-p, Y452-p
287	FNDC1	FNDC1	UP:Q4ZHG4	205558	1878	1879	Y1878-p, Y1879-p
288	FNDC1	FNDC1	UP:Q4ZHG4	205558	1879	1880	Y1879-p, Y1880-p
289	FOXK1	FOXK1	UP:P85037	75457	341	342	Y341-p, Y342-p
290	FRAS1	FRAS1	UP:Q86XX4	443214	3090	3091	Y3090-p, Y3091-p
291	FRMPD1	FRMPD1	UP:Q5SYB0	173437	868	869	Y868-p, Y869-p
292	FUT3	FUT3	UP:P21217	42117	209	210	Y209-p, Y210-p
293	FUT5	FUT5	UP:Q11128	43008	222	223	Y222-p, Y223-p
294	FUT6	FUT6	UP:P51993	41860	208	209	Y208-p, Y209-p
295	Fyn	FYN	UP:P06241	60762	213	214	Y213-p, Y214-p
296	G2	KIAA1549L	UP:Q6ZVL6	198999	1417	1418	Y1417-p, Y1418-p
297	G3BP-2	G3BP2	UP:Q9UN86	54121	175	176	Y175-p, Y176-p
298	Gab1	GAB1	UP:Q13480	76616	47	48	Y47-p, Y48-p
299	Gab2	GAB2	UP:Q9UQC2	74458	48	49	Y48-p, Y49-p
300	GABPA	GABPA	UP:Q06546	51295	380	381	Y380-p, Y381-p
301	GABPA	GABPA	UP:Q06546	51295	381	382	Y381-p, Y382-p
302	GAGE1	GAGE1	UP:Q13065	15610	9	10	Y9-p, Y10-p
303	GAGE12B/C/D/E	GAGE12B; GAGE12C; GAGE12D; GAGE12E	UP:A1L429	12925	9	10	Y9-p, Y10-p
304	GAGE12F	GAGE12F	UP:POCL80	12978	9	10	Y9-p, Y10-p
305	GAGE12G		UP:POCL81	12978	9	10	Y9-p, Y10-p
306	GAGE12H	GAGE12H	UP:A6NDE8	12924	9	10	Y9-p, Y10-p
307	GAGE12I	GAGE12I	UP:POCL82	12978	9	10	Y9-p, Y10-p
308	GAGE12J	GAGE12J	UP:A6NER3	12896	9	10	Y9-p, Y10-p
309	GAGE3	GAGE3	UP:Q13067	12937	10	11	Y10-p, Y11-p
310	GAGE4	GAGE4	UP:Q13068	12885	9	10	Y9-p, Y10-p
311	GAGE5	GAGE5	UP:Q13069	12924	9	10	Y9-p, Y10-p
312	GAGE6	GAGE6	UP:Q13070	12892	9	10	Y9-p, Y10-p

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313	GAGE7	GAGE7	UP:Q76087	12978	9	10	Y9-p, Y10-p
314	GALNT10	GALNT10	UP:Q86SR1	68992	293	294	Y293-p, Y294-p
315	GAMT	GAMT	UP:Q14353	26318	222	223	Y222-p, Y223-p
316	GAREM iso3	GAREM	UP:Q9H706-3	97099	570	571	Y570-p, Y571-p
317	GATA1	GATA1	UP:P15976	42751	285	286	Y285-p, Y286-p
318	GBP6	GBP6	UP:Q6ZM66	72427	333	334	Y333-p, Y334-p
319	GCET2	GCSAM	UP:Q8N6F7	21005	106	107	Y106-p, Y107-p
320	GCHFR	GCHFR	UP:P30047	9698	47	48	Y47-p, Y48-p
321	GCM2	GCM2	UP:Q75603	56610	359	360	Y359-p, Y360-p
322	GCP3	TUBGCP3	UP:Q96CW5	103571	131	132	Y131-p, Y132-p
323	GCP3	TUBGCP3	UP:Q96CW5	103571	132	133	Y132-p, Y133-p
324	GDAP2	GDAP2	UP:Q9NXXN4	56225	487	488	Y487-p, Y488-p
325	GK2	GK2	UP:Q14410	60594	315	316	Y315-p, Y316-p
326	GLDN	GLDN	UP:Q6ZMI3	58957	382	383	Y382-p, Y383-p
327	GLT1	SLC1A2	UP:P43004	62104	123	124	Y123-p, Y124-p
328	GLT25D2	GLT25D2	UP:Q8IYK4	72924	541	542	Y541-p, Y542-p
329	GMD	GMDS	UP:Q60547	41950	323	324	Y323-p, Y324-p
330	GNL2	GNL2	UP:Q13823	83655	698	699	Y698-p, Y699-p
331	GNMT	GNMT	UP:Q14749	32742	196	197	Y196-p, Y197-p
332	GNPNAT1	GNPNAT1	UP:Q96EK6	20749	84	85	Y84-p, Y85-p
333	GPD2	GPD2	UP:P43304	80853	600	601	Y600-p, Y601-p
334	GP1bA	GP1BA	UP:P07359	71540	294	295	Y294-p, Y295-p
335	GPR161	GPR161	UP:Q8N6U8	58559	344	345	Y344-p, Y345-p
336	GPR68	GPR68	UP:Q15743	41077	187	188	Y187-p, Y188-p
337	GPSM1	GPSM1	UP:Q86YR5	74510	271	272	Y271-p, Y272-p
338	GRHL1	GRHL1	UP:Q9NZI5	70113	67	68	Y67-p, Y68-p
339	GRHL2	GRHL2	UP:Q6ISB3	71105	70	71	Y70-p, Y71-p
340	GRP94	HSP90B1	UP:P14625	92469	677	678	Y677-p, Y678-p
341	GSE1	GSE1	UP:Q14687	136164	755	756	Y755-p, Y756-p
342	GSE1	GSE1	UP:Q14687	136164	756	757	Y756-p, Y757-p
343	GSK3A	GSK3A	UP:P49840	50981	284	285	Y284-p, Y285-p
344	GSK3B	GSK3B	UP:P49841	46744	221	222	Y221-p, Y222-p
345	GTF2E1	GTF2E1	UP:P29083	49452	91	92	Y91-p, Y92-p
346	GTF2F2	GTF2F2	UP:P13984	28380	196	197	Y196-p, Y197-p
347	GTF2I	GTF2I	UP:P78347	112416	248	249	Y248-p, Y249-p
348	GTF2I iso2	GTF2I	UP:P78347-2	107970	248	249	Y248-p, Y249-p
349	GTSE1	GTSE1	UP:Q9NYZ3	76645	147	148	Y147-p, Y148-p
350	GUK1	GUK1	UP:Q16774	21726	53	54	Y53-p, Y54-p
351	HAUS4	HAUS4	UP:Q9H6D7	42400	182	183	Y182-p, Y183-p
352	HCCS	HCCS	UP:P53701	30602	228	229	Y228-p, Y229-p
353	HEG1	HEG1	UP:Q9ULI3	147461	1330	1331	Y1330-p, Y1331-p
354	HER2	ERBB2	UP:P04626	137911	1221	1222	Y1221-p, Y1222-p
355	HEXIM1	HEXIM1	UP:Q94992	40623	167	168	Y167-p, Y168-p
356	HGD	HGD	UP:Q93099	49964	333	334	Y333-p, Y334-p
357	HIPK1	HIPK1	UP:Q86Z02	130843	357	358	Y357-p, Y358-p
358	HIPK2	HIPK2	UP:Q9H2X6	130966	366	367	Y366-p, Y367-p
359	HIPK4	HIPK4	UP:Q8NE63	69425	392	393	Y392-p, Y393-p
360	HMOX2	HMOX2	UP:P30519	36033	314	315	Y314-p, Y315-p
361	hnRNP 2H9	HNRNPH3	UP:P31942	36926	331	332	Y331-p, Y332-p
362	hnRNP A/B	HNRNPAB	UP:Q99729	36225	300	301	Y300-p, Y301-p
363	hnRNP A2/B1	HNRNPA2B1	UP:P22626	37430	40	41	Y40-p, Y41-p
364	hnRNP C1/C2	HNRNPC	UP:P07910	33670	132	133	Y132-p, Y133-p
365	hnRNP C1/C2 iso2	HNRNPC	UP:P07910-2	32338	119	120	Y119-p, Y120-p
366	hnRNP C1/C2 iso4	HNRNPC	UP:P07910-4	27822	119	120	Y119-p, Y120-p
367	hnRNP L	HNRNPL	UP:P14866	64133	47	48	Y47-p, Y48-p
368	hnRNP R	HNRNPR	UP:Q43390	70943	434	435	Y434-p, Y435-p
369	hnRNP R	HNRNPR	UP:Q43390	70943	435	436	Y435-p, Y436-p
370	hnRNP U	HNRNPU	UP:Q00839	90584	824	825	Y824-p, Y825-p
371	HNRPUL2	HNRNPUL2	UP:Q1KMD3	85105	725	726	Y725-p, Y726-p
372	HNRPUL2	HNRNPUL2	UP:Q1KMD3	85105	726	727	Y726-p, Y727-p
373	HP	HP	UP:P00738	45205	55	56	Y55-p, Y56-p
374	HP	HP	UP:P00738	45205	114	115	Y114-p, Y115-p
375	HP1BP3	HP1BP3	UP:Q55SJ5	61207	288	289	Y288-p, Y289-p
376	HPD	HPD	UP:P32754	44934	295	296	Y295-p, Y296-p
377	HRG	HRG	UP:P04196	59578	67	68	Y67-p, Y68-p
378	Hrs	HGS	UP:Q14964	86192	466	467	Y466-p, Y467-p
379	HSFY1	HSFY2	UP:Q96LI6	45107	175	176	Y175-p, Y176-p

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380	HSP75	TRAP1	UP:Q12931	80110	498	499	Y498-p, Y499-p
381	HSP90A	HSP90AA1	UP:P07900	84660	492	493	Y492-p, Y493-p
382	HSP90A iso2	HSP90AA1	UP:P07900-2	98161	614	615	Y614-p, Y615-p
383	HSP90AA5P	HSP90AA5P	UP:Q58FG0	38738	177	178	Y177-p, Y178-p
384	HSP90B	HSP90AB1	UP:P08238	83264	484	485	Y484-p, Y485-p
385	IGF1R	IGF1R	UP:P08069	154793	1165	1166	Y1165-p, Y1166-p
386	IGF1R	IGF1R	UP:P08069	154793	1280	1281	Y1280-p, Y1281-p
387	IGF2R	IGF2R	UP:P11717	274375	700	701	Y700-p, Y701-p
388	IGF2R	IGF2R	UP:P11717	274375	2024	2025	Y2024-p, Y2025-p
389	IL32	IL32	UP:P24001	26676	107	108	Y107-p, Y108-p
390	ILDR2	ILDR2	UP:Q71H61	71200	477	478	Y477-p, Y478-p
391	ILDR2	ILDR2	UP:Q71H61	71200	565	566	Y565-p, Y566-p
392	InsR	INSR	UP:P06213	156333	1189	1190	Y1189-p, Y1190-p
393	InsR iso2	INSR	UP:P06213-2	155146	1177	1178	Y1177-p, Y1178-p
394	IPMK	IPMK	UP:Q8NFU5	47222	113	114	Y113-p, Y114-p
395	IQGAP1	IQGAP1	UP:P46940	189252	694	695	Y694-p, Y695-p
396	IQGAP2	IQGAP2	UP:Q13576	180578	579	580	Y579-p, Y580-p
397	IQGAP2	IQGAP2	UP:Q13576	180578	611	612	Y611-p, Y612-p
398	IQGAP2	IQGAP2	UP:Q13576	180578	612	613	Y612-p, Y613-p
399	IRS1	IRS1	UP:P35568	131591	46	47	Y46-p, Y47-p
400	IRS2	IRS2	UP:Q9Y4H2	137334	75	76	Y75-p, Y76-p
401	ITCH	ITCH	UP:Q96J02	102803	343	344	Y343-p, Y344-p
402	ITGB4	ITGB4	UP:P16144	202167	920	921	Y920-p, Y921-p
403	ITM1	STT3A	UP:P46977	80530	617	618	Y617-p, Y618-p
404	ITPKC	ITPKC	UP:Q96DU7	75207	456	457	Y456-p, Y457-p
405	JAG2	JAG2	UP:Q9Y219	133367	202	203	Y202-p, Y203-p
406	JAK1	JAK1	UP:P23458	133277	1034	1035	Y1034-p, Y1035-p
407	JAK2	JAK2	UP:O60674	130674	1007	1008	Y1007-p, Y1008-p
408	JAK3	JAK3	UP:P52333	125099	980	981	Y980-p, Y981-p
409	JPH1	JPH1	UP:Q9HDC5	71686	553	554	Y553-p, Y554-p
410	K10	KRT10	UP:P13645	58827	199	200	Y199-p, Y200-p
411	K17	KRT17	UP:Q04695	48106	134	135	Y134-p, Y135-p
412	K19	KRT19	UP:P08727	44106	130	131	Y130-p, Y131-p
413	KA35	KRT39	UP:Q6A163	55651	146	147	Y146-p, Y147-p
414	KBTBD4	KBTBD4	UP:Q9NVX7	58144	350	351	Y350-p, Y351-p
415	KCC1	SLC12A4	UP:Q9UP95	120650	61	62	Y61-p, Y62-p
416	KCNJ2	KCNJ2	UP:P63252	48288	336	337	Y336-p, Y337-p
417	KCTD7	KCTD7	UP:Q96MP8	33132	162	163	Y162-p, Y163-p
418	KDF1	KDF1	UP:Q8NAX2	43642	216	217	Y216-p, Y217-p
419	KHS2	MAP4K3	UP:Q8IVH8	101316	366	367	Y366-p, Y367-p
420	KHSRP	KHSRP	UP:Q92945	73115	625	626	Y625-p, Y626-p
421	KHSRP	KHSRP	UP:Q92945	73115	651	652	Y651-p, Y652-p
422	KIAA0922	KIAA0922	UP:A2VDJ0	179339	1288	1289	Y1288-p, Y1289-p
423	KIAA1033	KIAA1033	UP:Q2M389	136403	405	406	Y405-p, Y406-p
424	KIAA1430	KIAA1430	UP:Q9P2B7	59475	131	132	Y131-p, Y132-p
425	Kidins220	KIDINS220	UP:Q9ULH0	196542	1150	1151	Y1150-p, Y1151-p
426	KIF1A	KIF1A	UP:Q12756	191064	682	683	Y682-p, Y683-p
427	KIFAP3	KIFAP3	UP:Q92845	91205	786	787	Y786-p, Y787-p
428	KIFAP3	KIFAP3	UP:Q92845	91205	787	788	Y787-p, Y788-p
429	Kir4.1	KCNJ10	UP:P78508	42508	8	9	Y8-p, Y9-p
430	KIRREL	KIRREL	UP:Q96J84	83536	605	606	Y605-p, Y606-p
431	KLC2	KLC2	UP:Q9H0B6	68935	345	346	Y345-p, Y346-p
432	KLC2	KLC2	UP:Q9H0B6	68935	346	347	Y346-p, Y347-p
433	KLHDC7A	KLHDC7A	UP:Q5VTJ3	84479	292	293	Y292-p, Y293-p
434	KRTAP20-3	KRTAP20-3	UP:Q3LI60	4909	7	8	Y7-p, Y8-p
435	KRTAP6-1	KRTAP6-1	UP:Q3LI64	7279	69	70	Y69-p, Y70-p
436	KRTCAP2	KRTCAP2	UP:Q8N6L1	14679	106	107	Y106-p, Y107-p
437	Ku70	XRCC6	UP:P12956	69843	7	8	Y7-p, Y8-p
438	Kv1.3	KCNA3	UP:P22001	63842	161	162	Y161-p, Y162-p
439	Kv1.3	KCNA3	UP:P22001	63842	162	163	Y162-p, Y163-p
440	L-plastin	LCP1	UP:P13796	70288	299	300	Y299-p, Y300-p
441	LAB	LAT2	UP:Q9GZY6	26550	118	119	Y118-p, Y119-p
442	LACE1	LACE1	UP:Q8WV93	54845	295	296	Y295-p, Y296-p

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443	LAMA2	LAMA2	UP:P24043	343905	274	275	Y274-p, Y275-p
444	LAMA5	LAMA5	UP:O15230	399737	287	288	Y287-p, Y288-p
445	LAMA5	LAMA5	UP:O15230	399737	288	289	Y288-p, Y289-p
446	LAMB4	LAMB4	UP:A4D0S4	193540	252	253	Y252-p, Y253-p
447	LAMB4	LAMB4	UP:A4D0S4	193540	253	254	Y253-p, Y254-p
448	LAMC1	LAMC1	UP:P11047	177603	273	274	Y273-p, Y274-p
449	LAMC1	LAMC1	UP:P11047	177603	274	275	Y274-p, Y275-p
450	latrophilin 1	LPHN1	UP:O94910	162717	966	967	Y966-p, Y967-p
451	latrophilin 1	LPHN1	UP:O94910	162717	1141	1142	Y1141-p, Y1142-p
452	latrophilin 1	LPHN1	UP:O94910	162717	1440	1441	Y1440-p, Y1441-p
453	latrophilin 2	LPHN2	UP:O95490	163349	1406	1407	Y1406-p, Y1407-p
454	latrophilin 3	LPHN3	UP:Q9HAR2	161812	1411	1412	Y1411-p, Y1412-p
455	LBR	LBR	UP:Q14739	70703	22	23	Y22-p, Y23-p
456	Lck	LCK	UP:P06239	58001	263	264	Y263-p, Y264-p
457	LEF-1	LEF1	UP:Q9UJU2	44201	348	349	Y348-p, Y349-p
458	LEPR	LEPR	UP:P48357	132494	795	796	Y795-p, Y796-p
459	LHPP	LHPP	UP:Q9H008	29165	158	159	Y158-p, Y159-p
460	LIG3	LIG3	UP:P49916	112907	767	768	Y767-p, Y768-p
461	LILRA6	LILRA6	UP:Q6PI73	52399	198	199	Y198-p, Y199-p
462	LIMD1	LIMD1	UP:Q9UGP4	72190	179	180	Y179-p, Y180-p
463	LISCH	LSR	UP:Q86X29	71439	406	407	Y406-p, Y407-p
464	LISCH	LSR	UP:Q86X29	71439	615	616	Y615-p, Y616-p
465	LITAF	LITAF	UP:Q99732	17107	32	33	Y32-p, Y33-p
466	LITAF	LITAF	UP:Q99732	17107	61	62	Y61-p, Y62-p
467	LMAN2L	LMAN2L	UP:Q9H0V9	39711	249	250	Y249-p, Y250-p
468	LMBRD2	LMBRD2	UP:Q68DH5	81172	154	155	Y154-p, Y155-p
469	LMO7	LMO7	UP:Q8WWI1	192696	185	186	Y185-p, Y186-p
470	Lmr3	LMTK3	UP:Q96Q04	153661	296	297	Y296-p, Y297-p
471	LPIN2	LPIN2	UP:Q92539	99399	518	519	Y518-p, Y519-p
472	LPP	LPP	UP:Q93052	65746	296	297	Y296-p, Y297-p
473	LPP	LPP	UP:Q93052	65746	300	301	Y300-p, Y301-p
474	LRIF1	LRIF1	UP:Q5T3J3	84568	697	698	Y697-p, Y698-p
475	LRP2BP	LRP2BP	UP:Q9P2M1	39780	182	183	Y182-p, Y183-p
476	LRRC3B	LRRC3B	UP:Q96PB8	29275	223	224	Y223-p, Y224-p
477	LSD1	KDM1A	UP:O60341	92903	135	136	Y135-p, Y136-p
478	LSM14B	LSM14B	UP:Q9BX40	42071	311	312	Y311-p, Y312-p
479	LTF	LTF	UP:P02788	78182	111	112	Y111-p, Y112-p
480	LTK	LTK	UP:P29376	91681	676	677	Y676-p, Y677-p
481	LTV1	LTV1	UP:Q96GA3	54855	301	302	Y301-p, Y302-p
482	LURAP1L	LURAP1L	UP:Q8IV03	24583	227	228	Y227-p, Y228-p
483	LYAR	LYAR	UP:Q9NX58	43615	340	341	Y340-p, Y341-p
484	Lyn	LYN	UP:P07948	58574	193	194	Y193-p, Y194-p
485	Lyn	LYN	UP:P07948	58574	265	266	Y265-p, Y266-p
486	Lyn iso2	LYN	UP:P07948-2	56033	172	173	Y172-p, Y173-p
487	MAB21L1	MAB21L1	UP:Q13394	40956	15	16	Y15-p, Y16-p
488	MAB21L2	MAB21L2	UP:Q9Y586	40923	15	16	Y15-p, Y16-p
489	MAGE-D2	MAGED2	UP:Q9UNF1	64954	448	449	Y448-p, Y449-p
490	MAGI1	MAGI1	UP:Q96QZ7	164581	376	377	Y376-p, Y377-p
491	MAN2A1	MAN2A1	UP:Q16706	131141	532	533	Y532-p, Y533-p
492	MAP1B	MAP1B	UP:P46821	270634	1336	1337	Y1336-p, Y1337-p
493	MAP1B	MAP1B	UP:P46821	270634	1904	1905	Y1904-p, Y1905-p
494	MAP1B	MAP1B	UP:P46821	270634	1905	1906	Y1905-p, Y1906-p
495	MAP2	MAP2	UP:P11137	199526	592	593	Y592-p, Y593-p
496	MAPKAPK3	MAPKAPK3	UP:Q16644	42987	207	208	Y207-p, Y208-p
497	matrin 3	MATR3	UP:P43243	94623	213	214	Y213-p, Y214-p
498	MBD3	MBD3	UP:O95983	32844	35	36	Y35-p, Y36-p
499	MCM8	MCM8	UP:Q9UJA3	93697	214	215	Y214-p, Y215-p
500	MED1	MED1	UP:Q15648	168478	224	225	Y224-p, Y225-p
501	MEKK3	MAP3K3	UP:Q99759	70898	427	428	Y427-p, Y428-p
502	Mer	MERTK	UP:Q12866	110249	753	754	Y753-p, Y754-p
503	Met	MET	UP:P08581	155541	1234	1235	Y1234-p, Y1235-p
504	METTL25	METTL25	UP:Q8N6Q8	68213	172	173	Y172-p, Y173-p
505	MFI2	MFI2	UP:P08582	80215	207	208	Y207-p, Y208-p
506	MGAM	MGAM	UP:O43451	209852	1172	1173	Y1172-p, Y1173-p

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							Y1173-p
507	MGAM	MGAM	UP:O43451	209852	1685	1686	Y1685-p, Y1686-p
508	MGAT4A	MGAT4A	UP:Q9UM21	61544	255	256	Y255-p, Y256-p
509	MGAT4B	MGAT4B	UP:Q9UQ53	63198	262	263	Y262-p, Y263-p
510	MGAT4C	MGAT4C	UP:Q9UBM8	56061	178	179	Y178-p, Y179-p
511	midasin	MDN1	UP:Q9NU22	632820	3919	3920	Y3919-p, Y3920-p
512	MIF	MIF	UP:P14174	12476	99	100	Y99-p, Y100-p
513	MIG-6	ERRF1	UP:Q9UJM3	50560	394	395	Y394-p, Y395-p
514	MINA	MINA	UP:Q8IUF8	52800	76	77	Y76-p, Y77-p
515	MIPEP	MIPEP	UP:Q99797	80641	632	633	Y632-p, Y633-p
516	MLEC	MLEC	UP:Q14165	32234	199	200	Y199-p, Y200-p
517	MMP20	MMP20	UP:O60882	54387	48	49	Y48-p, Y49-p
518	MMP3	MMP3	UP:P08254	53977	41	42	Y41-p, Y42-p
519	MND1	MND1	UP:Q9BWT6	23753	70	71	Y70-p, Y71-p
520	MOV10	MOV10	UP:Q9HCE1	113671	746	747	Y746-p, Y747-p
521	MRPL4	MRPL4	UP:Q9BYD3	34919	161	162	Y161-p, Y162-p
522	MTSS1	MTSS1	UP:O43312	82251	393	394	Y393-p, Y394-p
523	MUC2	MUC2	UP:Q02817	540300	610	611	Y610-p, Y611-p
524	MuSK	MUSK	UP:Q15146	97056	755	756	Y755-p, Y756-p
525	MYBPC1	MYBPC1	UP:Q00872	128294	823	824	Y823-p, Y824-p
526	MYBPC3	MYBPC3	UP:Q14896	140762	1135	1136	Y1135-p, Y1136-p
527	MYH6	MYH6	UP:P13533	223735	422	423	Y422-p, Y423-p
528	MYO18A	MYO18A	UP:Q92614	233115	904	905	Y904-p, Y905-p
529	MYO1D	MYO1D	UP:O94832	116202	585	586	Y585-p, Y586-p
530	myomesin 3	MYOM3	UP:Q5VTT5	162189	1244	1245	Y1244-p, Y1245-p
531	MYSM1	MYSM1	UP:Q5VVJ2	95032	74	75	Y74-p, Y75-p
532	N-CoR1	NCOR1	UP:O75376	270210	341	342	Y341-p, Y342-p
533	N-CoR1	NCOR1	UP:O75376	270210	477	478	Y477-p, Y478-p
534	NAA10	NAA10	UP:P41227	26459	137	138	Y137-p, Y138-p
535	NAA11	NAA11	UP:Q9BSU3	25979	137	138	Y137-p, Y138-p
536	NAA20	NAA20	UP:P61599	20368	137	138	Y137-p, Y138-p
537	NCL	NCL	UP:P19338	76614	462	463	Y462-p, Y463-p
538	NCoA7	NCOA7	UP:Q8NI08	106162	87	88	Y87-p, Y88-p
539	NCoA7	NCOA7	UP:Q8NI08	106162	525	526	Y525-p, Y526-p
540	NDST1	NDST1	UP:P52848	100868	851	852	Y851-p, Y852-p
541	NDUFA1	NDUFA1	UP:O15239	8072	60	61	Y60-p, Y61-p
542	NDUFB10	NDUFB10	UP:O96000	20777	55	56	Y55-p, Y56-p
543	NDUFB10	NDUFB10	UP:O96000	20777	56	57	Y56-p, Y57-p
544	NEK10	NEK10	UP:Q6ZWH5	133259	590	591	Y590-p, Y591-p
545	NEK6	NEK6	UP:Q9HC98	35714	212	213	Y212-p, Y213-p
546	NEK7	NEK7	UP:Q8TDX7	34551	201	202	Y201-p, Y202-p
547	NFkB-p100	NFKB2	UP:Q00653	96749	325	326	Y325-p, Y326-p
548	NHS	NHS	UP:Q6T4R5	179135	202	203	Y202-p, Y203-p
549	NHS	NHS	UP:Q6T4R5	179135	784	785	Y784-p, Y785-p
550	NICE-4	UBAP2L	UP:Q14157	114535	834	835	Y834-p, Y835-p
551	NICE-4 iso2	UBAP2L	UP:Q14157-1	103930	834	835	Y834-p, Y835-p
552	NIPSNAP1	NIPSNAP1	UP:Q9BPW8	33310	261	262	Y261-p, Y262-p
553	NKTR	NKTR	UP:P30414	165677	414	415	Y414-p, Y415-p
554	NNMT	NNMT	UP:P40261	29574	24	25	Y24-p, Y25-p
555	NNMT	NNMT	UP:P40261	29574	203	204	Y203-p, Y204-p
556	NOL10	NOL10	UP:Q9BSC4	80302	339	340	Y339-p, Y340-p
557	NOT2	CNOT2	UP:Q9NZN8	59738	43	44	Y43-p, Y44-p
558	NPHS2	NPHS2	UP:Q9NP85	42201	194	195	Y194-p, Y195-p
559	NPM-ALK	NPM/ALK	GP:AAA58698	75314	342	343	Y342-p, Y343-p
560	NPY	NPY	UP:P01303	10851	48	49	Y48-p, Y49-p
561	NRK	NRK	UP:Q722Y5	178479	984	985	Y984-p, Y985-p
562	NRP1	NRP1	UP:O14786	103134	353	354	Y353-p, Y354-p
563	NSAP1	SYNCRIP	UP:O60506	69603	431	432	Y431-p, Y432-p
564	NSUN3	NSUN3	UP:Q9H649	38244	113	114	Y113-p, Y114-p
565	NT5C3B	NT5C3B	UP:Q969T7	34389	84	85	Y84-p, Y85-p
566	NTS	NTS	UP:P30990	19795	168	169	Y168-p, Y169-p
567	NTS	NTS	UP:P30990	19795	169	170	Y169-p, Y170-p
568	NUCB2	NUCB2	UP:P80303	50196	53	54	Y53-p, Y54-p
569	NUP155	NUP155	UP:O75694	155199	1084	1085	Y1084-p, Y1085-p
570	OCIAD1	OCIAD1	UP:Q9NX40	27626	128	129	Y128-p, Y129-p
571	ODZ1	TENM1	UP:Q9UKZ4	305011	1239	1240	Y1239-p,

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572	ODZ3	TENM3	UP:Q9P273	300951	1217	1218	Y1217-p, Y1218-p
573	OSAP	MGARP	UP:Q8TDB4	25390	61	62	Y61-p, Y62-p
574	OSBPL3	OSBPL3	UP:Q9H4L5	101224	597	598	Y597-p, Y598-p
575	OSER1	OSER1	UP:Q9NX31	31779	275	276	Y275-p, Y276-p
576	p27Kip1	CDKN1B	UP:P46527	22073	88	89	Y88-p, Y89-p
577	P2X4	P2RX4	UP:Q99571	43369	299	300	Y299-p, Y300-p
578	p300	EP300	UP:Q09472	264161	629	630	Y629-p, Y630-p
579	PAR3-alpha	PARD3	UP:Q8TEW0	151423	377	378	Y377-p, Y378-p
580	PARP14	PARP14	UP:Q460N5	202800	300	301	Y300-p, Y301-p
581	PCAF	KAT2B	UP:Q92831	93013	809	810	Y809-p, Y810-p
582	PCDH1 iso2	PCDH1	UP:Q08174-2	133722	1058	1059	Y1058-p, Y1059-p
583	PCDH8	PCDH8	UP:O95206	113019	1003	1004	Y1003-p, Y1004-p
584	PCDHGA7	PCDHGA7	UP:Q9Y5G6	101722	401	402	Y401-p, Y402-p
585	PCGF2	PCGF2	UP:P35227	37788	205	206	Y205-p, Y206-p
586	PCMTD1	PCMTD1	UP:Q96MG8	40675	41	42	Y41-p, Y42-p
587	PCSK5	PCSK5	UP:Q92824	206942	71	72	Y71-p, Y72-p
588	PDE8A	PDE8A	UP:O60658	93304	290	291	Y290-p, Y291-p
589	PDHA1	PDHA1	UP:P08559	43296	242	243	Y242-p, Y243-p
590	PDHA2	PDHA2	UP:P29803	42933	62	63	Y62-p, Y63-p
591	PDHK1	PDK1	UP:Q15118	49244	243	244	Y243-p, Y244-p
592	PDK1	PDPK1	UP:O15530	63152	485	486	Y485-p, Y486-p
593	PDPR	PDPR	UP:Q8NCN5	99364	109	110	Y109-p, Y110-p
594	PEG10	PEG10	UP:Q86TG7	80173	494	495	Y494-p, Y495-p
595	PERK	EIF2AK3	UP:Q9NZJ5	125216	480	481	Y480-p, Y481-p
596	PERK	EIF2AK3	UP:Q9NZJ5	125216	484	485	Y484-p, Y485-p
597	PEX11A	PEX11A	UP:O75192	28353	127	128	Y127-p, Y128-p
598	PEX11A	PEX11A	UP:O75192	28353	128	129	Y128-p, Y129-p
599	PFDN5	PFDN5	UP:Q99471	17328	90	91	Y90-p, Y91-p
600	PFKFB1	PFKFB1	UP:P16118	54681	242	243	Y242-p, Y243-p
601	PFKL	PFKL	UP:P17858	85018	633	634	Y633-p, Y634-p
602	PGAM2	PGAM2	UP:P15259	28766	132	133	Y132-p, Y133-p
603	PGC	PGC	UP:P20142	42426	371	372	Y371-p, Y372-p
604	PGM2	PGM2	UP:Q96G03	68283	568	569	Y568-p, Y569-p
605	PHF10	PHF10	UP:Q8WUB8	56051	265	266	Y265-p, Y266-p
606	PHF19	PHF19	UP:Q5T6S3	65591	55	56	Y55-p, Y56-p
607	PHF8	PHF8	UP:Q9UUP1	117864	214	215	Y214-p, Y215-p
608	PHF8	PHF8	UP:Q9UUP1	117864	215	216	Y215-p, Y216-p
609	PhLP	PDCL	UP:Q13371	34282	16	17	Y16-p, Y17-p
610	PHLPP	PHLPP1	UP:O60346	184672	1712	1713	Y1712-p, Y1713-p
611	PIGA iso4	PIGA	UP:A8K382	13215	90	91	Y90-p, Y91-p
612	PIK3C2A	PIK3C2A	UP:O00443	190680	900	901	Y900-p, Y901-p
613	PIK3C3	PIK3C3	UP:Q8NEB9	101549	321	322	Y321-p, Y322-p
614	PIK3CB	PIK3CB	UP:P42338	122762	503	504	Y503-p, Y504-p
615	PIK3CB	PIK3CB	UP:P42338	122762	504	505	Y504-p, Y505-p
616	PIK3CD	PIK3CD	UP:O00329	119479	484	485	Y484-p, Y485-p
617	PIK3R4	PIK3R4	UP:Q99570	153103	1290	1291	Y1290-p, Y1291-p
618	PIK4CA	PI4KA	UP:P42356	231319	973	974	Y973-p, Y974-p
619	PIKFYVE	PIKFYVE	UP:Q9Y2I7	237136	1772	1773	Y1772-p, Y1773-p
620	PIWIL4	PIWIL4	UP:Q7Z3Z4	96589	339	340	Y339-p, Y340-p
621	PKACB	PRKACB	UP:P22694	40623	69	70	Y69-p, Y70-p
622	PKCA	PRKCA	UP:P17252	76750	285	286	Y285-p, Y286-p
623	PKG2	PRKG2	UP:Q13237	87432	306	307	Y306-p, Y307-p
624	PLA2G2D	PLA2G2D	UP:Q9UNK4	16546	85	86	Y85-p, Y86-p
625	plakophilin 4	PKP4	UP:Q99569	131868	420	421	Y420-p, Y421-p
626	plakophilin 4	PKP4	UP:Q99569	131868	1115	1116	Y1115-p, Y1116-p
627	plakophilin 4 iso2	PKP4	UP:Q99569-2	127144	420	421	Y420-p, Y421-p
628	plakophilin 4 iso2	PKP4	UP:Q99569-2	127144	1072	1073	Y1072-p, Y1073-p
629	PLCB1	PLCB1	UP:Q9NQ66	138567	1024	1025	Y1024-p, Y1025-p
630	PLCE1	PLCE1	UP:Q9P212	258715	1400	1401	Y1400-p, Y1401-p
631	PLCE1	PLCE1	UP:Q9P212	258715	1401	1402	Y1401-p,

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							Y1402-p
632	pleckstrin	PLEK	UP:P08567	40125	277	278	Y277-p, Y278-p
633	Plectin-1	PLEC	UP:Q15149	531791	4517	4518	Y4517-p, Y4518-p
634	Plectin-1	PLEC	UP:Q15149	531791	4611	4612	Y4611-p, Y4612-p
635	Plectin-1 iso2	PLEC	UP:Q15149-2	518473	4501	4502	Y4501-p, Y4502-p
636	Plectin-1 iso4	PLEC	UP:Q15149-4	516198	4474	4475	Y4474-p, Y4475-p
637	Plectin-1 iso6	PLEC	UP:Q15149-6	516479	4478	4479	Y4478-p, Y4479-p
638	PLEK2	PLEK2	UP:Q9NYT0	39971	332	333	Y332-p, Y333-p
639	PLEKHA6	PLEKHA6	UP:Q9Y2H5	117128	364	365	Y364-p, Y365-p
640	PLEKHA6	PLEKHA6	UP:Q9Y2H5	117128	433	434	Y433-p, Y434-p
641	PLEKHB1	PLEKHB1	UP:Q9UF11	27186	175	176	Y175-p, Y176-p
642	PLEKHH2	PLEKHH2	UP:Q8IVE3	168229	839	840	Y839-p, Y840-p
643	PLK2	PLK2	UP:Q9NYY3	78237	184	185	Y184-p, Y185-p
644	PLPB1	MYT1	UP:Q01538	122329	427	428	Y427-p, Y428-p
645	PLXNA4	PLXNA4	UP:Q9HCM2	212455	1138	1139	Y1138-p, Y1139-p
646	PM20D2	PM20D2	UP:Q8IY51	47776	314	315	Y314-p, Y315-p
647	PMPCB	PMPCB	UP:O75439	54366	141	142	Y141-p, Y142-p
648	POLE	POLE	UP:Q07864	261518	84	85	Y84-p, Y85-p
649	POMT2	POMT2	UP:Q9UKY4	84214	95	96	Y95-p, Y96-p
650	POR	POR	UP:P16435	76690	373	374	Y373-p, Y374-p
651	PPhLN1	PPhLN1	UP:Q8NEY8	52737	52	53	Y52-p, Y53-p
652	PPIP5K2	PPIP5K2	UP:O43314	140407	334	335	Y334-p, Y335-p
653	PPP1R15B	PPP1R15B	UP:Q5SWA1	79152	650	651	Y650-p, Y651-p
654	PPP1R16B	PPP1R16B	UP:Q96T49	63551	536	537	Y536-p, Y537-p
655	PPP1R3B	PPP1R3B	UP:Q86X16	32695	213	214	Y213-p, Y214-p
656	PPP2R5C	PPP2R5C	UP:Q13362	61061	348	349	Y348-p, Y349-p
657	PRDM14	PRDM14	UP:Q9GZV8	64062	29	30	Y29-p, Y30-p
658	PRDM16	PRDM16	UP:Q9HAZ2	140251	193	194	Y193-p, Y194-p
659	PRMT1	PRMT1	UP:Q99873	41516	42	43	Y42-p, Y43-p
660	PROB1	PROB1	UP:E7EW31	106917	891	892	Y891-p, Y892-p
661	PRPF4	PRPF4	UP:O43172	58449	31	32	Y31-p, Y32-p
662	PSMA2	PSMA2	UP:P25787	25899	97	98	Y97-p, Y98-p
663	PSMA6	PSMA6	UP:P60900	27399	159	160	Y159-p, Y160-p
664	PSMB2	PSMB2	UP:P49721	22836	146	147	Y146-p, Y147-p
665	PSMB3	PSMB3	UP:P49720	22949	103	104	Y103-p, Y104-p
666	PSMB4	PSMB4	UP:P28070	29204	222	223	Y222-p, Y223-p
667	PSMB8	PSMB8	UP:P28062	30354	184	185	Y184-p, Y185-p
668	PSMD12	PSMD12	UP:O00232	52904	369	370	Y369-p, Y370-p
669	PSMD8	PSMD8	UP:P48556	39612	315	316	Y315-p, Y316-p
670	PSRC2	ZFC3H1	UP:O60293	226356	1161	1162	Y1161-p, Y1162-p
671	PTEN	PTEN	UP:P60484	47166	176	177	Y176-p, Y177-p
672	PTEN	PTEN	UP:P60484	47166	177	178	Y177-p, Y178-p
673	PTP1B	PTPN1	UP:P18031	49967	152	153	Y152-p, Y153-p
674	PTPRD	PTPRD	UP:P23468	214760	1140	1141	Y1140-p, Y1141-p
675	PTPRF	PTPRF	UP:P10586	212879	450	451	Y450-p, Y451-p
676	PTPRT	PTPRT	UP:O14522	162134	107	108	Y107-p, Y108-p
677	PUS7L	PUS7L	UP:Q9H0K6	80700	428	429	Y428-p, Y429-p
678	PVRL3	PVRL3	UP:Q9NQS3	61002	510	511	Y510-p, Y511-p
679	PYGB	PYGB	UP:P11216	96696	75	76	Y75-p, Y76-p
680	PYGB	PYGB	UP:P11216	96696	84	85	Y84-p, Y85-p
681	PYGB	PYGB	UP:P11216	96696	732	733	Y732-p, Y733-p
682	PYGL	PYGL	UP:P06737	97149	75	76	Y75-p, Y76-p
683	PYGM	PYGM	UP:P11217	97092	84	85	Y84-p, Y85-p
684	PYGM	PYGM	UP:P11217	97092	732	733	Y732-p, Y733-p
685	Pyk2	PTK2B	UP:Q14289	115875	579	580	Y579-p, Y580-p
686	PZP	PZP	UP:P20742	163863	700	701	Y700-p, Y701-p
687	RA70	SKAP2	UP:O75563	41217	151	152	Y151-p, Y152-p
688	Rab14	RAB14	UP:P61106	23897	80	81	Y80-p, Y81-p
689	Rab18	RAB18	UP:Q9NP72	22977	77	78	Y77-p, Y78-p
690	Rab1A	RAB1A	UP:P62820	22678	80	81	Y80-p, Y81-p
691	RAB1B	RAB1B	UP:Q9H0U4	22171	77	78	Y77-p, Y78-p
692	Rab3c	RAB3C	UP:Q96E17	25952	99	100	Y99-p, Y100-p
693	RAB8A	RAB8A	UP:P61006	23668	77	78	Y77-p, Y78-p
694	RAB9A	RAB9A	UP:P51151	22838	107	108	Y107-p, Y108-p

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695	RADIL	RADIL	UP:Q96JH8	117455	350	351	Y350-p, Y351-p
696	RAF1	RAF1	UP:P04049	73052	340	341	Y340-p, Y341-p
697	RAI1	RAI1	UP:Q7Z5J4	203352	50	51	Y50-p, Y51-p
698	RAN	RAN	UP:P62826	24423	146	147	Y146-p, Y147-p
699	Rb-like 1	RBL1	UP:P28749	120847	468	469	Y468-p, Y469-p
700	RBM15B	RBM15B	UP:Q8NDT2	97205	306	307	Y306-p, Y307-p
701	RBM22	RBM22	UP:Q9NW64	46896	116	117	Y116-p, Y117-p
702	RBM22	RBM22	UP:Q9NW64	46896	156	157	Y156-p, Y157-p
703	RBM3	RBM3	UP:P98179	17170	117	118	Y117-p, Y118-p
704	RBM4	RBM4	UP:Q9BWF3	40314	210	211	Y210-p, Y211-p
705	RBM4	RBM4	UP:Q9BWF3	40314	221	222	Y221-p, Y222-p
706	RBMS1	RBMS1	UP:P29558	44505	16	17	Y16-p, Y17-p
707	RC3H1	RC3H1	UP:Q5TC82	125736	592	593	Y592-p, Y593-p
708	RCL1	RCL1	UP:Q9Y2P8	40843	74	75	Y74-p, Y75-p
709	RCOR3	RCOR3	UP:Q9P2K3	55581	126	127	Y126-p, Y127-p
710	RCOR3	RCOR3	UP:Q9P2K3	55581	127	128	Y127-p, Y128-p
711	reelin	RELN	UP:P78509	388388	29	30	Y29-p, Y30-p
712	REL	REL	UP:Q04864	68520	88	89	Y88-p, Y89-p
713	RENT1	UPF1	UP:Q92900	124345	113	114	Y113-p, Y114-p
714	REV3	REV3L	UP:O60673	352776	2984	2985	Y2984-p, Y2985-p
715	RFK	RFK	UP:Q969G6	17623	70	71	Y70-p, Y71-p
716	RFX4	RFX4	UP:Q33E94	83368	129	130	Y129-p, Y130-p
717	RGPD1	RGPD1	UP:P0DJD0	196662	27	28	Y27-p, Y28-p
718	RGPD2	RGPD2	UP:P0DJD1	197308	35	36	Y35-p, Y36-p
719	RGPD3	RGPD3	UP:A6NKT7	197487	36	37	Y36-p, Y37-p
720	RGPD4	RGPD4	UP:Q7Z3J3	197289	36	37	Y36-p, Y37-p
721	RHBDD1	RHBDD1	UP:Q8TEB9	35823	245	246	Y245-p, Y246-p
722	RIAM	APBB1IP	UP:Q7Z5R6	73183	340	341	Y340-p, Y341-p
723	RILPL1	RILPL1	UP:Q5EBL4	47108	322	323	Y322-p, Y323-p
724	RIT1	RIT1	UP:Q92963	25145	169	170	Y169-p, Y170-p
725	RNAseT2	RNASET2	UP:O00584	29481	162	163	Y162-p, Y163-p
726	RNF139	RNF139	UP:Q8WU17	75994	449	450	Y449-p, Y450-p
727	RNF17	RNF17	UP:Q9BXT8	184643	86	87	Y86-p, Y87-p
728	ROCK1	ROCK1	UP:Q13464	158175	603	604	Y603-p, Y604-p
729	ROCK2	ROCK2	UP:O75116	160900	1318	1319	Y1318-p, Y1319-p
730	Ron	MST1R	UP:Q04912	152271	1238	1239	Y1238-p, Y1239-p
731	ROS	ROS1	UP:P08922	263915	2114	2115	Y2114-p, Y2115-p
732	RPL5	RPL5	UP:P46777	34363	30	31	Y30-p, Y31-p
733	RPP40	RPP40	UP:O75818	41834	37	38	Y37-p, Y38-p
734	RPS11	RPS11	UP:P62280	18431	36	37	Y36-p, Y37-p
735	RPS3	RPS3	UP:P23396	26688	166	167	Y166-p, Y167-p
736	RPT3	PSMC4	UP:P43686	47366	111	112	Y111-p, Y112-p
737	RRM1	RRM1	UP:P23921	90070	485	486	Y485-p, Y486-p
738	RTEL1	RTEL1	UP:Q9NZ71	133683	209	210	Y209-p, Y210-p
739	RYR2	RYR2	UP:Q92736	564567	1427	1428	Y1427-p, Y1428-p
740	Sam68	KHDRBS1	UP:Q07666	48227	396	397	Y396-p, Y397-p
741	SAMD4	SAMD4A	UP:Q9UPU9	79415	176	177	Y176-p, Y177-p
742	SAS10	UTP3	UP:Q9NQZ2	54558	43	44	Y43-p, Y44-p
743	SAS10	UTP3	UP:Q9NQZ2	54558	136	137	Y136-p, Y137-p
744	SAT	SAT1	UP:P21673	20024	77	78	Y77-p, Y78-p
745	SCFD1	SCFD1	UP:Q8WVM8	72380	114	115	Y114-p, Y115-p
746	SCGN	SCGN	UP:O76038	32040	208	209	Y208-p, Y209-p
747	SCN10A	SCN10A	UP:Q9Y5Y9	220626	723	724	Y723-p, Y724-p
748	SCN5A	SCN5A	UP:Q14524	226940	1494	1495	Y1494-p, Y1495-p
749	SEC11L3	SEC11C	UP:Q9BY50	21542	31	32	Y31-p, Y32-p
750	SEC13	SEC13	UP:P55735	35541	23	24	Y23-p, Y24-p
751	SEC16A	SEC16A	UP:O15027	233517	1064	1065	Y1064-p, Y1065-p
752	SEC16A iso7	SEC16A	UP:J3KNL6	251894	1242	1243	Y1242-p, Y1243-p
753	SEC16B	SEC16B	UP:Q96JE7	116604	125	126	Y125-p, Y126-p
754	SEL1L3	SEL1L3	UP:Q68CR1	128567	447	448	Y447-p, Y448-p
755	SEMA4A	SEMA4A	UP:Q9H3S1	83574	44	45	Y44-p, Y45-p
756	SEMA4C	SEMA4C	UP:Q9C0C4	92623	736	737	Y736-p, Y737-p
757	SERPINA4	SERPINA4	UP:P29622	48542	63	64	Y63-p, Y64-p
758	SERPINH1	SERPINH1	UP:P50454	46441	245	246	Y245-p, Y246-p



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759	SETD1A	SETD1A	UP:Q15047	186034	179	180	Y179-p, Y180-p
760	SETD2	SETD2	UP:Q9BYW2	287597	427	428	Y427-p, Y428-p
761	SETDB1	SETDB1	UP:Q15047	143157	677	678	Y677-p, Y678-p
762	SF3B1	SF3B1	UP:O75533	145830	38	39	Y38-p, Y39-p
763	SF3B2	SF3B2	UP:Q13435	100228	591	592	Y591-p, Y592-p
764	SF11	SF11	UP:A8K8P3	147664	733	734	Y733-p, Y734-p
765	SFRS10	TRA2B	UP:P62995	33666	221	222	Y221-p, Y222-p
766	SFRS10	TRA2B	UP:P62995	33666	235	236	Y235-p, Y236-p
767	SFRS10	TRA2B	UP:P62995	33666	268	269	Y268-p, Y269-p
768	SFRS2IP	SCAF11	UP:Q99590	164652	1161	1162	Y1161-p, Y1162-p
769	SFRS3	SRSF3	UP:P84103	19330	32	33	Y32-p, Y33-p
770	SFRS7	SRSF7	UP:Q16629	27367	33	34	Y33-p, Y34-p
771	SFRS8	SFSWAP	UP:Q12872	104822	252	253	Y252-p, Y253-p
772	SgK269	PEAK1	UP:Q9H792	193106	1371	1372	Y1371-p, Y1372-p
773	SGSM1	SGSM1	UP:Q2NKQ1	129718	154	155	Y154-p, Y155-p
774	SH2BP1	CTR9	UP:Q6PD62	133502	92	93	Y92-p, Y93-p
775	SH3PXD2B	SH3PXD2B	UP:A1X283	101579	373	374	Y373-p, Y374-p
776	SHARP	SPEN	UP:Q96T58	402248	183	184	Y183-p, Y184-p
777	SHARP	SPEN	UP:Q96T58	402248	632	633	Y632-p, Y633-p
778	Shb	SHB	UP:Q15464	55042	484	485	Y484-p, Y485-p
779	Shc1	SHC1	UP:P29353	62822	349	350	Y349-p, Y350-p
780	Shc1 iso2	SHC1	UP:P29353-2	51611	239	240	Y239-p, Y240-p
781	Shc1 iso3	SHC1	UP:P29353-3	46668	194	195	Y194-p, Y195-p
782	Shc2	SHC2	UP:P98077	61916	338	339	Y338-p, Y339-p
783	Shc3	SHC3	UP:Q92529	64056	341	342	Y341-p, Y342-p
784	Shc3	SHC3	UP:Q92529	64056	379	380	Y379-p, Y380-p
785	Shc3 iso2	SHC3	UP:Q92529-2	51939	218	219	Y218-p, Y219-p
786	Shc3 iso2	SHC3	UP:Q92529-2	51939	256	257	Y256-p, Y257-p
787	Shc4	SHC4	UP:Q655L8	68785	374	375	Y374-p, Y375-p
788	SHE	SHE	UP:Q5VZ18	53950	470	471	Y470-p, Y471-p
789	SHIP-2	INPPL1	UP:O15357	138599	986	987	Y986-p, Y987-p
790	SHP-1	PTPN6	UP:P29350	67561	213	214	Y213-p, Y214-p
791	SHP-2	PTPN11	UP:Q06124	68436	62	63	Y62-p, Y63-p
792	SIN3A	SIN3A	UP:Q96ST3	145175	958	959	Y958-p, Y959-p
793	SKAP55	SKAP1	UP:Q86WV1	41432	141	142	Y141-p, Y142-p
794	SKAP55	SKAP1	UP:Q86WV1	41432	142	143	Y142-p, Y143-p
795	SKAP55	SKAP1	UP:Q86WV1	41432	298	299	Y298-p, Y299-p
796	SKI2W	SKIV2L	UP:Q15477	137755	518	519	Y518-p, Y519-p
797	SKT	KIAA1217	UP:Q5T5P2	214116	244	245	Y244-p, Y245-p
798	SLC15A2	SLC15A2	UP:Q16348	81783	60	61	Y60-p, Y61-p
799	SLC26A2	SLC26A2	UP:P50443	81662	588	589	Y588-p, Y589-p
800	SLC27A1	SLC27A1	UP:Q6PCB7	71108	266	267	Y266-p, Y267-p
801	SLC27A4	SLC27A4	UP:Q6P1M0	72064	263	264	Y263-p, Y264-p
802	SLC35F3	SLC35F3	UP:Q8IY50	46817	115	116	Y115-p, Y116-p
803	SLC38A9	SLC38A9	UP:Q8NBW4	63776	70	71	Y70-p, Y71-p
804	SLC40A1	SLC40A1	UP:Q9NP59	62542	302	303	Y302-p, Y303-p
805	SLC45A4	SLC45A4	UP:Q5BKX6	83878	429	430	Y429-p, Y430-p
806	SLC4A5	SLC4A5	UP:Q9BY07	126255	662	663	Y662-p, Y663-p
807	SLC7A14	SLC7A14	UP:Q8TBB6	84052	730	731	Y730-p, Y731-p
808	SLC9A11	SLC9C2	UP:Q5TAH2	129053	645	646	Y645-p, Y646-p
809	SMC3	SMC3	UP:Q9UQE7	141542	668	669	Y668-p, Y669-p
810	SMG1	SMG1	UP:Q96Q15	410501	2253	2254	Y2253-p, Y2254-p
811	SMG8	SMG8	UP:Q8ND04	109684	141	142	Y141-p, Y142-p
812	SMRT	NCOR2	UP:Q9Y618	274804	332	333	Y332-p, Y333-p
813	SNIP1	SNIP1	UP:Q8TAD8	45778	349	350	Y349-p, Y350-p
814	snRNP C	SNRPC	UP:P09234	17394	37	38	Y37-p, Y38-p
815	SOCS3	SOCS3	UP:O14543	24770	165	166	Y165-p, Y166-p
816	SPANXN2	SPANXN2	UP:Q5MJ10	19917	56	57	Y56-p, Y57-p
817	SPATA13	SPATA13	UP:Q96N96	74820	497	498	Y497-p, Y498-p
818	SPATA17	SPATA17	UP:Q96L03	43499	83	84	Y83-p, Y84-p
819	SPATA17	SPATA17	UP:Q96L03	43499	115	116	Y115-p, Y116-p
820	SPATA2	SPATA2	UP:Q9UM82	58427	242	243	Y242-p, Y243-p
821	SPATA22	SPATA22	UP:Q8NHS9	41318	279	280	Y279-p, Y280-p
822	SPG20	SPG20	UP:Q8N0X7	72833	45	46	Y45-p, Y46-p
823	SPP2	SPP2	UP:Q13103	24338	109	110	Y109-p, Y110-p
824	SPT5	SUPT5H	UP:O00267	121000	140	141	Y140-p, Y141-p
825	Srcasm	TOM1L1	UP:O75674	52989	441	442	Y441-p, Y442-p
826	SSB	SSB	UP:P05455	46837	23	24	Y23-p, Y24-p

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827	SSUH2	SSUH2	UP:Q9Y2M2	39845	328	329	Y328-p, Y329-p
828	STAG1	STAG1	UP:Q8WVM7	144427	896	897	Y896-p, Y897-p
829	STAG2	STAG2	UP:Q8N3U4	141326	892	893	Y892-p, Y893-p
830	STAT5A	STAT5A	UP:P42229	90647	682	683	Y682-p, Y683-p
831	STAT5B	STAT5B	UP:P51692	89866	682	683	Y682-p, Y683-p
832	stomatin	STOM	UP:P27105	31731	123	124	Y123-p, Y124-p
833	STOX1	STOX1	UP:Q6ZVD7	110962	857	858	Y857-p, Y858-p
834	SUGT1	SUGT1	UP:Q9Y2Z0	41024	47	48	Y47-p, Y48-p
835	SV2A	SV2A	UP:Q7L0J3	82695	65	66	Y65-p, Y66-p
836	SV2B	SV2B	UP:Q7L1I2	77444	19	20	Y19-p, Y20-p
837	Syk	SYK	UP:P43405	72066	525	526	Y525-p, Y526-p
838	Syk	SYK	UP:P43405	72066	629	630	Y629-p, Y630-p
839	Syk	SYK	UP:P43405	72066	630	631	Y630-p, Y631-p
840	SYT11	SYT11	UP:Q9BT88	48297	337	338	Y337-p, Y338-p
841	SYTL2 iso17	SYTL2	UP:J3KP28	197903	447	448	Y447-p, Y448-p
842	TAF1	TAF1	UP:P21675	212677	888	889	Y888-p, Y889-p
843	TAF1B	TAF1B	UP:Q53T94	68832	434	435	Y434-p, Y435-p
844	TAK1	MAP3K7	UP:O43318	67196	584	585	Y584-p, Y585-p
845	Talin-1	TLN1	UP:Q9Y490	269767	70	71	Y70-p, Y71-p
846	TANC2	TANC2	UP:Q9HCD6	219650	1725	1726	Y1725-p, Y1726-p
847	TANC2	TANC2	UP:Q9HCD6	219650	1919	1920	Y1919-p, Y1920-p
848	TARBP1	TARBP1	UP:Q13395	181675	1159	1160	Y1159-p, Y1160-p
849	TBC1D10A	TBC1D10A	UP:Q9BXI6	57118	230	231	Y230-p, Y231-p
850	TBC1D2B	TBC1D2B	UP:Q9UPU7	109880	787	788	Y787-p, Y788-p
851	TBC1D5	TBC1D5	UP:Q92609	89004	431	432	Y431-p, Y432-p
852	TBC1D7	TBC1D7	UP:Q9PON9	33972	13	14	Y13-p, Y14-p
853	TCF12	TCF12	UP:Q99081	72965	156	157	Y156-p, Y157-p
854	TCF3	TCF7L1	UP:Q9HCS4	62631	395	396	Y395-p, Y396-p
855	TCF7	TCF7	UP:P36402	41642	318	319	Y318-p, Y319-p
856	TCF7L2	TCF7L2	UP:Q9NQ80	67919	399	400	Y399-p, Y400-p
857	TCP11	TCP11	UP:Q8WVU5	56141	68	69	Y68-p, Y69-p
858	TDRD6	TDRD6	UP:O60522	236517	552	553	Y552-p, Y553-p
859	TDRD7	TDRD7	UP:Q8NHU6	123586	501	502	Y501-p, Y502-p
860	Tel	ETV6	UP:P41212	53000	401	402	Y401-p, Y402-p
861	TF	TF	UP:P02787	77064	533	534	Y533-p, Y534-p
862	TFIP11	TFIP11	UP:Q9UBB9	96820	279	280	Y279-p, Y280-p
863	THEMIS	THEMIS	UP:Q8N1K5	73452	540	541	Y540-p, Y541-p
864	THUMPD3	THUMPD3	UP:Q9BV44	57003	187	188	Y187-p, Y188-p
865	Titin	TTN	UP:Q8WZ42	3816030	18665	18666	Y18665-p, Y18666-p
866	Titin	TTN	UP:Q8WZ42	3816030	18997	18998	Y18997-p, Y18998-p
867	Titin	TTN	UP:Q8WZ42	3816030	19695	19696	Y19695-p, Y19696-p
868	Titin	TTN	UP:Q8WZ42	3816030	19895	19896	Y19895-p, Y19896-p
869	Titin	TTN	UP:Q8WZ42	3816030	22948	22949	Y22948-p, Y22949-p
870	Titin	TTN	UP:Q8WZ42	3816030	24030	24031	Y24030-p, Y24031-p
871	Titin	TTN	UP:Q8WZ42	3816030	24837	24838	Y24837-p, Y24838-p
872	Titin	TTN	UP:Q8WZ42	3816030	26195	26196	Y26195-p, Y26196-p
873	Titin	TTN	UP:Q8WZ42	3816030	27274	27275	Y27274-p, Y27275-p
874	Titin	TTN	UP:Q8WZ42	3816030	28165	28166	Y28165-p, Y28166-p
875	Titin	TTN	UP:Q8WZ42	3816030	29445	29446	Y29445-p, Y29446-p
876	Titin	TTN	UP:Q8WZ42	3816030	31291	31292	Y31291-p, Y31292-p
877	Titin	TTN	UP:Q8WZ42	3816030	31565	31566	Y31565-p, Y31566-p
878	Titin	TTN	UP:Q8WZ42	3816030	31721	31722	Y31721-p, Y31722-p
879	Titin	TTN	UP:Q8WZ42	3816030	32594	32595	Y32594-p, Y32595-p
880	Titin	TTN	UP:Q8WZ42	3816030	33006	33007	Y33006-p,

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							Y33007-p
881	TM9SF2	TM9SF2	UP:Q99805	75776	217	218	Y217-p, Y218-p
882	TM9SF4	TM9SF4	UP:Q92544	74519	188	189	Y188-p, Y189-p
883	TMC6	TMC6	UP:Q7Z403	90045	101	102	Y101-p, Y102-p
884	TMEM119	TMEM119	UP:Q4V9L6	29203	127	128	Y127-p, Y128-p
885	TMEM123	TMEM123	UP:Q8N131	21531	190	191	Y190-p, Y191-p
886	TMPRSS2	TMPRSS2	UP:O15393	53859	44	45	Y44-p, Y45-p
887	TMTC4	TMTC4	UP:Q5T4D3	82991	587	588	Y587-p, Y588-p
888	TPX2	TPX2	UP:Q9ULW0	85653	81	82	Y81-p, Y82-p
889	TRA2A	TRA2A	UP:Q13595	32689	264	265	Y264-p, Y265-p
890	Trap150	THRAP3	UP:Q9Y2W1	108666	880	881	Y880-p, Y881-p
891	TRIM16	TRIM16	UP:O95361	63955	429	430	Y429-p, Y430-p
892	TRIM16L	TRIM16L	UP:Q309B1	40306	213	214	Y213-p, Y214-p
893	TRIM23	TRIM23	UP:P36406	64067	468	469	Y468-p, Y469-p
894	TrkA	NTRK1	UP:P04629	87497	680	681	Y680-p, Y681-p
895	TrkA iso2	NTRK1	UP:P04629-2	86880	674	675	Y674-p, Y675-p
896	TrkB	NTRK2	UP:Q16620	91999	706	707	Y706-p, Y707-p
897	TrkC	NTRK3	UP:Q16288	94428	709	710	Y709-p, Y710-p
898	TRM1L	TRMT1L	UP:Q7Z2T5	81747	426	427	Y426-p, Y427-p
899	TRS85	TRAPPC8	UP:Q9Y2L5	160997	192	193	Y192-p, Y193-p
900	TTC15	TRAPPC12	UP:Q8WVT3	79375	574	575	Y574-p, Y575-p
901	TTC18	TTC18	UP:Q5TON1	125721	529	530	Y529-p, Y530-p
902	TTC8	TTC8	UP:Q8TAM2	61534	261	262	Y261-p, Y262-p
903	TTRAP	TDP2	UP:O95551	40930	157	158	Y157-p, Y158-p
904	TUBB	TUBB	UP:P07437	49671	50	51	Y50-p, Y51-p
905	TUBB2C	TUBB4B	UP:P68371	49831	50	51	Y50-p, Y51-p
906	TULP2	TULP2	UP:O00295	58664	305	306	Y305-p, Y306-p
907	Tyk2	TYK2	UP:P29597	133650	1054	1055	Y1054-p, Y1055-p
908	Tyro3	TYRO3	UP:Q06418	96905	685	686	Y685-p, Y686-p
909	TyroBP	TYROBP	UP:O43914	12179	111	112	Y111-p, Y112-p
910	TyroBP iso2	TYROBP	UP:O43914-2	12108	110	111	Y110-p, Y111-p
911	UBAP2	UBAP2	UP:Q5T6F2	117116	839	840	Y839-p, Y840-p
912	UBR4	UBR4	UP:Q5T4S7	573841	1001	1002	Y1001-p, Y1002-p
913	UBR7	UBR7	UP:Q8N806	47999	422	423	Y422-p, Y423-p
914	UGCGL1	UGGT1	UP:Q9NYU2	177190	98	99	Y98-p, Y99-p
915	UHRF1BP1L	UHRF1BP1L	UP:A0JNW5	164199	362	363	Y362-p, Y363-p
916	UHRF1BP1L	UHRF1BP1L	UP:A0JNW5	164199	772	773	Y772-p, Y773-p
917	UNK	UNK	UP:Q9COB0	88084	236	237	Y236-p, Y237-p
918	UQCRC1	UQCRC1	UP:P31930	52646	131	132	Y131-p, Y132-p
919	URG4	URGCP	UP:Q8TCY9	104987	383	384	Y383-p, Y384-p
920	USP10	USP10	UP:Q14694	87134	159	160	Y159-p, Y160-p
921	USP11	USP11	UP:P51784	109817	607	608	Y607-p, Y608-p
922	USP24	USP24	UP:Q9UPU5	294365	2157	2158	Y2157-p, Y2158-p
923	USP25	USP25	UP:Q9UHP3	122218	69	70	Y69-p, Y70-p
924	USP4	USP4	UP:Q13107	108565	750	751	Y750-p, Y751-p
925	USP40	USP40	UP:Q9NVE5	140130	1156	1157	Y1156-p, Y1157-p
926	USP47	USP47	UP:Q96K76	157311	504	505	Y504-p, Y505-p
927	USP50	USP50	UP:Q70EL3	38955	24	25	Y24-p, Y25-p
928	USP9X	USP9X	UP:Q93008	292280	367	368	Y367-p, Y368-p
929	USP9Y	USP9Y	UP:O00507	291077	368	369	Y368-p, Y369-p
930	UTP11L	UTP11L	UP:Q9Y3A2	30447	67	68	Y67-p, Y68-p
931	VANGL1	VANGL1	UP:Q8TAA9	59975	344	345	Y344-p, Y345-p
932	VANGL2	VANGL2	UP:Q9ULK5	59714	341	342	Y341-p, Y342-p
933	VANGL2	VANGL2	UP:Q9ULK5	59714	342	343	Y342-p, Y343-p
934	VEGFR3	FLT4	UP:P35916	152757	1230	1231	Y1230-p, Y1231-p
935	VPS13B	VPS13B	UP:Q7Z7G8	448664	2100	2101	Y2100-p, Y2101-p
936	VRTN	VRTN	UP:Q9H8Y1	78260	436	437	Y436-p, Y437-p
937	WBP2	WBP2	UP:Q969T9	28087	231	232	Y231-p, Y232-p
938	WBP2	WBP2	UP:Q969T9	28087	252	253	Y252-p, Y253-p
939	WDR49	WDR49	UP:Q8IV35	79295	600	601	Y600-p, Y601-p
940	WNT7B	WNT7B	UP:P56706	39327	140	141	Y140-p, Y141-p
941	WSCD1	WSCD1	UP:Q658N2	65694	382	383	Y382-p, Y383-p
942	XPNPEP2	XPNPEP2	UP:O43895	75625	617	618	Y617-p, Y618-p
943	XRN2	XRN2	UP:Q9H0D6	108582	176	177	Y176-p, Y177-p
944	XXYL1	XXYL1	UP:Q8N8I6	43807	39	40	Y39-p, Y40-p

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945	YB-1	YBX1	UP:P67809	35924	196	197	Y196-p, Y197-p
946	Yes	YES1	UP:P07947	60801	222	223	Y222-p, Y223-p
947	ZAP70	ZAP70	UP:P43403	69872	492	493	Y492-p, Y493-p
948	ZAP70	ZAP70	UP:P43403	69872	597	598	Y597-p, Y598-p
949	ZC3H14	ZC3H14	UP:Q6PJT7	82876	453	454	Y453-p, Y454-p
950	ZC3H18	ZC3H18	UP:Q86VM9	106378	371	372	Y371-p, Y372-p
951	ZDHHC23	ZDHHC23	UP:Q8IYP9	45983	153	154	Y153-p, Y154-p
952	ZNF462	ZNF462	UP:Q96JM2	284688	1725	1726	Y1725-p, Y1726-p
953	ZNF484	ZNF484	UP:Q5JVG2	98221	327	328	Y327-p, Y328-p
954	ZO1	TJP1	UP:Q07157	195459	1354	1355	Y1354-p, Y1355-p
955	ZO2	TJP2	UP:Q9UDY2	133958	1178	1179	Y1178-p, Y1179-p
956	ZP4	ZP4	UP:Q12836	59400	330	331	Y330-p, Y331-p

The information in the table was extracted from the data published in the online database PhosphoSitePlus® ([www.phosphosite.org](http://www.phosphosite.org)), by performing a search for human protein sites containing a pYpY motif.

**Table S2:  $\Delta$  luminescence intensity of  $Tb^{3+}$  in the presence of various analyte\***

Analyte	mean	$\pm$ s.d.
pTApY	195.5	8.7
pYpY	63.2	3.6
pY	5.9	0.1
pTAY	2.0	0.2
pSpS	1.7	0.1
ATP	1.4	0.0
AMP	1.3	0.0
PPi	1.6	0.1

\* this table provides numerical representation of Figure 1B

**Table S3:  $\Delta$  luminescence intensity of  $Tb^{3+}$  in the presence of various analyte combinations\***

$Tb^{3+}$ Concentration	Analyte	$\Delta$ LI	s.d.	$\Delta$ LI (+pTApY) <sup>1</sup>	$\pm$ s.d.	$\Delta$ LI (+pYpY) <sup>1</sup>	$\pm$ s.d.
50 $\mu$ M	pYpY	30.8	1.6	-	-	-	-
	pTApY	65.4	3.0	-	-	-	-
	BSA	1.8	0.6	5.7	1.9	5.4	0.6
	Lysozyme	0.4	0.0	22.3	1.6	9.9	0.3
	Ovalbumin	15.9	0.7	23.5	2.1	15.7	0.7
	D- $\alpha$ -casein	3.6	0.6	10.3	1.1	8.7	1.4
	$\beta$ -casein	0.8	0.1	1.1	0.2	1.3	0.1
200 $\mu$ M	BSA	3.3	1.5	25.2	0.3	16.1	6.5
	Lysozyme	0.5	0.0	55.2	4.2	39.8	3.2

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	Ovalbumin	7.0	1.9	75.0	3.2	39.9	2.7
	D- $\alpha$ -casein	35.7	2.6	75.9	5.0	57.2	3.1
	$\beta$ -casein	3.7	1.4	24.9	3.8	14.6	0.9

<sup>1</sup> 40  $\mu$ M of peptide was added to the solutions of all analytes

\* this table provides numerical representation of the data presented in Figure 2

### **Supplementary notes:**

#### **Supplementary note 1: biophysical experiments**

Bovine serum albumin (BSA), lysozyme, ovalbumin, dephosphorylated  $\alpha$ -casein and  $\beta$ -casein proteins were purchased as lyophilized powders from Sigma Aldrich. TbCl<sub>3</sub> (99.0% purity) was purchased from Sigma Aldrich. HEPES free acid was purchased from BioShop Canada (cat. HEP005). ATP, AMP and PPi were purchased from Sigma Aldrich. All peptides were purchased from CanPeptide at 95 % purity.

Full-length sequences for purchased peptides:

pY = Ac-AYpYAA-NH<sub>2</sub>

pYpY = Ac-ApYpYAA-NH<sub>2</sub>

pSpS = Ac-ApSpSAA-NH<sub>2</sub>

pTAY = Ac-ApTAYA-NH<sub>2</sub>

pTApY = Ac-ApTApYA-NH<sub>2</sub>

**Luminescence experiments:** A Tecan Infinite M1000 microplate reader was used for all solution fluorescence intensity measurements at 100 Hz in black 384 well, flat bottom plates, unless otherwise indicated. For 384 well plates a total sample volume of 60  $\mu$ L was used throughout. All time resolved luminescence measurements were taken at a delay time of 60  $\mu$ s and an integration time of 1.5 ms, unless otherwise indicated. All experiments were performed in 50 mM HEPES, 50 mM NaCl buffer, pH 7.5 in triplicate. Tb<sup>3+</sup> and analytes were incubated for 30 min and following this, samples were excited at 263 nm and luminescence intensity was recorded from 450 to 650 nm or at the analytical emission wavelength of 544 nm with the bandwidth of 20 nm.

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$\Delta$  luminescence intensity represents the ratio of Tb<sup>3+</sup> luminescence intensity in the presence of analytes and in the absence of lanthanides.

All images were acquired upon excitation with a short-wave UV lamp and captured with a digital camera. Images were taken on black 96 well plates with a total sample volume of 300  $\mu$ L.

The following Hill equation was used for fitting titration data:

$$Y = (V_{\max} * X^n) / (k^n + X^n), \text{ where}$$

Y is the observed luminescence intensity;

V max is the maximum luminescence intensity;

X is the concentration of analyte titrated in;

n is the cooperativity coefficient;

k is the apparent dissociation constant.