

Additional File 2

Additional file 2 provides detailed descriptions of the 408 manually-curated housekeeping genes.

Transcription Pre-initiation Complex (PIC) – 40 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
TFIID	TBP	<i>TBP</i>	6908	NM_003194
	Transcription initiation factor TFIID 250 kDa subunit	<i>TAF1</i>	6872	NM_138923
	Transcription initiation factor TFIID 135 kDa subunit	<i>TAF4</i>	6874	NM_003185
	Transcription initiation factor TFIID 105 kDa subunit	<i>TAF4B</i>	6875	NM_005640
	Transcription initiation factor TFIID 100 kDa subunit	<i>TAF5</i>	6877	NM_006951
	Transcription initiation factor TFIID 70 kDa subunit	<i>TAF6</i>	6878	NM_005641
	Transcription initiation factor TFIID 55 kDa subunit	<i>TAF7</i>	6879	NM_005642
	Transcription initiation factor TFIID 31 kDa subunit	<i>TAF9</i>	6880	NM_001015892
	Transcription initiation factor TFIID 30 kDa subunit	<i>TAF10</i>	6881	NM_006284
	Transcription initiation factor TFIID 28 kDa subunit	<i>TAF11</i>	6882	NM_005643
	Transcription initiation factor TFIID 20/15 kDa subunit	<i>TAF12</i>	6883	NM_005644
	Transcription initiation factor TFIID 18 kDa subunit	<i>TAF13</i>	6884	NM_005645
	TFIIB	TFIIB	<i>GTF2B</i>	2959
TFIIA	Transcription Factor IIA alpha chain - p35	<i>GTF2A1</i>	2957	NM_015859
	Transcription Factor IIA beta chain - p19	<i>GTF2A1</i>	2957	NM_015859
	Transcription initiation factor IIA gamma chain	<i>GTF2A2</i>	2958	NM_004492
RNA Pol II	RNA Pol II (unphosphorylated) largest subunit	<i>POLR2A</i>	5430	NM_000937
	DNA-directed RNA polymerase II 140 kDa polypeptide	<i>POLR2B</i>	5431	NM_000938
	DNA-directed RNA polymerase II 33 kDa polypeptide	<i>POLR2C</i>	5432	NM_032940
	DNA-directed RNA polymerase II 16 kDa polypeptide	<i>POLR2D</i>	5433	NM_004805
	HsRPABC1	<i>POLR2E</i>	5434	NM_002695
	HsRPABC2	<i>POLR2F</i>	5435	NM_021974
	DNA-directed RNA polymerase II 19 kDa polypeptide	<i>POLR2G</i>	5436	NM_002696
	DNA-directed RNA polymerases I, II, and III 17.1 kDa polypeptide	<i>POLR2H</i>	5437	NM_006232
	DNA-directed RNA polymerase II 14.5 kDa polypeptide	<i>POLR2I</i>	5438	NM_006233
	DNA-directed RNA polymerase II 13.3 kDa polypeptide	<i>POLR2J</i>	5439	NM_006234
	DNA-directed RNA polymerases I, II, and III 7.0 kDa polypeptide	<i>POLR2K</i>	5440	NM_005034
	HsRPABC5	<i>POLR2L</i>	5441	NM_021128
TFIIF	Transcription initiation factor IIF, alpha subunit	<i>GTF2F1</i>	2962	NM_002096
	Transcription initiation factor IIF, beta subunit	<i>GTF2F2</i>	2963	NM_004128
TFIIE	Transcription initiation factor IIE, alpha subunit	<i>GTF2E1</i>	2960	NM_005513
	Transcription initiation factor IIE, beta subunit	<i>GTF2E2</i>	2961	NM_002095
TFIIH	(CAK) Cdk7	<i>CDK7</i>	1022	NM_001799
	(CAK) Cyclin H	<i>CCNH</i>	902	NM_001239
	(CAK) MAT1	<i>MNAT1</i>	4331	NM_002431
	XPD protein	<i>ERCC2</i>	2068	NM_000400
	XPB protein	<i>ERCC3</i>	2071	NM_000122
	TFIIH basal transcription factor complex p62 subunit	<i>GTF2H1</i>	2965	NM_005316
	BTF2-p44 (TFIIH component)	<i>GTF2H2</i>	2966	NM_001515
	BTF2-p34 (TFIIH component)	<i>GTF2H3</i>	2967	NM_001516
BTF2-p52 (TFIIH component)	<i>GTF2H4</i>	2968	NM_001517	

Transcription Elongation Complex – 17 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
FCP1P	FCP1P protein	<i>CTDP1</i>	9150	NM_004715
DSIF	SPT4H1 protein	<i>SUPT4H1</i>	6827	NM_003168
	SUPT5H protein	<i>SUPT5H</i>	6829	NM_003169
NELF	NELF-A protein	<i>WHSC2</i>	7469	NM_005663
	NELF-B protein	<i>RP13-122B23.3</i>	25920	NM_015456
	NELF-C/D protein	<i>TH1L</i>	51497	NM_198976
	RD protein	<i>RDBP</i>	7936	NM_002904
P-TEFb	Cyclin T1	<i>CCNT1</i>	904	NM_001240
	Cyclin T2	<i>CCNT2</i>	905	NM_058241
	Cdk 9 protein	<i>CDK9</i>	1025	NM_001261
TFIIS	TFIIS protein	<i>TCEA1</i>	6917	NM_201437
ELL	RNA polymerase II elongation factor ELL	<i>ELL</i>	8178	NM_006532
FACT complex	FACT 80 kDa subunit	<i>SSRP1</i>	6749	NM_003146
	FACT 140 kDa subunit	<i>SUPT16H</i>	11198	NM_007192
Elongin complex	Elongin B protein	<i>TCEB1</i>	6921	NM_005648
	Elongin C protein	<i>TCEB2</i>	6923	NM_007108
	Elongin A1 protein	<i>TCEB3</i>	6924	NM_003198

Essential Splicing Factor – 31 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
U2AF	U2AF 35 kDa subunit	<i>U2AF1</i>	7307	NM_006758
	U2AF 65 kDa subunit	<i>U2AF2</i>	11338	NM_007279
Splicing factors	SF2/ASF/SFRS1	<i>SFRS1</i>	6426	NM_006924
	SR2 / SC35	<i>SFRS2</i>	6427	NM_003016
	SRp20	<i>SFRS3</i>	6428	NM_003017
	SR4 / SRp75	<i>SFRS4</i>	6429	NM_005626
	SRp40	<i>SFRS5</i>	6430	NM_006925
	SRp55	<i>SFRS6</i>	6431	NM_006275
	SR7/ 9G8 protein	<i>SFRS7</i>	6432	NM_001031684
	SR9 / SRp30	<i>SFRS9</i>	8683	NM_003769
	SR 11/ p54	<i>SFRS11</i>	9295	NM_004768
	SF1/BBP (Branch binding protein)	<i>SF1</i>	7536	NM_201998
	SURP 2, G patch protein	<i>SF4</i>	57794	NM_172231
	DDX9/NDH II	<i>DHX9</i>	1660	NM_001357
	FUS - RNA binding protein/TLS	<i>FUS</i>	2521	NM_004960
	YB-1	<i>YBX1</i>	4904	NM_004559
	FLJ10839 DNA-binding protein	<i>CCAR1</i>	55749	NM_018237
	RBM 5	<i>RBM5</i>	10181	NM_005778
	E1B-AP5 nucleocytoplasmic transport protein	<i>HNRPUL1</i>	11100	NM_007040
	CD2BP2 - GYF	<i>CD2BP2</i>	10421	NM_006110
	SMC1 (BAA11495)	<i>SMC1A</i>	8243	NM_006306
	THOC4(Aly/Ref)	<i>THOC4</i>	10189	NM_005782
	SRm160	<i>SRRM1</i>	10250	NM_005839
	RNPS1	<i>RNPS1</i>	10921	NM_006711
	NFX.1	<i>NFX1</i>	4799	NM_002504
	hPrp16	<i>DHX38</i>	9785	NM_014003
	hPrp17	<i>CDC40</i>	51362	NM_015891
	SPF31 (Dna J)	<i>DNAJC8</i>	22826	NM_014280
hUpf3B	<i>UPF3B</i>	65109	NM_023010	
Magoh-Y14 complex	magoh	<i>MAGOH</i>	4116	NM_002370
	RBM8A/Y14	<i>RBM8A</i>	9939	NM_005105

hnRNP – 18 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
hnRNP	hnRNP A0	<i>HNRPA0</i>	10949	NM_006805
	hnRNP A1	<i>HNRPA1</i>	3178	NM_031157
	hnRNP A2	<i>HNRPA2B1</i>	3181	NM_031243
	hnRNP A3	<i>HNRPA3</i>	220988	NM_194247
	hnRNP C1/C2	<i>HNRPC</i>	3183	NM_001077442
	hnRNP D0	<i>HNRPD</i>	3184	NM_031370
	hnRNP F	<i>HNRPF</i>	3185	NM_004966
	hnRNP G	<i>RBMX</i>	27316	NM_002139
	hnRNP H	<i>HNRPH1</i>	3187	NM_005520
	hnRNP H'	<i>HNRPH2</i>	3188	NM_001032393
	hnRNP I	<i>PTBP1</i>	5725	NM_031991
	hnRNP K	<i>HNRPK</i>	3190	NM_031262
	hnRNP L	<i>HNRPL</i>	3191	NM_001533
	hnRNP M	<i>HNRPM</i>	4670	NM_005968
	hnRNP R	<i>HNRPR</i>	10236	NM_005826
	hnRNP U	<i>HNRPU</i>	3192	NM_004501
hnRNP-E1	<i>PCBP1</i>	5093	NM_006196	
hnRNP-E2	<i>PCBP2</i>	5094	NM_005016	

U1, U2, U4, U5, U6, U11, U12 snRNP – 32 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
snRNP core proteins	Sm Protein B	<i>SNRPB</i>	6628	NM_198216
	Sm protein D1	<i>SNRPD1</i>	6632	NM_006938
	Sm protein D2	<i>SNRPD2</i>	6633	NM_004597
	Sm protein D3	<i>SNRPD3</i>	6634	NM_004175
	Sm protein E	<i>SNRPE</i>	6635	NM_003094
	Sm protein F	<i>SNRPF</i>	6636	NM_003095
	Sm protein G	<i>SNRPG</i>	6637	NM_003096
U1 snRNP specific protein	U1 - 70K protein	<i>SNRP70</i>	6625	NM_003089
	U1 - A protein	<i>SNRPA</i>	6626	NM_004596
	U1 - C protein	<i>SNRPC</i>	6631	NM_003093
U2 snRNP specific protein	U2 A' protein	<i>SNRPA1</i>	6627	NM_003090
	U2 B' protein	<i>SNRPB2</i>	6629	NM_003092
	SAP 114 (Splicing factor 3A subunit 1)	<i>SF3A1</i>	10291	NM_005877
	SAP 60 (splicing factor 3A subunit2)	<i>SF3A2</i>	8175	NM_007165
	SAP 61 (Splicing factor 3A subunit 3)	<i>SF3A3</i>	10946	NM_006802
	SAP155	<i>SF3B1</i>	23451	NM_012433
	SAP 145/ SF3b	<i>SF3B2</i>	10992	NM_006842
	SAP130	<i>SF3B3</i>	23450	NM_012426
	SAP49	<i>SF3B4</i>	10262	NM_005850
	Splicing factor 3B subunit 5	<i>SF3B5</i>	83443	NM_031287
	p14 branch site protein	<i>SF3B14</i>	51639	NM_016047
	SF3b14b	<i>PHF5A</i>	84844	NM_032758
U4:U5:U6 tri-snRNP specific protein	tri-snRNP 15.5 kDa protein	<i>NHP2L1</i>	4809	NM_005008
	hPrp4	<i>PRPF4</i>	9128	NM_004697
	Sm-like protein LSM2	<i>LSM2</i>	57819	NM_021177
	DIM1	<i>TXNL4A</i>	10907	NM_006701
	U5-40 kDa protein	<i>WDR57</i>	9410	NM_004814
	U5-100 kDa protein	<i>DDX23</i>	9416	NM_004818
	U5-102 kDa protein	<i>PRPF6</i>	24148	NM_012469
	U5-116 kDa protein	<i>EFTUD2</i>	9343	NM_004247
	U5-200kDa helicase	<i>ASCC3L1</i>	23020	NM_014014
	hPrp8	<i>PRPF8</i>	10594	NM_006445

Capping Related Genes – 5 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
RPT and GT	mRNA capping enzyme	<i>RNGTT</i>	8732	NM_003800
SPT5	Spt5 (suppressor of Ty 5 homolog)	<i>SUPT5H</i>	6829	NM_003169
MT	RNA (guanine-7-) methyltransferase	<i>RNMT</i>	8731	NM_003799
Cap-binding complex	CBP80	<i>NCBP1</i>	4686	NM_002486
	CBP20	<i>NCBP2</i>	22916	NM_007362

Cleavage and Polyadenylation Complex – 13 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
CPSF	CPSF1	<i>CPSF1</i>	29894	NM_013291
	CPSF2	<i>CPSF2</i>	53981	NM_017437
	CPSF3	<i>CPSF3</i>	51692	NM_016207
	CPSF4 - 30 kDa subunit	<i>CPSF4</i>	10898	NM_006693
CSTF	CSTF 50 kDa subunit	<i>CSTF1</i>	1477	NM_001324
	CSTF 64 kDa subunit	<i>CSTF2</i>	1478	NM_001325
	CSTF 77 kD subunit	<i>CSTF3</i>	1479	NM_001326
CF I	CF I - 25 kDa subunit	<i>NUDT21</i>	11051	NM_007006
	CF I - 59 kDa subunit	<i>FLJ12529</i>	79869	NM_024811
CF II	CF II - Clp1	<i>CLP1</i>	10978	NM_006831
	CF II - PCF11	<i>PCF11</i>	51585	NM_015885
Poly(A) polymerase	Poly(A) polymerase alpha	<i>PAPOLA</i>	10914	NM_032632
Poly(A) binding protein	PABPN1	<i>PABPN1</i>	8106	NM_004643

Nuclear Pore Complex (NPC) – 29 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
Nuclear pore complexes (NPC)	Nup107 [nuclear envelope]	<i>NUP107</i>	57122	NM_020401
	Nup133 [nuclear envelope]	<i>NUP133</i>	55746	NM_018230
	Nup153 [nucleoplasm]	<i>NUP153</i>	9972	NM_005124
	Nup155 [nuclear envelope]	<i>NUP155</i>	9631	NM_004298
	Nup160 [nuclear envelope]	<i>NUP160</i>	23279	NM_015231
	Nup188 [nuclear envelope]	<i>NUP188</i>	23511	NM_015354
	Nup205 [nuclear envelope]	<i>NUP205</i>	23165	NM_015135
	Gp210 [nuclear envelope]	<i>NUP210</i>	23225	NM_024923
	Nup214 [cytosol]	<i>NUP214</i>	8021	NM_005085
	Nup35 [nuclear envelope]	<i>NUP35</i>	129401	NM_138285
	Nup37 [nuclear envelope]	<i>NUP37</i>	79023	NM_024057
	Nup43 [nuclear envelope]	<i>NUP43</i>	348995	NM_198887
	Nup50 [nucleoplasm]	<i>NUP50</i>	10762	NM_007172
	Nup54 [nuclear envelope]	<i>NUP54</i>	53371	NM_017426
	Nup62 [nuclear envelope]	<i>NUP62</i>	23636	NM_012346
	Nup75 [nuclear envelope]	<i>NUP85</i>	79902	NM_024844
	Nup88 [cytosol]	<i>NUP88</i>	4927	NM_002532
	Nup93 [nuclear envelope]	<i>NUP93</i>	9688	NM_014669
	Nup96 [nuclear envelope]	<i>NUP98</i>	4928	NM_139131
	Nup98 [nuclear envelope]	<i>NUP98</i>	4928	NM_005387
	Nup58 [nuclear envelope]	<i>NUPL1</i>	9818	NM_014089
	Nup45 [nuclear envelope]	<i>NUPL1</i>	9818	NM_014089
	NLP1/CG1 [cytosol]	<i>NUPL2</i>	11097	NM_007342
	ALADIN [nuclear envelope]	<i>AAAS</i>	8086	NM_015665
	POM121 [nuclear envelope]	<i>POM121</i>	9883	NM_172020
	Rae1/Gle2 [nuclear envelope]	<i>RAE1</i>	8480	NM_003610
	Nup358 [cytosol]	<i>RANBP2</i>	5903	NM_006267
	Seh1 [nuclear envelope]	<i>SEH1L</i>	81929	NM_031216
	Tpr [nucleoplasm]	<i>TPR</i>	7175	NM_003292

Translation Initiation, Elongation, and Termination Factor – 37 genes

General Description	Reactome Description	Symbol	GeneID	RefSeq Acc
eIF1	eIF1	<i>EIF1</i>	10209	NM_005801
eIF1A	eIF1A	<i>EIF1AX</i>	1964	NM_001412
eIF2 subunit complex	eIF2-alpha	<i>EIF2S1</i>	1965	NM_004094
	eIF2-alpha	<i>EIF2S2</i>	8894	NM_003908
	eIF2-gamma	<i>EIF2S3</i>	1968	NM_001415
eIF2B subunits complex	eIF2B-alpha	<i>EIF2B1</i>	1967	NM_001414
	eIF2B-beta	<i>EIF2B2</i>	8892	NM_014239
	eIF2B-gamma	<i>EIF2B3</i>	8891	NM_020365
	eIF2B-delta	<i>EIF2B4</i>	8890	NM_015636
	eIF2B-epsilon	<i>EIF2B5</i>	8893	NM_003907
eIF3 subunit complex	eIF3-alpha	<i>EIF3S1</i>	8669	NM_003758
	eIF3-beta	<i>EIF3S2</i>	8668	NM_003757
	eIF3-gamma	<i>EIF3S3</i>	8667	NM_003756
	eIF3-delta	<i>EIF3S4</i>	8666	NM_003755
	eIF3-epsilon	<i>EIF3S5</i>	8665	NM_003754
	eIF3e	<i>EIF3S6</i>	3646	NM_001568
	eIF3-zeta	<i>EIF3S7</i>	8664	NM_003753
	eIF3c	<i>EIF3S8</i>	8663	NM_003752
	eIF3-eta	<i>EIF3S9</i>	8662	NM_003751
	eIF3-theta	<i>EIF3S10</i>	8661	NM_003750
	eIF3k	<i>EIF3S12</i>	27335	NM_013234
eIF4F	eIF4A-I	<i>EIF4A1</i>	1973	NM_001416
	eIF4A-II	<i>EIF4A2</i>	1974	NM_001967
	eIF4E	<i>EIF4E</i>	1977	NM_001968
	4E-BP	<i>EIF4EBP1</i>	1978	NM_004095
	eIF4G	<i>EIF4G1</i>	1981	NM_004953
	eIF4B	<i>EIF4B</i>	1975	NM_001417
	eIF4H	<i>EIF4H</i>	7458	NM_022170
	eIF5	<i>EIF5</i>	1983	NM_001969
	eIF5B	<i>EIF5B</i>	9669	NM_015904
eEF1A	eEF1A	<i>EEF1A1</i>	1915	NM_001402
eEF2	eEF2	<i>EEF2</i>	1938	NM_001961
eEF1B subunit complex	eEF1B alpha	<i>EEF1B2</i>	1933	NM_001959
	eEF1B beta	<i>EEF1D</i>	1936	NM_032378
	eEF1B gamma	<i>EEF1G</i>	1937	NM_001404
eRF1	Eukaryotic peptide chain release factor subunit 1	<i>ETF1</i>	2107	NM_004730
eRF3	eRF3	<i>GSPT2</i>	23708	NM_018094

tRNA Synthetase – 20 genes

General Description	Description	Symbol	GeneID	RefSeq Acc
	alanyl-tRNA synthetase	AARS	16	NM_001605
	cysteinyI-tRNA synthetase	CARS	833	NM_139273
	aspartyl-tRNA synthetase	DARS	1615	NM_001349
	glutamyl-prolyl-tRNA synthetase	EPRS	2058	NM_004446
	phenylalanyl-tRNA synthetase, alpha subunit	FARSA	2193	NM_004461
	phenylalanyl-tRNA synthetase, beta subunit	FARSB	10056	NM_005687
	glycyl-tRNA synthetase	GARS	2617	NM_002047
	histidyl-tRNA synthetase	HARS	3035	NM_002109
	isoleucyl-tRNA synthetase	IARS	3376	NM_002161
	lysyl-tRNA synthetase	KARS	3735	NM_005548
	leucyl-tRNA synthetase	LARS	51520	NM_020117
	methionyl-tRNA synthetase	MARS	4141	NM_004990
	asparaginyI-tRNA synthetase	NARS	4677	NM_004539
	glutaminyl-tRNA synthetase	QARS	5859	NM_005051
	arginyl-tRNA synthetase	RARS	5917	NM_002887
	seryl-tRNA synthetase	SARS	6301	NM_006513
	threonyl-tRNA synthetase	TARS	6897	NM_152295
	valyl-tRNA synthetase	VARS	7407	NM_006295
	tryptophanyl-tRNA synthetase	WARS	7453	NM_004184
	tyrosyl-tRNA synthetase	YARS	8565	NM_003680

Cytosolic Ribosome – 82 genes

General Description	Reactome Description	Symbol	GenelD	RefSeq Acc	
40S ribosomal complex	40S small ribosomal protein 2	RPS2	6187	NM_002952	
	40S small ribosomal protein 3	RPS3	6188	NM_001005	
	40S small ribosomal protein 3A	RPS3A	6189	NM_001006	
	40S small ribosomal protein 4	RPS4X	6191	NM_001007	
	40S small ribosomal protein 4Y	RPS4Y1	6192	NM_001008	
	40S small ribosomal protein 5	RPS5	6193	NM_001009	
	40S small ribosomal protein 6	RPS6	6194	NM_001010	
	40S small ribosomal protein 7	RPS7	6201	NM_001011	
	40S small ribosomal protein 8	RPS8	6202	NM_001012	
	40S small ribosomal protein 9	RPS9	6203	NM_001013	
	40S small ribosomal protein 10	RPS10	6204	NM_001014	
	40S small ribosomal protein 11	RPS11	6205	NM_001015	
	40S small ribosomal protein 12	RPS12	6206	NM_001016	
	40S small ribosomal protein 13	RPS13	6207	NM_001017	
	40S small ribosomal protein 14	RPS14	6208	NM_005617	
	40S small ribosomal protein 15	RPS15	6209	NM_001018	
	40S small ribosomal protein 1A	RPS15A	6210	NM_001019	
	40S small ribosomal protein 16	RPS16	6217	NM_001020	
	40S small ribosomal protein 17	RPS17	6218	NM_001021	
	40S small ribosomal protein 18	RPS18	6222	NM_022551	
	40S small ribosomal protein 19	RPS19	6223	NM_001022	
	40S small ribosomal protein 20	RPS20	6224	NM_001023	
	40S small ribosomal protein 21	RPS21	6227	NM_001024	
	40S small ribosomal protein 23	RPS23	6228	NM_001025	
	40S small ribosomal protein 24	RPS24	6229	NM_001026	
	40S small ribosomal protein 25	RPS25	6230	NM_001028	
	40S small ribosomal protein 26	RPS26	6231	NM_001029	
	40S small ribosomal protein 27	RPS27	6232	NM_001030	
	40S small ribosomal protein 27A	RPS27A	6233	NM_002954	
	40S small ribosomal protein 28	RPS28	6234	NM_001031	
	40S small ribosomal protein 29	RPS29	6235	NM_001032	
	40S small ribosomal protein 30	FAU	2197	NM_001997	
	40S small ribosomal protein P4	RPSA	3921	NM_002295	
	60S ribosomal complex	60S acidic ribosomal protein P0	RPLP0	6175	NM_001002
		60S acidic ribosomal protein P1	RPLP1	6176	NM_001003
		60S acidic ribosomal protein P2	RPLP2	6181	NM_001004
		60S ribosomal protein L3	RPL3	6122	NM_000967
		60S ribosomal protein L3-like	RPL3L	6123	NM_005061
60S ribosomal protein L4		RPL4	6124	NM_000968	
60S ribosomal protein L5		RPL5	6125	NM_000969	
60S ribosomal protein L6		RPL6	6128	NM_000970	
60S ribosomal protein L7		RPL7	6129	NM_000971	
60S ribosomal protein L7a		RPL7A	6130	NM_000972	
60S ribosomal protein L8		RPL8	6132	NM_000973	
60S ribosomal protein L9		RPL9	6133	NM_000661	
60S ribosomal protein L10		RPL10	6134	NM_006013	
60S ribosomal protein L10a		RPL10A	4736	NM_007104	
60S ribosomal protein L11		RPL11	6135	NM_000975	
60S ribosomal protein L12		RPL12	6136	NM_000976	
60S ribosomal protein L13		RPL13	6137	NM_000977	
60S ribosomal protein L13a		RPL13A	23521	NM_012423	
60S ribosomal protein L14		RPL14	9045	NM_003973	
60S ribosomal protein L15		RPL15	6138	NM_002948	
60S ribosomal protein L17		RPL17	6139	NM_000985	
60S ribosomal protein L18		RPL18	6141	NM_000979	
60S ribosomal protein L18a		RPL18A	6142	NM_000980	
60S ribosomal protein L19		RPL19	6143	NM_000981	
60S ribosomal protein L21		RPL21	6144	NM_000982	
60S ribosomal protein L22		RPL22	6146	NM_000983	
60S ribosomal protein L23		RPL23	9349	NM_000978	
60S ribosomal protein L23a		RPL23A	6147	NM_000984	
60S ribosomal protein L24		RPL24	6152	NM_000986	
60S ribosomal protein L26		RPL26	6154	NM_000987	
60S ribosomal protein L26-like 1		RPL26L1	51121	NM_016093	
60S ribosomal protein L27		RPL27	6155	NM_000988	
60S ribosomal protein L27a		RPL27A	6157	NM_000990	
60S ribosomal protein L28		RPL28	6158	NM_000991	
60S ribosomal protein L29		RPL29	6159	NM_000992	
60S ribosomal protein L30		RPL30	6156	NM_000989	
60S ribosomal protein L31		RPL31	6160	NM_000993	
60S ribosomal protein L32		RPL32	6161	NM_000994	
60S ribosomal protein L34		RPL34	6164	NM_000995	
60S ribosomal protein L35		RPL35	11224	NM_007209	
60S ribosomal protein L35a		RPL35A	6165	NM_000996	
60S ribosomal protein L36		RPL36	25873	NM_015414	
60S ribosomal protein L44	RPL36A	6173	NM_021029		
60S ribosomal protein L37	RPL37	6167	NM_000997		
60S ribosomal protein L37a	RPL37A	6168	NM_000998		
60S ribosomal protein L38	RPL38	6169	NM_000999		
60S ribosomal protein L39	RPL39	6170	NM_001000		
60S ribosomal protein L41	RPL41	6171	NM_001035267		
60S ribosomal protein L40	UBA52	7311	NM_003333		

Ubiquitin Mediated Proteolysis – 45 genes

General Description	Description	Symbol	GeneID	RefSeq Acc
	cell division cycle 20 homolog (<i>S. cerevisiae</i>)	CDC20	991	NM_001255
	cell division cycle 27 homolog (<i>S. cerevisiae</i>)	CDC27	996	NM_001256
	cell division cycle 34 homolog (<i>S. cerevisiae</i>)	CDC34	997	NM_004359
	neural precursor cell expressed, developmentally down-regulated 4	NEDD4	4734	NM_006154
	S-phase kinase-associated protein 1A (p19A)	SKP1A	6500	NM_006930
	S-phase kinase-associated protein 2 (p45)	SKP2	6502	NM_005983
	transcription elongation factor B (SIII), polypeptide 1 (15kDa, elongin C)	TCEB1	6921	NM_005648
	transcription elongation factor B (SIII), polypeptide 2 (18kDa, elongin B)	TCEB2	6923	NM_007108
	ubiquitin-activating enzyme E1 (A1S9T and BN75 temperature sensitivity complementing)	UBE1	7317	NM_003334
	ubiquitin-conjugating enzyme E2D 1 (UBC4/5 homolog, yeast)	UBE2D1	7321	NM_003338
	ubiquitin-conjugating enzyme E2D 2 (UBC4/5 homolog, yeast)	UBE2D2	7322	NM_003339
	ubiquitin-conjugating enzyme E2D 3 (UBC4/5 homolog, yeast)	UBE2D3	7323	NM_003340
	ubiquitin-conjugating enzyme E2E 1 (UBC4/5 homolog, yeast)	UBE2E1	7324	NM_003341
	ubiquitin-conjugating enzyme E2E 2 (UBC4/5 homolog, yeast)	UBE2E2	7325	NM_152653
	von Hippel-Lindau tumor suppressor	VHL	7428	NM_000551
	cullin 3	CUL3	8452	NM_003590
	cullin 2	CUL2	8453	NM_003591
	cullin 1	CUL1	8454	NM_003592
	cell division cycle 23 homolog (<i>S. cerevisiae</i>)	CDC23	8697	NM_004661
	cell division cycle 16 homolog (<i>S. cerevisiae</i>)	CDC16	8881	NM_003903
	hect domain and RLD 2	HERC2	8924	NM_004667
	hect (homologous to the E6-AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1	HERC1	8925	NM_003922
	beta-transducin repeat containing	BTRC	8945	NM_003939
	ring-box 1	RBX1	9978	NM_014248
	anaphase promoting complex subunit 10	ANAPC10	10393	NM_014885
	ubiquitin-conjugating enzyme E2E 3 (UBC4/5 homolog, yeast)	UBE2E3	10477	NM_006357
	WW domain containing E3 ubiquitin protein ligase 1	WWP1	11059	NM_007013
	WW domain containing E3 ubiquitin protein ligase 2	WWP2	11060	NM_007014
	ubiquitin-conjugating enzyme E2C	UBE2C	11065	NM_007019
	F-box and WD repeat domain containing 11	FBXW11	23291	NM_012300
	neural precursor cell expressed, developmentally down-regulated 4-like	NEDD4L	23327	NM_015277
	anaphase promoting complex subunit 2	ANAPC2	29882	NM_013366
	anaphase promoting complex subunit 4	ANAPC4	29945	NM_013367
	fizzy/cell division cycle 20 related 1 (<i>Drosophila</i>)	FZR1	51343	NM_016263
	ubiquitin protein ligase E3 component n-recogin 5	UBR5	51366	NM_015902
	anaphase promoting complex subunit 5	ANAPC5	51433	NM_016237
	anaphase promoting complex subunit 7	ANAPC7	51434	NM_016238
	APC11 anaphase promoting complex subunit 11 homolog (yeast)	ANAPC11	51529	NM_016476
	ubiquitin-conjugating enzyme E2D 4 (putative)	UBE2D4	51619	NM_015983
	ubiquitin-conjugating enzyme E2R 2	UBE2R2	54926	NM_017811
	F-box and WD repeat domain containing 7	FBXW7	55294	NM_033632
	SMAD specific E3 ubiquitin protein ligase 1	SMURF1	57154	NM_020429
	anaphase promoting complex subunit 1	ANAPC1	64682	NM_022662
	SMAD specific E3 ubiquitin protein ligase 2	SMURF2	64750	NM_022739
	itchy homolog E3 ubiquitin protein ligase (mouse)	ITCH	83737	NM_031483

Proteasome – 43 genes

General Description	Description	Symbol	GeneID	RefSeq Acc
	proteasome subunit, alpha type, 1	PSMA1	5682	NM_002786
	proteasome subunit, alpha type, 2	PSMA2	5683	NM_002787
	proteasome subunit, alpha type, 3	PSMA3	5684	NM_002788
	proteasome subunit, alpha type, 4	PSMA4	5685	NM_002789
	proteasome subunit, alpha type, 5	PSMA5	5686	NM_002790
	proteasome subunit, alpha type, 6	PSMA6	5687	NM_002791
	proteasome subunit, alpha type, 7	PSMA7	5688	NM_002792
	proteasome subunit, alpha type, 8	PSMA8	143471	NM_001025096
	proteasome subunit, beta type, 1	PSMB1	5689	NM_002793
	proteasome subunit, beta type, 2	PSMB2	5690	NM_002794
	proteasome subunit, beta type, 3	PSMB3	5691	NM_002795
	proteasome subunit, beta type, 4	PSMB4	5692	NM_002796
	proteasome subunit, beta type, 5	PSMB5	5693	NM_002797
	proteasome subunit, beta type, 6	PSMB6	5694	NM_002798
	proteasome subunit, beta type, 7	PSMB7	5695	NM_002799
	proteasome subunit, beta type, 8	PSMB8	5696	NM_004159
	proteasome subunit, beta type, 9	PSMB9	5698	NM_002800
	proteasome subunit, beta type, 10	PSMB10	5699	NM_002801
	proteasome 26S subunit, ATPase, 1	PSMC1	5700	NM_002802
	proteasome 26S subunit, ATPase, 2	PSMC2	5701	NM_002803
	proteasome 26S subunit, ATPase, 3	PSMC3	5702	NM_002804
	proteasome 26S subunit, ATPase, 4	PSMC4	5704	NM_006503
	proteasome 26S subunit, ATPase, 5	PSMC5	5705	NM_002805
	proteasome 26S subunit, ATPase, 6	PSMC6	5706	NM_002806
	proteasome 26S subunit, non-ATPase, 1	PSMD1	5707	NM_002807
	proteasome 26S subunit, non-ATPase, 2	PSMD2	5708	NM_002808
	proteasome 26S subunit, non-ATPase, 3	PSMD3	5709	NM_002809
	proteasome 26S subunit, non-ATPase, 4	PSMD4	5710	NM_002810
	proteasome 26S subunit, non-ATPase, 5	PSMD5	5711	NM_005047
	proteasome 26S subunit, non-ATPase, 6	PSMD6	9861	NM_014814
	proteasome 26S subunit, non-ATPase, 7	PSMD7	5713	NM_002811
	proteasome 26S subunit, non-ATPase, 8	PSMD8	5714	NM_002812
	proteasome 26S subunit, non-ATPase, 9	PSMD9	5715	NM_002813
	proteasome 26S subunit, non-ATPase, 10	PSMD10	5716	NM_002814
	proteasome 26S subunit, non-ATPase, 11	PSMD11	5717	NM_002815
	proteasome 26S subunit, non-ATPase, 12	PSMD12	5718	NM_002816
	proteasome 26S subunit, non-ATPase, 13	PSMD13	5719	NM_002817
	proteasome 26S subunit, non-ATPase, 14	PSMD14	10213	NM_005805
	proteasome activator subunit 1	PSME1	5720	NM_006263
	proteasome activator subunit 2	PSME2	5721	NM_002818
	proteasome activator subunit 3	PSME3	10197	NM_005789
	proteasome activator subunit 4	PSME4	23198	NM_014614
	proteasome inhibitor subunit 1	PSMF1	9491	NM_006814