Table S7. Putative transmembrane proteins of the nuclear envelope

Number	Locus	TM	tested	chromosome loc	Dis Locus	Length	pI	SD-extracted NEs			NaOH-extracted NEs			splice variants	Description	annotationannotationannotationannotationannotation
								pep	spec	seq cov	pep	spec	seq cov			
1	gi|8922358|ref|NP_060531.1|	1		1p13.2		546	10.5	1	2	1.8				a	hypothetical protein FLJ10330 [Homo sapiens]	−1/2 of protein is related to splicing PRP38 family
	gi|23621872|ref|XP_131120.2|	1				542	10.5	1	2	1.8				a	RIKEN cDNA 1110021E09 [Mus musculus]	
	gi|27694972|ref|XP_227591.1|	2				1022	7.7	1	2	1				b first 250 aa same	norvegicus]	for this splice variant, −1/4 is annotated as the PRP38 family
2	gi|25060732|ref|XP_131247.3|	1		1p31		453	11.5	7	26	14.6					RIKEN cDNA 2610019N13 [Mus musculus]	−1/6 of protein is RNA recognition motif
3 [NET3]	gi|28077005|ref|NP_082631.1|	5	targets to NE, triton resistant	1p32.2	Disease	673	8.9	2	5	4	5	5	6.1		RIKEN cDNA 2810475A17 [Mus musculus]	no homology to known proteins or functional domains
	gi|21359924|ref|NP_060557.2|	5				674	9	2	5	4	3	3	3.3		hypothetical protein FLJ10407 [Homo sapiens]	
4 [NET4]	gi|21312110|ref|NP_081113.1|	1	targets to NE and ER	1p34.1	Disease	276	8				1	1	5.1		RIKEN cDNA 1110038M16 [Mus musculus]	no homology to known proteins or functional domains
5	gi|27662674|ref|XP_233684.1|	6		1p36.22	Disease	673	9	3	5	7.9	6	11	7.9	a	norvegicus]	no homology to known proteins or functional domains
	gi|28499527|ref|XP_149561.2|	6				664	9.2	1	1	2	6	11	8	b splice product, whole middle different First 4	similar to SD10769p [Drosophila melanogaster] [Mus musculus]	
6	gi|27663154|ref|XP_233702.1|	1		1p36.23	Disease	676	9.6	1	1	3	1	1	3	a	norvegicus]	no homology to known proteins or functional domains
	gi|21311971|ref|NP_083003.1|	0				671	9.4	1	1	3	1	1	3	b0 have diff exons througout	RIKEN cDNA 4632412I24 [Mus musculus]	but this splice variant has a predicted GTP-binding site
7	gi|23956106|ref|NP_067278.1|	1		1p36.3	Disease	747	6	2	2	2.5					musculus]	no homology to known proteins or functional domains
	gi|27663586|ref|XP_233726.1|	1				752	6.2	2	2	2.5					AF155546 [Mus musculus] [Rattus norvegicus]	
	gi|7661606|ref|NP_056473.1|	2				749	5.5	1	1	1.2					DKFZP564C186 protein [Homo sapiens]	
8 [NET8]	gi|23593471|ref|XM_129651.2|	3	targets to NE, triton resistant	1p36.13-q42.3	Disease	370	8.8							a	gi:26986566 NM_172266 Mus musculus hypothetical protein	−1/4 of protein is acetyltransferase region
	gi|20834508|ref|XP_129651.1|	3				370	8.8	2	3	6.8				a	hypothetical protein LOC226856 [Mus musculus]	
	gi|1503993|ref|D86960.1|	3				370	8.9							a	BC034621 Homo sapiens, similar to KIAA0205 gene product,	
	gi|7661996|ref|NP_055688.1|	3				370	8.9	1	2	3.2				a	KIAA0205 gene product [Homo sapiens]	
	gi|27708562|ref|XP_228902.1|	1				252	9.5	1	1	5.2				b	similar to Hypothetical protein KIAA0205 [Rattus norvegicus]	all related products also have acetyltransferase region
	gi|27708561|ref|XM_228902.1|	1				252	9.5							b	KIAA0205 (LOC317456)	
	gi|27680326|ref|XP_223077.1|	3				654	9.4	2	3	3.8				c	similar to Hypothetical protein KIAA0205 [Rattus norvegicus]	
	gi|27680325|ref|XM_223077.1|	3				654	9.4							c	KIAA0205 LOC305074	
9	gi|27370270|ref|NP_766431.1|	1		1q24.3/1q25.3		502	4.9	2	4	4.8					hypothetical protein A130072J07 [Mus musculus]	this protein is closely related to LAP1 in the last exon, and it
	gi|21450775|ref|NP_659471.1|	1				470	5	1	1	2.1					AF464140 [Homo sapiens]	
	gi|27677474|ref|XP_222761.1|	1				567	4.7	2	4	4.2					similar to AF464140 [Homo sapiens] [Rattus norvegicus]	the rat cDNA contains an additional exon close the the begin
10	gi|27659542|ref|XP_226578.1|	4		1q42.13	Disease	1504	7.5	2	3	1.5					similar to Hypothetical protein KIAA0133 [Rattus norvegicus]	no homology to known proteins or functional domains
11	gi|7705767|ref|NP_057086.1|	1		1q44		428	9.1	1	1	5.4					CGI-49 protein [Homo sapiens]	contains a predicted NAD Rossman fold
	gi|20832116|ref|NP_129627.1|	1				429	8.6	1	1	5.4					RIKEN cDNA C330023F11 [Mus musculus]	
12	gi|20535866|ref|XP_087089.2|	1		2p23.3	Disease	677	5.6	2	2	4.4					similar to KIAA0007 [Homo sapiens]	contains FOG:WD40 repeatscontains FOG:WD40 repeats
	gi|20901019|ref|XP_128762.1|	1				677	5.4	2	2	3					RIKEN cDNA 2610318G08 [Mus musculus]	
13	gi|12859688|ref|BAB31737.1|	1		2q21.1		823	8							a	BAB31737.1 AK019466.1 H [Mus musculus]	contains predicted P-loop, protein was also found in Dreger
	gi|27229251|ref|NP_084221.1|	1				823	8	5	6	8.3	3	4	6.6	a	RIKEN cDNA 4122402O22 [Mus musculus]	
	gi|27665302|ref|XP_221266.1|	1				885	7.8	7	8	12.1	2	2	4.2	b ident to a to 315	norvegicus]	
	gi|8923277|ref|NP_060221.1|	1				798	8	1	1	1.8	1	1	2.4	c distinct from all others except for first 285	hypothetical protein FLJ20297 [Homo sapiens]	
14	gi|27683629|ref|XP_214598.1|	2		2q21.1		319	9.6	1	1	9.1					norvegicus]	contains FOG:WD40 repeatscontains FOG:WD40 repeats
15	gi|30148844|ref|XP_292983.2|	4		2q21.2		717	5.9								similar to Hypothetical protein DKFZp564C186 [Homo sapiens]	contains predicted ATPase domain: note considerable simila
16	gi|27671086|ref|XP_234768.1|	1		2q32.3		754	6	3	3	4.8				a	norvegicus]	several proteins were annotated as "weakly similar to vegeta
	gi|28478908|ref|XP_129726.2|	1				171	5.5	1	1	5.3				b has exon internal, but does not align with DN	RIKEN cDNA 2410118I19 [Mus musculus]	
17	gi|22122411|ref|NP_666084.1|	1		3q13.2	Disease	564	9.9	1	1	3.7					hypothetical protein MGC27931 [Mus musculus]	no homology to known proteins or functional domains
18	gi|9506671|ref|NP_061900.1|	1		4p13-p12		524	6.3	1	1	3.8					RNA-binding protein [Homo sapiens]	protein contains RNA recognition motif
19	gi|29728840|ref|XP_298567.1|	1		4q35.2	Disease	242	10.9	1	1	4.1					hypothetical protein XP_298567 [Homo sapiens]	no homology to known proteins or functional domains
20	gi|9506641|ref|NP_061891.1|	1		5p15.2		356	9.3	1	1	5.3					hypothetical protein FLJ11127 [Homo sapiens]	no homology to known proteins or functional domains
	gi|28482013|ref|XP_127968.2|	1				312	9.4	1	1	6.1					musculus]	
	gi|27688689|ref|XP_226886.1|	1				329	9	1	1	5.8					norvegicus]	
21	gi|28526857|ref|XP_127498.3|	1		5q13.3	Disease	528	8.8	5	5	14.4					expressed sequence AW544865 [Mus musculus]	protein contains WG repeatsprotein contains WG repeats
	gi|27686925|ref|XP_226713.1|	1				528	9.1	5	5	14.4					norvegicus]	
22	gi|7765599|ref|NP_057688.1|	1		5q31	Disease	1417	7.2	1	1	1.3					[Homo sapiens]	protein function is totally unknown, but was noted as being o
23	gi|20877634|ref|XP_128954.1|	3		5q31.3	Disease	378	7.4				1	1	6.1		RIKEN cDNA 2610307O08 [Mus musculus]	no homology to known proteins or functional domains
24	gi|13385678|ref|NP_080446.1|	2		5q35.2	Disease	290	7.1	2	5	8.3					RIKEN cDNA 1200007D18 [Mus musculus]	no homology to known proteins or functional domains
	gi|27668460|ref|XP_213272.1|	1				145	9.3	2	5	16.6				is last half of longer one, they are colinear so	norvegicus]	
25	gi|22122563|ref|NP_666187.1|	1		6p21.31		271	6.7				1	2	3.7	this is C-term half of other	hypothetical protein MGC37253 [Mus musculus]	has LEM domain, but does not align with LAP2, emerin or M
	gi|27498518|ref|XP_166338.3|	1				503	9				2	3	5.6		[Homo sapiens]	
26* [NET26]	gi|13384766|ref|NP_079663.1|	4	targets to NE and ER	6p24.1		112	9.8				1	3	10.5		RIKEN cDNA 1110021D01 [Mus musculus]	has UPF0136 uncharacterized protein family region
27	gi|25071721|ref|XP_125972.3|	1		7p13	Disease	920	7.1	1	1	1.6					RIKEN cDNA 2410117E06 [Mus musculus]	no homology to known proteins or functional domains
28	gi|29734839|ref|XP_291222.1|	3		7p22.3		1882	6.1	1	1	0.8					similar to KIAA1440 protein [Homo sapiens]	no homology to known proteins or functional domains
29	gi|20342491|ref|XP_110572.1|	5		7q11.23		343	8.9				1	1	5		RIKEN cDNA 2010310D06 [Mus musculus]	no homology to known proteins or functional domains
30	gi|28077073|ref|NP_084313.1|	2		7q22		235	8.5	1	1	9.4					RIKEN cDNA 5133401H10 [Mus musculus]	−1/2 of protein is annotated as major sperm protein domain
	gi|27663614|ref|XP_213738.1|	2				235	8.5	1	1	9.4					norvegicus]	
31 [NET31]	gi|14249558|ref|NP_116231.1|	2	targets to NE and ER	7q32.3		561	8.5	6	16	9.1				a	hypothetical protein FLJ14803 [Homo sapiens]	no homology to known proteins or functional domains
	gi|28522840|ref|XP_194313.2|	2	note diff between COS7			561	8.7	14	45	22.6				a	RIKEN cDNA 2700094F01 [Mus musculus]	
	gi|27709446|ref|XP_231568.1|	0	and HeLa cells			377	9.2	12	33	35.5				b0 colinear, but lacks TM exon. Alignment ind	norvegicus]	
32	gi|23956396|ref|NP_705820.1|	1		8p11.2		340	5.5	1	1	3.2					hypothetical protein MGC27952 [Mus musculus]	no homology to known proteins or functional domains
33	gi|22296589|ref|NP_083179.1|	1		8p21.1		491	6.8	1	1	3.1					RIKEN cDNA 4933425F03 [Mus musculus]	−1/4 of protein is similar to scavenger receptor region
	gi|27701294|ref|XP_224299.1|	1				470	6.6	1	1	3.2					[Rattus norvegicus]	
34	gi|27701964|ref|XP_224332.1|	7		8p21.2		721	6.4	1	2	2.6					MGC38539; hypothetical protein, BC021530; cDNA sequence,	protein has homology to a zinc transporter from arabidopsis
35	gi|22122545|ref|NP_666167.1|	1		8p22		181	7.9	1	1	9.9				b has longer splice variant known that lacks T	hypothetical protein MGC7730 [Mus musculus]	two splice variants which are > 4 times larger (gi 24432106 a
36	gi|27718701|ref|XP_235233.1|	2		8q23.2	Disease	305	4.7				1	1	9.5		norvegicus]	no homology to known proteins or functional domains
37	gi|28495681|ref|XP_283952.1|	2		9		716	8.3				1	1	2.1		similar to KIAA1161 protein [Homo sapiens] [Mus musculus]	−2/3 of protein has homology to sugar hydrolases
38	gi|9910440|ref|NP_064382.1|	1		9q22.33		415	8	2	2	5.8					hypothetical protein MNCb-5081 [Mus musculus]	−1/2 of protein is likely glycosyltransferase region
	gi|27714517|ref|XP_232987.1|					415	8	2	2	5.8					[Rattus norvegicus]	
39 [NET39]	gi|14349303|ref|NP_116117.1|	3	targets to NE, triton resistant	9q34.2		201	9.6				1	1	10		hypothetical protein MGC12921 [Homo sapiens]	−1/2 of protein has phosphatase region similarity
40	gi|27735125|ref|NP_775961.1|	2		9q34.11		629	8.5	1	1	3.3					hypothetical protein FLJ36664 [Homo sapiens]	no homology to known proteins or functional domains
	gi|28485292|ref|XP_130243.2|	1				606	8.6	1	1	3.5					RIKEN cDNA A930041I02 gene [Mus musculus]	
	gi|27707228|ref|XP_231194.1|	1				471	6	1	1	4.5					norvegicus]	
41	gi|20860640|ref|XP_125636.1|	2		10q22.2		568	7.2	1	1	4.4					RIKEN cDNA 1300019N10 [Mus musculus]	no homology to known proteins or functional domains
42	gi|27370264|ref|NP_766428.1|	1		10q25.1		721	8.5	1	1	3.1					hypothetical protein 4832416E03 [Mus musculus]	contains von Willebrand factor type A/ EGF-like domains
43	gi|23346561|ref|NP_694766.1|	1		11p13		1024	8.3	1	1	1.5				a	hypothetical protein MGC25461 [Mus musculus]	contains predicted ATPase and acetyltransferase regions
	gi|27703111|ref|XP_230334.1|	2				530	8.6	2	3	7.2				b start is at 530 in the long one, but only 21	[Rattus norvegicus]	
44	gi|21311845|ref|NP_080922.1|	3		11p15.5	Disease	323	9.1	3	5	14.9					RIKEN cDNA 1300006L01 [Mus musculus]	−2/3 of protein has mitochondrial carrier protein region simila
	gi|27680997|ref|XP_219484.1|	2				291	8.5	2	3	8.9					norvegicus]	
45	gi|20149621|ref|NP_056348.2|	1		11q12.2		575	7.5	1	1	3.7					DKFZP586B1621 protein [Homo sapiens]	−1/2 of protein is DAG kinase-like and 1/2 is similar to phosp
	gi|21703976|ref|NP_663471.1|	1				578	6.9	1	1	3.6					similar to DKFZP586B1621 protein [Mus musculus]	
46	gi|27734797|ref|NP_775857.1|	6		11q12.3		322	5.7				1	1	2.2		hypothetical protein MGC34821 [Homo sapiens]	protein is annotated as being similar to a sugar transporter, b
47	gi|20884659|ref|NP_129087.1|	7		11q13		399	8.6				3	3	5.3		RIKEN cDNA 3110041O18 [Mus musculus]	this protein is similar to C14 sterol reductase which is a funct
48	gi|11024686|ref|NP_060634.1|	1		12p11.23	Disease	706	6.8	1	1	1.6				a	hypothetical protein FLJ10637 [Homo sapiens]	no homology to known proteins or functional domains
	gi|20270295|ref|NP_620096.1|	1				732	6.9	1	1	1.5				b note Align program finds no match	hypothetical protein MGC28965 [Mus musculus]	
49	gi|23956360|ref|NP_705798.1|	1		12q24.33		516	6.7	1	1	2.1					hypothetical protein MGC28606 [Mus musculus]	−1/5 of protein is CBF/Mak21 family region
50	gi|27665688|ref|XP_234304.1|	2		14q23.1	Disease	462	7.2	1	1	5.2					similar to CGI-86 protein [Homo sapiens] [Rattus norvegicus]	−1/2 of protein is annotated as short chain dehydrogenases
51 [NET51]	gi|10946822|ref|NP_067421.1|	3	targets to NE, triton resistant	14q24.3	Disease	140	9.9				2	2	11.4		open reading frame 11 [Mus musculus]	protein is related to an uncharacterized protein family
	gi|27667056|ref|XP_216756.1|	3				140	9.9				2	2	11.4		norvegicus]	
	gi|6005719|ref|NP_009107.1|	3				140	9.8				1	1	5		chromosome 14 open reading frame 1 [Homo sapiens]	
52	gi|29736045|ref|XP_027330.4|	1		14q24.3	Disease	706	6.7	11	23	15.2	1	1	2.1	a	sapiens]	no homology to known proteins or functional domains
	gi|23956206|ref|NP_081625.1|	0				240	8.8	10	21	32.1				b0, lacks TM exon	RIKEN cDNA 2610015J01 [Mus musculus]	
53	gi|27369682|ref|NP_766088.1|	1		14q32.2	Disease	895	6.4				1	1	1.5		musculus]	protein contains spectrin repeats and SMC regions (which ki
54	gi|27717295|ref|XP_234559.1|	4		14q32.33	Disease	1546	6.7	1	2	0.7	2	6	1.4		norvegicus]	−1/3 has homology to RNA methylases and −2/3 to helicase
55	gi|21492616|ref|NP_080950.1|	6		15q21.3		258	8				1	1	6.6		RIKEN cDNA 0610008A10 [Mus musculus]	annotated as likely ortholog of pharynx defective (celegans);
56** [NET56]	gi|23956160|ref|NP_080293.1|	1	targets to NE, triton resistant	17p13		244	9.8	1	5	9					Dullard homolog [Mus musculus]	**********
	gi|27672973|ref|XP_213339.1|	0				111	8.2	1	5	19.8				shorter one is C-term part, are colinear	similar to Dullard homolog [Mus musculus] [Rattus norvegicus]	
	gi|7661722|ref|NP_056158.1|	1				244	9.8	1	5	9					likely ortholog of Xenopus dullard [Homo sapiens]	
57	gi|27690880|ref|XP_221193.1|	1		17q25.3		2342	8.4	1	1	0.9					similar to FLJ00039 protein [Homo sapiens] [Rattus norvegicus]	protein contains predicted Zn finger RING, ubiquitin ligase, a
58	gi|29743162|ref|XP_292696.1|	1		18q23		669	8.2				1	1	2.1		similar to KIAA1689 protein [Homo sapiens]	no homology to known proteins or functional domains

59	gi|27717667|ref|XP_234929.1|	3		19p13.3		709	6.7	1	3	2					norvegicus]	~1/15 of protein has predicted aminopeptidase region
60	gi|11034845|ref|NP_067038.1|	0		20q11.21-q12		326	6	1	2	4.6					chromosome 20 open reading frame 77 [Homo sapiens] chromosome 20 open reading frame 77 [Homo sapiens]	
	gi|28488213|ref|XP_130605.4|	0				326	6	1	2	4.6					RIKEN cDNA 2610304G08 [Mus musculus] RIKEN cDNA 2610304G08 [Mus musculus]	
	gi|27704394|ref|XP_230798.1|	1				414	6.2	1	2	3.6					similar to Protein C20orf77 homolog [Rattus norvegicus]	~1/4 of protein is domain of proteins involved in regulation of
	gi|21450083|ref|NP_659110.1|	0				312	7.6	1	2	4.8					hypothetical protein MGC36325 [Mus musculus] hypothetical protein MGC36325 [Mus musculus]	
	gi|21361709|ref|NP_060640.2|	0				312	7.5	1	2	4.8					hypothetical protein FLJ10656; cyclin-dependent kinase inhibitor-related protein [Homo sapiens]	
61	gi|27670274|ref|XP_221669.1|	2		21q22.11		2282	6.9	5	9	3				a	similar to Hypothetical protein KIAA0539 [Rattus norvegicus]	no homology to known proteins or functional domains
	gi|28496556|ref|XP_128377.3|	0				992	8.1	1	1	1.2				b0 lacks TM exon	similar to Hypothetical protein KIAA0539 [Mus musculus]	
62	gi|27663300|ref|XP_235527.1|	1		22q13.31		380	8.1	1	1	9.2					norvegicus]	protein contains similarity to both S-malonyl and acyl transfe
63	gi|27721269|ref|XP_243957.1|	1		no hum homolog		699	9.3				1	1	3		hypothetical protein XP_243957 [Rattus norvegicus]	no homology to known proteins or functional domains
64	gi|20886081|ref|XP_150109.1|	2		no hum homolog		157	9.8	1	1	15.9					RIKEN cDNA A330008L17 gene [Mus musculus]	no homology to known proteins or functional domains
65	gi|20844230|ref|XP_163618.1|	1		no hum homolog		120	9.6				1	1	16.7		hypothetical protein XP_163618 [Mus musculus]	contains RNA recognition motif
66	gi|20866411|ref|XP_137321.1|	1		no hum homolog		257	9	1	1	5.8					similar to Inner nuclear membrane protein Man1 [Mus musculus]	has LEM domain, but does not align with LAP2, emerin or M
67	gi|28522903|ref|XP_285910.1|	1		no hum homolog		602	5.9	1	1	3					hypothetical protein XP_285910 [Mus musculus]	no homology to known proteins or functional domains

* note: this protein initially passed all selection criteria; however when the dataset was reanalyzed after cloning and testing for targeting to the NE, one peptide was also detected in the MM fraction

** during the course of our study a paper was published (27) showing a function for this protein, now called dullard, in neural development in C. elegans. However, the intracellular localization of the protein was not investigated.

TM The number of transmembrane segments predicted using TMPred with a minimum score of 1000 in one orientation and 1900 in both. These score limitations were based on an average to match those of the previously characterized NE proteins.

pep the number of peptides detected in NaOH-extrated and salt- and detergent-extracted NEs

spec spectrum matches

seq cov the percentage of the total protein sequence covered by peptide matches

the peptide/ spectrum matches passed all the SEQUEST and PEP_PROBE criteria defined in Table 1.