Gene: NF1 - Sequence: NG\_009018.1 Transcript: NM\_000267.3 - Protein: NP\_000258.1 Date : March 2, 2015

$1^{st}$ line: Base numbering. Full stops for intronic $+/-$ 5, 10, 15 $2^{nd}$ line: Base sequence. lower case Introns, upper case Exons $3^{rd}$ line: Amino acid sequence. Printed on FIRST base of codon $4^{th}$ line: Amino acid numbering. Numbered on $1^{st}$ and increments of 10
Exon 1   Start: 4951   End: 5393   Length: 442
gcatgcgcggcaggccgccttccctctcgcttccccctttcccagccgcgctctc
-379  -369  -359  -349  -339  -329 AATCTCTAGCTCGCTCCCCTCTCCCCGGGCCGTGGAAAGGATCCCACTTCCGGTG
-319  -309  -299  -289  -279  -269 GGGTGTCATGGCGGCGTCTCGGACTGTGATGGCTGTGGGGAGACGGCGCTAGTGGGGAGA
-259  -249  -239  -229  -219  -209 GCGACCAAGAGGCCCCTCCCCTCCCCGGGTCCCCTTCCCCTATCCCCCTCCCCCAGCC
-199  -189  -179  -169  -159  -149 TCCTTGCCAACGCCCCTTTCCCTCTCCCCCTCCCGCTCGGCGCTGACCCCCCATCCCCA
-139  -129  -119  -109  -99  -89 CCCCCGTGGGAACACTGGGAGCCTGCACTCCACAGACCCTCTCCTTGCCTCTCCCTCAC
-79  -69  -59  -49  -39  -29   CTCAGCCTCCGCCCCCCCCCCCCCCCCCCCCCCCCCCCC

-19	-9	1	1	.1	21	31	
CGCCCCCGGC	CGCGGGGAGGA	CATGGCC	CGCGCAC	CAGGCCG	GTGGAAT	GGGTCCAGG	CCG
		M A   1	А Н	R P '	V E W	V Q A  11	V
41 TGGTCAGCCGCT VSRI		AGgtaaco	eggeeeç	gtggcgg	gcgggag	· gtgggagcg	• gag
· · tgggggtgggga		 .gagggga				· cccgcggct	gcc
· · tcaggctctgga	· · aggaaaggaag					taagtgggg	gtg
· · · gccaaggcggga		 .aggaggg				accetttee	ctc
· · ctaagtcgggg	· · · ggtgggcctt			cctccga		tccccttta	tcc
	 cttqqaaatqq	•					

Exon 2   Start: 66007   End: 66150   Length: 143													
tatttatggtcgtttttaaggataagctgttaacgtgtttttttt													
61  71  81  91  101  111  CTTCCAATAAAAACAGGACAGCAGAACACACATACCAAAGTCAGTACTGAGCACAACAAG L P I K T G Q Q N T H T K V S T E H N K  21  31													
121  131  141  151  161  171 GAATGTCTAATCAATATTTCCAAATACAAGTTTTCTTTGGTTATAAGCGGCCTCACTACT E C L I N I S K Y K F S L V I S G L T T  41  51													
181  191  201													
ttctgtggactttggatataaccattaatcttattttgtttacgagcacagataaccttt													
taattttattttgtcaaatttttaatcagctgggttttagattcagtgagcacaagtaac													
tgtaactttcattttaatttatttcccttagaaacatctcctatcttttgtgaccat													
gtctccttttccagtatgtttctt													

Exon 3   S	start:	69034	End:	69117	l Ler	ngth:	83		
 tggtacaggt	 .ctatat	gtgtgtc	ctaaat	cctaca	tattt	ctaaaq	gcatga	· lagcaa	• laacag
catcttttac	· · ·: tgttac	aaggtta	aatggc	agacto	:taataa	aatgc	cattto	ctgttt	gcctt
agactttagt	· · ·	gaggatt	Laggat	aaaatc	• :agaaat	taatat	cattta	wagtat	agtat
aatctgggag									.gatgt
gtgttgattg	· · · gtagca	• gaaagto	gaaact	aacttt	tatgtt	cctgaa	atatct	tttct	gttag
211 AGAATATTTC R I F G  71	GAGAAG	221 CTGCTG <i>F</i> . A E	AAAAA	ATTTAT	ATCTC	CTCAC	GTTGAT		TGGAT
271 ACACTGGAAA T L E K	AATGTC	TTGCTG	GGgtaa	· · · gtaaat	tgatct	Etaagt	• caggca	uggctt	tgtga
atttgatctt	gagaat	gatctta	atgtcc	· . caaagt	• .acagat	Egtgga	accaaç	gaggac	agtcc
. tatggacttt	tgtctg	agacata	ataaat	 atgagt	· tttgtt	taatat	tagcto	gacctg	Igtgac
. agacaatttt	tcatga				tgtaaa			attaa	
cttataaaat	gttatg	tttcago	ccacgt	 atctgt	ctctca	aggttt	Ettago	gaaaat	atttt
atgaagagat	.cactat	ttgattt	ca						

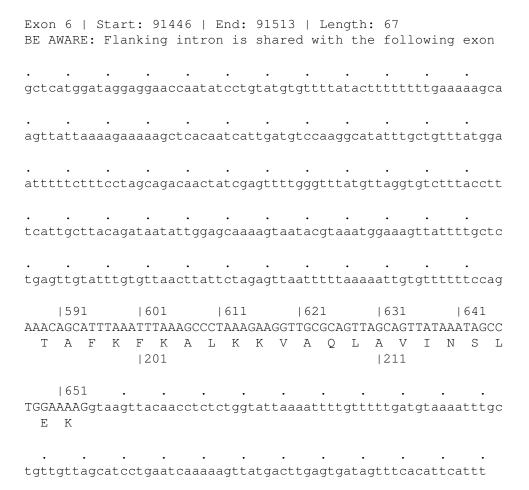
Exon 4   Start: 73210   End: 73400   Length: 190
291  301  311  321  331  341  CAACCAAAGGACACAATGAGATTAGATGAAACGATGCTGGTCAAACAGTTGCTGCCAGAA Q P K D T M R L D E T M L V K Q L L P E
101
351   361   371   381   391   401   ATCTGCCATTTTCTTCACACCTGTCGTGAAGGAAACCAGCATGCAGCTGAACTTCGGAAT
I C H F L H T C R E G N Q H A A E L R N
411  421  431  441  451  461 TCTGCCTCTGGGGTTTTATTTTCTCTCAGCTGCAACAACTTCAATGCAGTCTTTAGTCGC
S A S G V L F S L S C N N F N A V F S R  141  151
$\mid$ 471 $\:$
tgagacaagttcttttgcccctcacagcagctttgacctcccaggcttaggtgatcctcc
tacctcagcctccagagaaatgagtttgtctgggcttgcgtagaaattttatgcattaat

 $\verb|atctttgacattttaattgcgtaatattgtgatattgatatgtgcaattaaataagagca|$ 

. . .

ctgttatgaat

Exon	5	Sta	rt:	799	915	1	End	: 8	0021	-	Ler	ngtl	1:	106				
· gctga	agt <i>a</i>	acag	tggi	tgt	gato	cac	agc	tca <sup>.</sup>	ttgc	cag	ctto	caaa	act <sup>.</sup>	tcta	agg	ctca	aag	aga
tcctc	ctc	cctt	agc	ctc	ctga	agt	agc	tgg	gcct	·	aggt	:gt	gtg	ccat	ca	tgc	·	gct
aattt	ttgt	tatt	ttt1	ttta	agaq	gat	gat	gtc <sup>.</sup>	ttgc	cta	tgtt	.gc	cca	ggct	· gg	tct	Ega	act
cctgg	cct	caag	tggl	tcct							aagt				·	aggt	:gt	gag
· atacc	acad	cctg	tcc	ccta	aata	act	taa	ttt:	gat <i>a</i>	nag	ttaa	attt	.tg	gttt	ttt	acti	· :tt	tag
481 GTTAC. L Q  161				IGT: V	rtg:	ГТС			CAAI	GT V	TGAT D	GT:		TGAT	ГАТ			GTT L
541 ACAGT. Q Y  181	ATAI	ГСАА		GGA:	rtg:	ГGС		ATT		ACG R		CCT	GAA		caa	· gtt	· caa	atg
tataa	tata	atct	gaaa	aaaa	aato	cac	tgg	gtc	• aaaa	aac	tagt	tato	cat	gaat	:gt	acta	aat	tat
attaa	ttgt	:gct	gaa	ctaq	gaad	cac	caa	act:	ggat	tt	tata	aatq	gac	attt	cc.	ttg:	zga	aat
aacca	gtaa	atac	aaat	tggg	gtaa	att	att	ttt	caat	ct	ttga	aaaa	ata	atgo	cag	taga	aga	aaa
tgagc	attt	taa	atci	ttg	gcaa	atg	• gaa	agt <sup>.</sup>	tttç	gct	taad	ctad	caa	tttt	tg.	· ttt¹	ca	ata
· cagag	aatq	gcaa	gggt	tgct	tatt	tat	ttc	att <sup>.</sup>	tttc	ctg	gaat	ett	gat	ct				

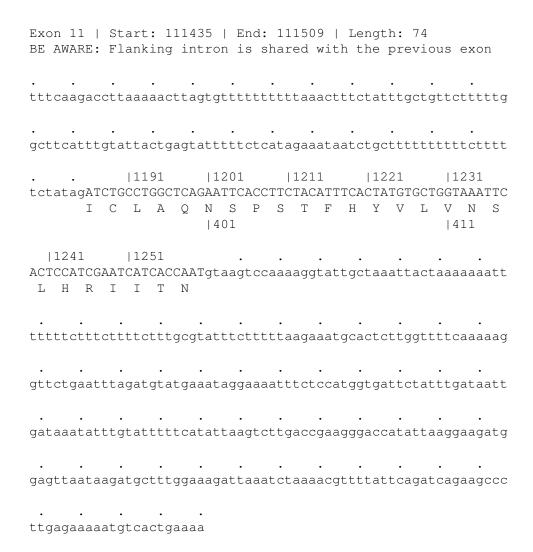


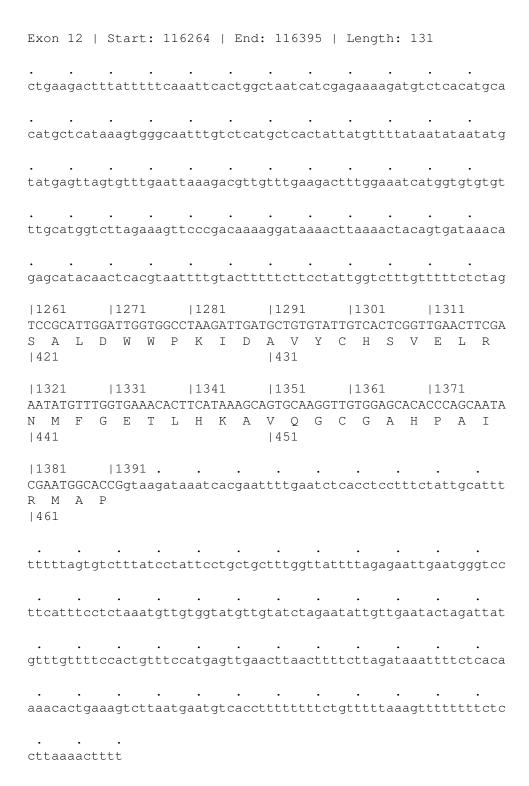
Exon 7   Start: 91734   End: 91809   Length: 75 SE AWARE: Flanking intron is shared with the previous exon	
	t
	A N
671   681   691   701   711   72 CTGGGTAGAAATTATCCAGATGAATTTACAAAACTGTACCAGATCCCACAGACTGAT W V E N Y P D E F T K L Y Q I P Q T D 1   231   24	'A M
	t
tattgtcaactggtgtcaaataggaaatactgtttttctcttacatttctaaattagg	
caaccctcttcctttggagcaaacaaagtagtttgaaatgaaggtcagatcttt	a
	t
tattt	

Exon 8   Start: 92532   End: 92689   Length: 157
gatcatccattctaaaatgtgagcttttccaggatagatcaagatagctcttctaacaca
tagacagtattacattgcttgtctacttaccagaatgcatttgtgtagttgcttaaatga
731  741  751  761  771  781 AATGTGCAGAAAAGCTATTTGACTTGGTGGATGGTTTTGCTGAAAGCACCAAACGTAAAG
C A E K L F D L V D G F A E S T K R K A   251
791  801  811  821  831  841   CAGCAGTTTGGCCACTACAAATCATTCTCCTTATCTTGTGTCCAGAAATAATCCAGGATA
A V W P L Q I I L L I L C P E I I Q D I   271   281
851  861  871  881
tatttaagcaaagtatttcagggaaccatttaaatgatcattttaggtttctttgtttg
tggacttagaagagacatactcatacataattttatttggcagagggaaaataataccag
cgatacctctgttattattaaacgtagtttctctaata

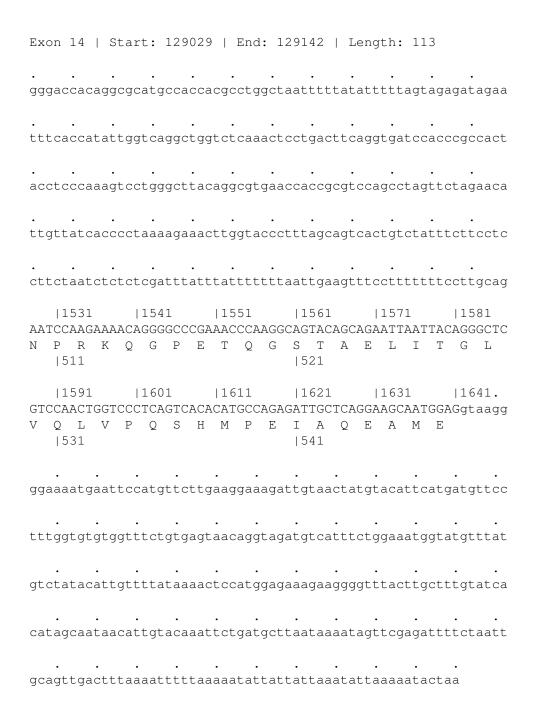
Exon 9   Start: 110446   End: 110619   Length: 173
891  901  911  921  931  941 AAGTTATTTCTGGACAGTCTACGAAAAGCTCTTGCTGGCCATGGAGGAAGTAGGCAGCTG
K L F L D S L R K A L A G H G G S R Q L  301  311
951   961   971   981   991   1001   ACAGAAAGTGCTGCAATTGCCTGTGTCAAACTGTGTAAAGCAAGTACTTACATCAATTGG
T E S A A I A C V K L C K A S T Y I N W   331
1011  1021  1031  1041  1051  1061. GAAGATAACTCTGTCATTTTCCTACTTGTTCAGTCCATGGTGGTTGATCTTAAGgtaaca
E D N S V I F L L V Q S M V V D L K   341
tgcttattctttctctactacaaactttaagaaaattaaatgaattttctagcataagta
ttatgtcaaagataattgctaacattaaagttctgactcttcgttgataagttcatagga
cctgaaatgaacctatatatggtataggaagaattgtatcagactgatgaacca

		10 ARE												_				g ez	xon	
		gtt																	ataa	
		aat																gaa	ccta	
ta		ggt:																	gctt	
ct	tct	ggc:								igtg								·	atgt	
ta	gta	aaga	aaa	tac	tgc	atg	ggt	att	taa	aagg	rctt	.ttg	rttt	tct	gtt	ggg	gtt	Etta	atag	
AA N	CCT L	GCT'	ГТТ		TCC. P	AAG S		GCC	CTA	109 TCTC S	AAG	SAGG	GCAG	TCA		TGC	AGA: D		GGAT	121
CT L	AAT M	GAT'	IGA	CTG	CCT L	TGT V	TTC S	TTG	CTI	115  TCG  R	TAT	AAG		TCA		CAA( N	CCA <i>I</i> Q		1 CTTT F	181
ΔΔ	Gat		adc	·	aat	•	81	ct a	·	ata	•	act	cat	·	att.	3:		-at;	· aaac	
K	ggc	gag	<b>19</b> C	acc	ggc		cac	ССа	iaci	Jaca		acc	.yac	gcc	guu	acci		Jaco	aaac	
aa	aaa •	gac	tat	aga	gat	taa	tag	gtt	cac	cttt	tat	.cgg	ŗtat	ttc	tca	cta	ttat	igta	attg	
at	gtt	cg																		





Exo	n :	13	5	Star	rt:	1244	75	E1	nd:	: 12	246	09	I	leng	gth:	134			
																gtaa			itc
																• attt			itt
																acta			cac
																attt			aaa
																gttt			tag
AGT S			ATI		AAGA	AAAA	GTAZ V :		AG	CCT	TAA	ATI		AAGA		ACCT	ACA T	GAC	1451 CTG
		AAG R	AAC		ATAA	GTAT	CTT(	CTC'	TTC	GTC	CAT	GGI	'GA <i>P</i>	AACI	TAAT	TCAT	GCA A		
AAG K			GCI		GTgt	aagt	att!	· ttt:								atca		taaq	gtt
aat	tg(	ggt	· tta	ıgct		acgc										caag	agc	actt	·
tga	tc	ctt	tct	gat	cat		gaa									taat	gta	taat	• Ega
ata	ct															aaca			
																tgtt			
tta				atat															



Exon 15	Start	: 13	1874	Enc	d: 13	1953	Leng	gth:	79		
tttgtttc											ta
tatgtaca											at
tattccct	agaggtt									tatat	tg
aaactaca											at
gtttacca									taaaa	aatto	ag
GCTCTGCT( A L L		ГСАТС	AGTTA	AGATAG	CATT	GATTT	GTGGAA	ATCCT	GATGC	TCCTG	
GAAACATT E T F			Ggtat								
tattttgt:	• attttt										
cacttcca	• aaggttt	ctatg	• gtttt	:gtatt	ttat	ttgac	· ttcaaa	ittati	· tagaa	tttct	• tg
ttttaact	• gtaagaa										
attttgtc	• accctaa	acata	agtad	Etgttg	gtttg	gtata	ttactt	tttt:	cagat	ttcaa	.tg
tggttact	actgtat	ctttt	• .а								

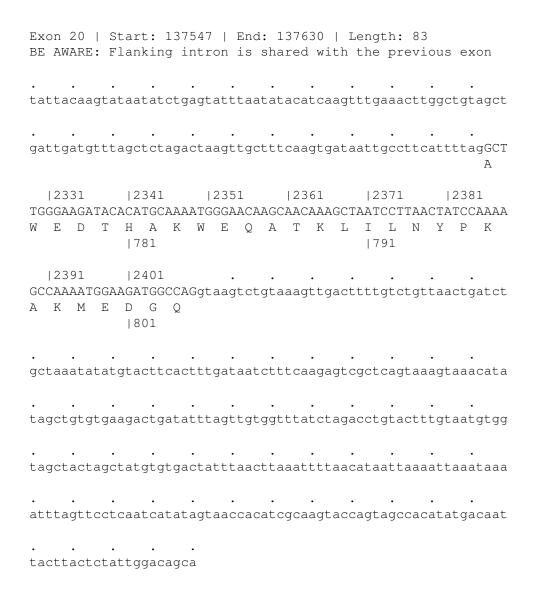
Exo	n I	6	St	art	: 1	3346	8	Ei	nd:	13	359	Ι Ι	Lei	ngt	h: .	123				
													· .aca						gga	
													:ttt!						aga	
													· lact						tac	
													Igaga						tct	
													latga						cag	
CTC S				TTT	TTA:	CATC	CTGC C	CAA	GAA.	ATT	AAC	TAG	17 GTCA: H	ГСА	AAT(	GCT	rag: s	ΓAG		
AGA E				GTG		GCGG	GA <i>P</i> E	AATA	ATT	GAT	CTG	CAG	182 GAA: N	ГАА	ATT:	ГСТ	CT: L			
TAA K	Ggt	aag	gcaa	ıaat	gac	atat							atti					ggt		
aga	tta	cta	aaag	ŗtgt	ttt								tca			cctt	cct	CC(	caa	
tgt	tct	caa	aaag	• Igaa	ata	tgta	itgo	caga	agg	aca	.atg	act	.ggc	aaa	tca	gcat	· :tt!	caa	• aaa	
tta	ttc	tga	aggc	ettt	.ggc	ctta	ıga <i>a</i>	acca	aca	ctg	ttg		gaat	tct	agti	tcta	agti	:ga	gtt	
aaa													ıctg							
gag	<b>.</b>																			

gaattaagtaaaccttgtttgttctaatgggtttctagtgaatctccttcaagttggggc
gtgtttattcctcttggttgtcagtgcttcagtaaagcttatttat
1851   1861   1871   1881   1891   1901   CAGGCAGATAGAAGTTCCTGTCACTTTCTCCTTTTTTACGGGGTAGGATGTGATATTCCT Q A D R S S C H F L L F Y G V G C D I P
621  631
1911   1921   1931   1941   1951   1961
TCTAGTGGAAATACCAGTCAAATGTCCATGGATCATGAAGAATTACTACGTACTCCTGGA
S S G N T S Q M S M D H E E L L R T P G  641  651
641   651
641   651
1971   1981   1991   2001 GCCTCTCTCCGGAAGGGAAAAGGGAACTCCTCTATGgtcagcttcttctgtacttttct A S L R K G K G N S S M
1971   1981   1991   2001
1971   1981   1991   2001
1971   1981   1991   2001
1971   1981   1991   2001

Ex	on	18	Star	t:	136	459		End	l: 1	367	8 0	L	eng	th:	24	9			
ta	gaa	tcaq	gtttac	att		gga	atc	tgg	aat	agg	· ataa	ata	tct	att	tga	ittt	gaa	.att	g
• aa	cag	atg	gtagca	tta	atgt	tgg	tcc	aga	taa	tct	catt	tc	tca	ttt	gga	Icaa	gat	att	it
tg	ggg	tttq	• gaaaaa	tto							• aaaq				agt	tat	tgt	ato	JC
	aga	caca	acacac	aca	acac	aca	cac	aca	.cac	aca	caca	aca	cac	agt	tta	ittg	cat	tgt	t
ag	att <sup>.</sup>	ttat	tacata	aaa							tat			cac		tga	.ctc	tca	ıg
GA' D	TAG S	TGC <i>I</i> A	2011 AGCAGG A G  671		GCAG	202 CGG G			20  CCC  P				Q						2061 [A
GA.	AGT	GGC	2071 CCTGTA		 GTT				20 .ccc										2121 :G
Ε	V	А	L Y  691	М	F	L	W	N	Р	D	Τ	E  7	A 01	V	L	V	A	М	
TC	CTG C	TTT( F	2131 CCGCCA R H				.GGA		AGA	TAT		GTG	TGG		GGA	TGA			2181 CA
٥	Ü	_	711		Ü	L			ב	_	10	7		·	2	_	v	J	
GT	GCA	TAA(	2191 CCTCTT			220 CTA			22 ATT				221 TGC			223 CAG			2241 :G
V	Н	N	L L  731	Р	N	Y	N	Т	F	М	Ε	F  7	А	S	V			М	
AT M	GTC. S	AAC <i>I</i> T	2251 AGgtaa G  751		gtga	ata	gtg	gtt	ttt	ttt	acto	cag	tct	gcc	tca	aag	·	ato	ia •
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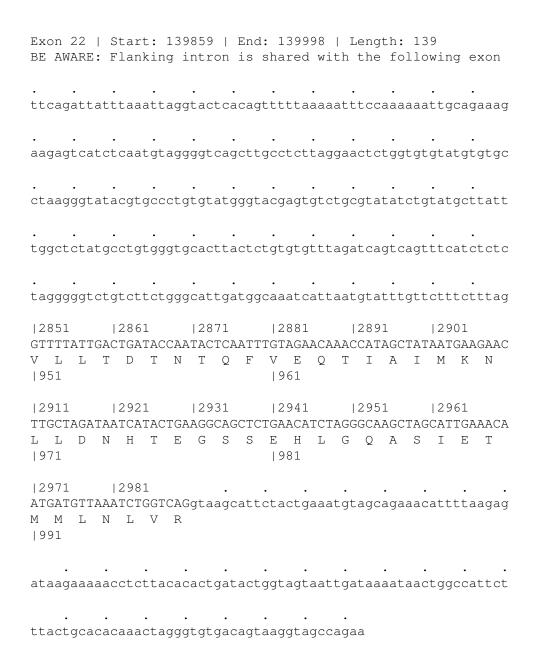
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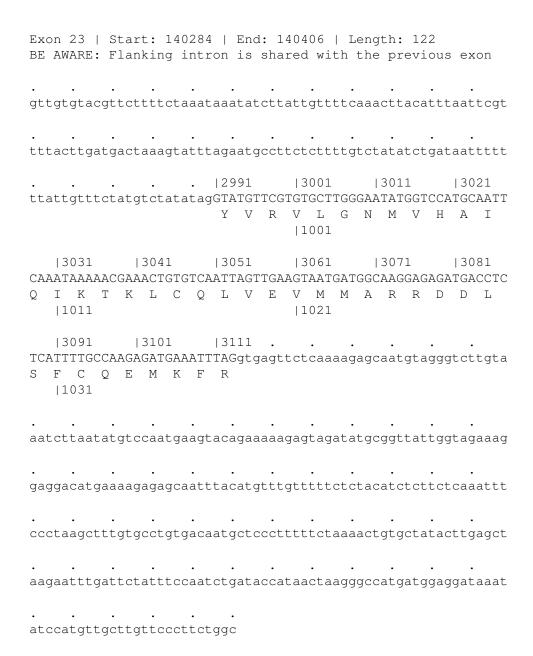
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								cagtaa								
			CACT	ГСАG	AAA	AGAGT	GAT	2281 GGCACT A L  761	GCT	GAG	GCGC.	ATTG	AGCA	TCC	CCAC	
	GAA G N		2323 CTGA0 E					• . acagaa								
att								· gatcaç								
tac	gtg	ca														



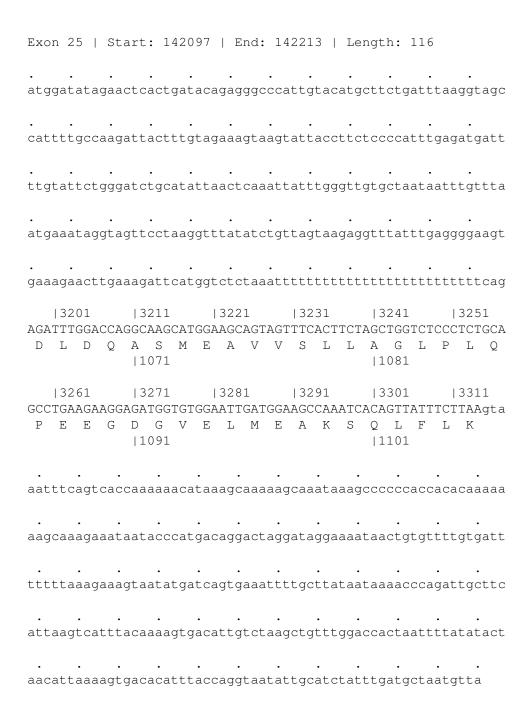
Exc	on	21	5	Star	t:	139	049		End	: 1	394	89	L	eng	th:	44	0		
																	•		
tag	gaa	tat	gto	gggc	ttt	tgt	gati	tag	ctt	ctt	tca	ctt	agc	atg	atg	ttt	ccaa	ıggt	tca
		•			•		•			•							•		
tco	cat	gtg	aaa	atca	aaa	ctt	ttta	aaa	aga	aat	ttg	aca	.ctc	ggc	tga	tta	tatt	agt	tgta
·	a + a	•	· a+s			t aa								22t	•	a t o	aa++	·	ttt
cyc	100	.aaa	acc	igat	cay	regg			aaa	aat	.gca	cac	ggt	aat		acy	ggcc	.yaı	
aat	at	ata	ttt	tac	att	ttt	tata	act	ttt	atc	atq	qaa	gaa	atq	tta	gat	aaac	rcat	taat
	_						_			_	_	_	-	-	_	-	_		
· ttg	gtc	• aag	tct	caa	· cta	att	· aag	gtt	taa	· ttc	atg	ctt	tgc	aca	• aaa	att	ttgt	· .gtt	tag
12	241	1		24	21		124	431		ı	244	1		124	51		124	61	
			AAG													TGT			AGGA
A	Α	E	S	L		K	T  83	I	V				М	S		V	S  82	G	G
2	247	1		24	81		12	491		ı	250	1		25	11		25	21	
GGZ	ATC	CAT	AGA	ATTT	GTC	TGA	CAC	AGA	CTC	CCI	'ACA	GGA	ATG	GAT	CAA	CAT	GACI	GG	CTTC
G	S	I	D	L	S	D	T  83		S	L	Q	Ε	W	Ι	N	M	T  84	G 1	F
2	253	1		25	41		12	551		-	256	1		25	71		125	81	
CTI	ГТС	TGC	CCI	TGG									CAA		TGG	CCT	GGCA		CTAT
L	С	A	L	G	G	V	C   8	L 51	Q	Q	R	S	N	S	G	L	A  86	T 51	Y
'	259			126				611			262			26			126		
																			ГТСА
S	Р	Р	М	G	Ρ	V	S  87	E 71	R	K	G	S	М	Ι	S	V	M  88	S 31	S
	265			26				671			268			26			27		
																			GGTG
Ε	G	N	Α	D	Τ	Р	V  8!	S 91	K	F	М	D	R	L	L	S	L  90	M 1	V

2711	27	21	2731		2741		2751		2761	
TGTAACCA	TGAGAA	AGTGGG	ACTTCA	AATAC	GGACC.	AATGT	TAAGG	ATCTG	GTGGG:	ГСТА
C N H	E K	V G	L Q  911	I R	T :	N V	K D	L	V G  921	L
2771 GAATTGAG E L S	TCCTGC	TCTGTA	TCCAAT	GCTAT'	TTAAC.	AAATT	GAAGA	ATACC	2821 ATCAG( I S  941	
2831 TTTTTTGA F F D	CTCCCA	AGGACA	Ggtaaa	gtgtt	ctctt	atttt	tcacc	tttct	ctatga	aata
gagtgact										cagt
· · · ttttaaaa										cttg
cctcttag										ggta
cgagtgtc									acttad	ctct
· · · gtgtgttt	agatca	gtcagt	· t							





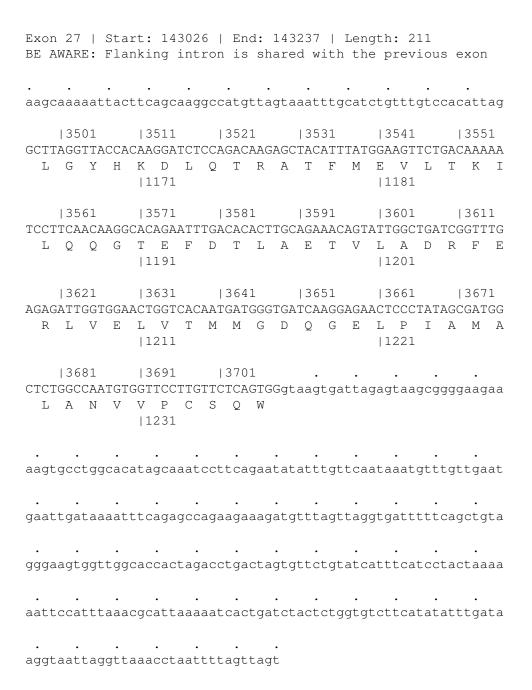
Exon 24   Start: 140866   End: 140949   Length: 83
3121   3131   3141   3151   3161   3171  GAATAAGATGGTAGAATACCTGACAGACTGGGTTATGGGAACATCAAACCAAGCAGCAGA  N K M V E Y L T D W V M G T S N Q A A D    1041   1051
3181  3191
gcctcagattgcatttgtgttatg

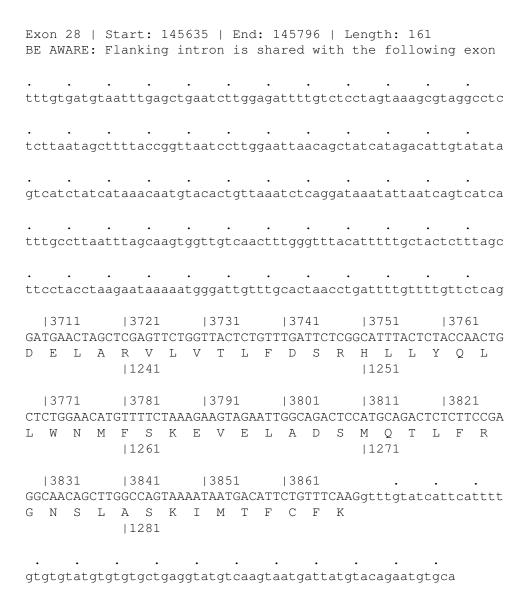


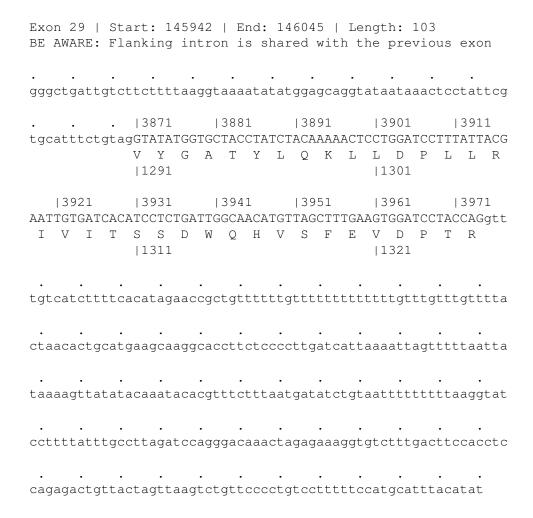
```
Exon 26 | Start: 142724 | End: 142905 | Length: 181
BE AWARE: Flanking intron is shared with the following exon
\verb|tctaagctgtttggaccactaattttatatactaacattaaaagtgacacatttaccagg|
taatattgcatctatttgatgctaatgttatgaaaggtatactaggctatatcaggtaaa
\verb|atcatgtccaacatagcacacttcataataagccaccctggctgattatcgcgagagagg|
. . .
           agagaaa cagtta acc cagggc cattca cac catgcacat at gattg tttt ggaat g tct\\
\verb|ggttag| cttctagttgatacggccttcactatgtaaaggtcagtctttttatttctcag|
    |3321
             |3331
                     |3341
                              |3351
                                      |3361
ATACTTCACATTATTTATGAACCTTTTGAATGACTGCAGTGAAGTTGAAGATGAAAGTGC
|1111
                                        |1121
    |3381
           |3391 |3401
                             |3411 |3421
\tt GCAAACAGGTGGCAGGAAACGTGGCATGTCTCGGAGGCTGGCATCACTGAGGCACTGTAC
Q T G G R K R G M S R R L A S L R H C T
             |1131
                                        |1141
     |3441 |3451 |3461 |3471 |3481 |3491
\tt GGTCCTTGCAATGTCAAACTTACTCAATGCCAACGTAGACAGTGGTCTCATGCACTCCAT
V L A M S N L L N A N V D S G L M H S I
             |1151
AGgtgagatcaaatgaaagtttcatatagaaatacaaaacctagagaactggcatgtaag
```

30

aq

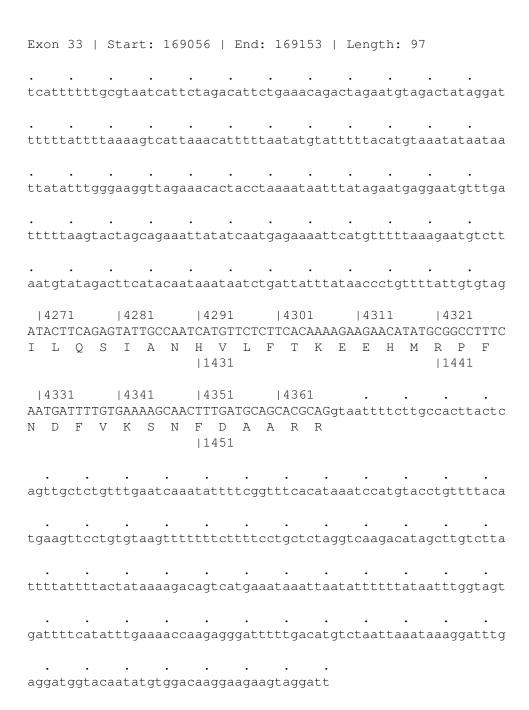






Exon 30   Start	: 159008	End: 1591	.43   Length	n: 135
gactaatttttgtat				
aactcctgacctcaa				
taagccatccagccc				
tccaatgaagtctac			· · · gtctgtataaga	
gtgatttttgttatt			· · · uggattttatt!	
3981 GTTAGAACCATCAGA L E P S E	GAGCCTTGAG		CGGAACCTCCT	
4041 GTTCTTCCATGCCAT F F H A I	CATCAGTTCC	TCCTCAGAAT		4081  4091 ACTTCGAAGTGTGTG L R S V C  1361
4101 CCACTGTTTATACCA H C L Y Q	Ggtatgctta	cagttagaga	· · · uttaccattati	
ttatgaagaatgctt			.gctgatggtgt	
tactgagtcagtttg			ıttgttggaat!	
cttaaatattactta				
cttgcattgggagca				
aatgaacatattatg				

Exon 32   Start: 168368   End: 168526   Length: 158
gttttcatgtctttatattaattcaaaccttatactcaattctcaactccttgtttttag
4111  4121  4131  4141  4151  4161   GTGGTTAGCCAGCGTTTCCCTCAGAACAGCATCGGTGCAGTAGGAAGTGCCATGTTCCTC
4171  4181  4191  4201  4211  4221 AGATTTATCAATCCTGCCATTGTCTCACCGTATGAAGCAGGGATTTTAGATAAAAAGCCA R F I N P A I V S P Y E A G I L D K K P  1391  1401
4231  4241  4251  4261 CCACCTAGAATCGAAAGGGGCTTGAAGTTAATGTCAAAGGtgaattattttgataatcta P P R I E R G L K L M S K  1411  1421
gctatcttaaattccccttccaactaaattttcagcttttcttacagtacttcctcttac
ttatagcagatgtcttgtgttatgaagatcattttttgcgtaatcattctagacattctg
aaacagactagaatgtagactataggattttttatttta



Exon 34   Start: 170393   End: 170539   Length: 146
ggaaagccaactttctccttgtcctttttgctttgtctaatgtcaagtcacattgtgtga
4371  4381  4391  4401  4411  4421   GTTTTTCCTTGATATAGCATCTGATTGTCCTACAAGTGATGCAGTAAATCATAGTCTTTC   F F L D I A S D C P T S D A V N H S L S   11461   11471
4431  4441  4451  4461  4471  4481   CTTCATAAGTGACGGCAATGTGCTTTGCTTTACATCGTCTACTCTGGAACAATCAGGAGAA   F I S D G N V L A L H R L L W N N Q E K
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
gcagattgttatagatccaaagaagtt

Exon 35   Start: 171735   End: 171881   Length: 146
ttggtgctgtttacaaatcagctgacagtaaaaggaaaagcaaccagttacaagttaaag
4521   4531   4541   4551   4561   4571 GGATCATAAAGCTGTTGGAAGACGACCTTTTGATAAGATGGCAACACTTCTTGCATACCT
D H K A V G R R P F D K M A T L L A Y L  1511  1521
4581  4591  4601  4611  4621  4631 GGGTCCTCCAGAGCACAAACCTGTGGCAGATACACACTGGTCCAGCCTTAACCTTACCAG
G P P E H K P V A D T H W S S L N L T S  1531  1541
tgaggaaagatgtatttaataatcacattgccatgtttggggaatccaactatatattat



Exo	n 3	7	St	art	: 2	2358	44	E1	nd:	23	627	6	Le	ngt	h:	432			
ttg	gtg	ggc	cct	gca	ggc •	·	caa	ctaa	att	· ccc	act	gtt	ttc	ttc	ctt	tct	tga	ctc	atg
· ggc	aaa	ttt	· ttt	att	gtt	gtc	gtg	· gct	caa	aati	ttt	tga	att	gga	.gat	ttg	tct	ctt	ctc
tta	gcc	tta	ttt			gtc									• gaa	tcc	aga	ctt	iga
agaa	att	gtt	tta	tat	tat	tct	ctc	taga	aaa	atg	aat	cat	aaa	ata	• .aaa	ttg	att	agt	ggc
atc	tgt	ata	ttt	att	tta	·	act	gcta	aat	aat	ctt	tgt	ctt	ttt	tgt	cat	ttt	cct	ag
GTT	CAA		478 TGG'		AAT	47													4831 AAA
F	K	Τ	G	Q	Ι	N	G	D		L 601	Ι	Y	Н	V	L	L	Τ	L	K  1611
GCC	ATA		484 TGC		GCC	48  ATA				861 AGT								TAG	4891 CAA
Р	Y		A		Р	Y		I	V	V 621				Н	Т			S	N  1631
TCG	CTT		490 AAC		СТТ	49 TCT		TAA(		921 GTT'								TTAG	4951 CGA
R	F	K	Τ	D	F	L	S	K	W	F 641					G	F		Y	D  1651
CAA	CGT	'	496 CGC		CTA	49  XTAT		TAA(		981 TAA								CAA	5011 GTA
N	V	S			Y	I	Y	N	С		S		V		Ε	Y	Τ	K	Y  1671
T C N	r C A		502		C 7 C	50		~ ~ ~ .		041			505			50		OTT C	5071
H	IGA E	GCG R	GC I (	JC1 L	GAC T	TGG( G	T.	CAAA K		S IAG	JAA K	aag R	GC1 L	V IGI	F	CAI.	AGA D	CIG. C	P
11	ш	1/	ш	ш	_	J	ш	17		681	Τſ	11	ш	v	T		ע	C	1691

			508	1		50	91		5	101			511	1		51	21		513
TGG	GAA	ACT	'GGC	TGA	.GCA	CAT	AGA	GCA	TGA.	ACA.	ACA	GAA	ACT	ACC	TGC	TGC	CAC	CTT	GGC
G	K	L	A	Ε	Н	Ι	Ε	Н	E  1	Q 701	Q	K	L	Р	A	A	Т	L	A  1711
TTT L	AGA E	AGA		.CCT	GAA		ATT		CAA N	TGC	TCT	CAA	GCT	AGC	TCA		AGA		5191 CAA K  1731
					• aag	ttc	cag	tct	gtg	ttt	tgt	aaa	cga	ttc	att	.gct	ttt	ctt	• gac
taa	cta	gac	tat	atc	ctg	gcc	tcc	cta	· ggt	gtc	cta	ccc	cta	tag	tgg	rtgt	ata	.aaa	tgt
cac	gta	agg	ctg	tcg	cgg	tgg			· cct							ıgat		aag	• gtg
ggc	aga	tca	.cgt	gag	gtc	agg	agt	tca	• aga	cca	gcc					rtga		ccc	· gtc
tct	act	aaa	aat	aca	aac	att	• agc	cgg	• gta	tgg	tgg	tgg	gca	cct	gta	atc	tca	.gct	act
tgg	agg	· ctg	agg	·															

Exc	n	38	S	tart	: 2	237	523	I	End	: 23	378	63	Le	engt	h:	340	)		
												•				,			
tga	ıtc	tgc	cca	cctc	ggg	cct	ccca	aaq	gtg	ctg	gga	ttad	cago	ggat	gaq	gcca	acto	gcad	cccg
gcc	ett	· ctat	caa	gatt	ctt	:ga	cctt	ttt	caaa	aaag	gga	• aaat	ctaa	aaaa	natt	ttt	caaa	ıtgt	ttt
ttg	ŗtt			gaga			tato								:gaa	atat	caca	nato	ggtg
• gga	ıac	· tctt	·	ttaa	nato	ggc	ata <u>c</u>	gtgt	ttt	:gtt	tg	gtto	ggtt	zggt	tto	ctg	gago	cctt	tta
• gaa	ıtt																		ccag
GTT	'GG	521  TTC					AGTZ									251 CCT			5261 ATCA
V	G	S	Т	A	V		V			A				K	V		G	Q	S
СТС	יתית	52		<b>ጥ</b> ሮ አር			ר ת ידי די									311 3CT7	\		321 GAG
V	F	L	N N	D	I		Y	A		E	I	E	E	I	С			D	E
		533														371			381
																			GGAG
N	Q	F	Τ	L	T  17	781	A	N	Q	Ġ	Τ	Р	L	Τ		M 791	Н	Q	Ε
		539				101						542				131			5441
																			GCCC
С	Ε	A	Ι	V	Q  18	S 301	Ι	Ι	Н	Ι	R	Τ	R	W	E  18	L 311	S	Q	P
		545	51		154	161		[	5471	l		548	31		54	191		5	5501
																			CAAT
D	S	Ι	Р	Q	H  18	T 321	K	Ι	R	Р	K	D	V	P	G  18	T 331	L	L	N

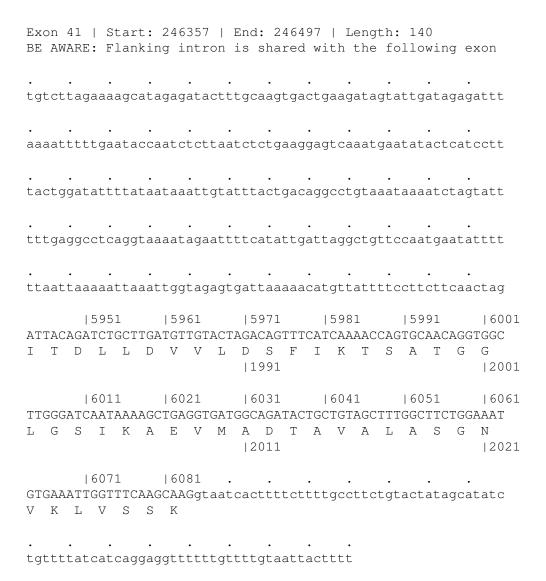
		5521  TAGGCAGT					
I A L		L G S  1841	S D P	S L	R		
. cttcagt	ttgatttg	 gggtttgtt	 gctttta	aaatgag	accattt	 .aatgaatt	ttaaaac
		attgtaaat					
catcaag	• ttgtgggg†	 tattcacat	 gaactgt	ggaattc	caaacag	Iggtgattca	acactaa
		· · · ttctccatc					
aaagtat	cctaaatta	 aagtttttc	 ttcctct	aagtcct	cta		

Exor	n 3!	9	St	art	: 2	403	20	E	nd:	240	)522	2	Le	ngt	h:	202			
atat	· :tt!	tat	· gtc	tca	gtg	aga	tgt	att	tta	ggaa	aago	cta	ata	ccc	cgc	ccc	tct	· gtc	ata
ggag	gcct	ca	cag	tgc	tct	tat	ggt	tat	atc	aagt	igto	jtc	cct	ttt	tat	aaa	atc	cct	aaa
tgat	taa	agg	ggt	att	ttg	gtt	tta			aatt			atc	tta	ttt	cta	act	gat	cat
aaaa	att	caa	aaa	tag	ttg	atc	ata	ctt	tgt	aaca	aga <i>a</i>	itca	aca	aat	tgt	atg	tta	tga	aaa
aatt	tt	gga	act	ata	agg	aaa	aat	acg	ttt	taaa	aaca	ıact	ttc	att	tgt	gtt	ttc	· tcc	tag
GTC <i>I</i> S	AGC:	551 FGC A 851				TCT					55  TTGT  C  18	TAC(			559 TTT L		AAT I	560 CGA0 E	
CCA(	TTZ L		AGA		ATC	1 AGG G	TTT			CCC'		CAA( N	CAA					56 TGT( V	
TAT1	TAGT S	671 ГАА К 891		ACT			CAA		GCC.		57 CCTC L  19	CAC( T		AGA	ATT		GGA E	57; AGA( E	
TAT]	TTC: S	ГGG			CAA	ATC	TAg S	taa	gta	atga	ataa	itti	ttc	ttt	aat	act	aac	aat	tat
tcta	aaga	aga	att	caa	aga	aaa	ccc	ttt	cat	ttca	agaa	itti	ttc	• cag	tga	aga	ctt	tca	ctt
acat	tti	· cta	ctt <sup>.</sup>	· ttt	ttc	ctc	ttc	tga	ttt	tata	atct	.gt	ggt	atc	ctg	taa	ctg	aag	gaa

Exon 40   Start: 24	4862   End: 2	245055   Len	gth: 193
attaccacatttcctttta	· · · · · · taatgagaataaa	· · aacaactttta	· · · acaagaaaggactaaaa
tggaggaaaataagacaaa	acttttcaaaaat	.tggcttactgg	cttttaaaattactttc
ttcaaggactgttctttct	tcgcctctacaaa	aaatatatttgc	caagtgtcttttctcca
ggcctgattctaggtaata	gtctttacctttt	 caccatttttc	cccgaattctttatgtt
aaataattgttgatgtgat	· · · · tttcattgaccat	· · · cacatgctaat	agtgtattttttccag
5751  5761 GTATTGAATTGAAACACCT I E L K H L  1921		M T P W	GCTGTCAAATCTAGTTC
5811  5821 GTTTTTGCAAGCATAATGA F C K H N D  1941	5831 TGATGCCAAACGA DAKR	ACAAAGAGTTAC Q R V T	851   5861 TGCTATTCTTGACAAGC A I L D K L 951
5871  5881 TGATAACAATGACCATCAA I T M T I N  1961	•	GTACCCATCTAT Y P S I	911  5921 TCAAGCAAAAATATGGG Q A K I W G 971
5931  5941 . GAAGCCTTGGGCAGgtatt S L G Q  1981	 gagtttgctcaaa	atatttatctag	tatctcctttgtgcaca
tatttatctggtgccacat	tgggcaaagcact		tagggatagagttgtaa
aaaacacagtttcctcctt	cagaaagcatgta	agacactcaccc	agctcttcatctggttc

aaaattgtaaatgtctagtgcatgtctcagagccagagaaaagctagttatttgcacagt

tgcaaataactaga

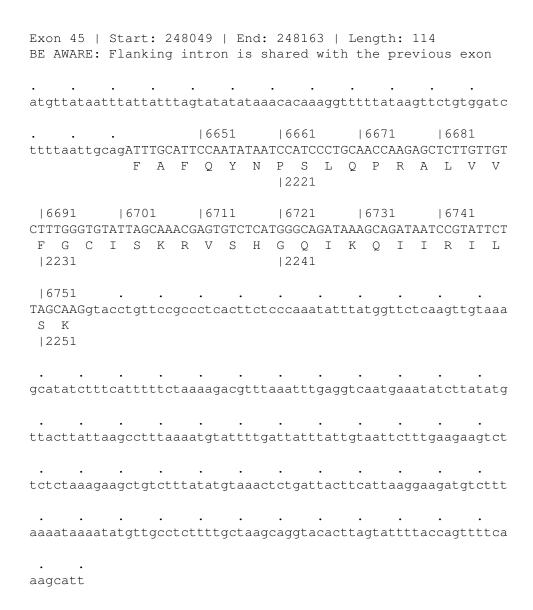


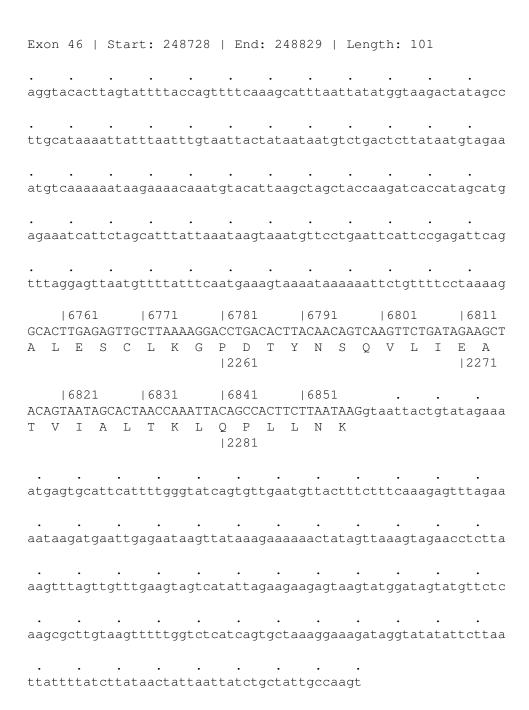
Exon 42   St BE AWARE: Fl	eart: 246659 Lanking intro				exon
aaattaaactga	· · · acttttttgtg	· · · ctaaaacttt	 :gagtcccatgt	tttttttttt	• aaaaaa
aaaaatcctgct	ttctttacagGT V	TATTGGAAGO	6101 GATGTGCAAAAT M C K I	'AATTGACAAG	
6131 TTATCTCCAACT	l   6141 ICCTACTTTAGA		6161 FATGTGGGATGA		6181 TTAGCA
		Q H L  2051			L A  2061
6191 CGCTACATGCT	6201 GATGCTGTCCTT		6221 CCTTGATGTGGC		
R Y M L	M L S F	N N S	L D V A	A H L 1	P Y  2081
6251 CTCTTCCACGTT L F H V	TGTTACTTTCTT	AGTAGCCAC <i>I</i>	6281 AGGTCCGCTCTC G P L S	CCTTAGAGCT	
6311	L  6321 CATTAATATCAT		6341 GTGTACTTGTTC		6361 TTTAGT
H G L V	I N I I	H S L  2111	C T C S	Q L H 1	F S  2121
 Ggtaagttctag E	ggaaaggaattt	 gtgtttacca	 agtteetttete	 cattttactt	cacctg
atcaatatagat	.tatcttattta!	tgtttgtgct	· · · ctaacaccaag	· · · · · · · · · · · · · · · · · · ·	aagcct
ccagtaatgaca	atgaaatattac	 caaaaagaaa	aataaattactt	.ccattccata	tcaagc
· · · · · tatagtaaagat	· · · ctatgcata	 acttgtcato	· · · gtagagttatco	· · · cataagcgga	atactc

Exon 43   Start: 247392   End: 247606   Length: 214 BE AWARE: Flanking intron is shared with the following exon
6371   6381   6391   6401   6411   6421   AAGAGACCAAGCAAGTTTTGAGACTCAGTCTGACAGAGTTCTCATTACCCAAATTTTACT   E T K Q V L R L S L T E F S L P K F Y L   2131   2141
6431   6441   6451   6461   6471   6481   TGCTGTTTGGCATTAGCAAAGTCAAGTCAGCTGCTGTCATTGCCTTCCGTTCCAGTTACC
L F G I S K V K S A A V I A F R S S Y R  2151  2161
6491  6501  6511  6521  6531  6541 GGGACAGGTCATTCTCTCCTGGCTCCTATGAGAGAGAGACTTTTGCTTTGACATCCTTGG
D R S F S P G S Y E R E T F A L T S L E  2171    2181
6551  6561  6571
ctaagttaaaatcttttttaaaaatatgttaatactatatagaagaaatattggttat

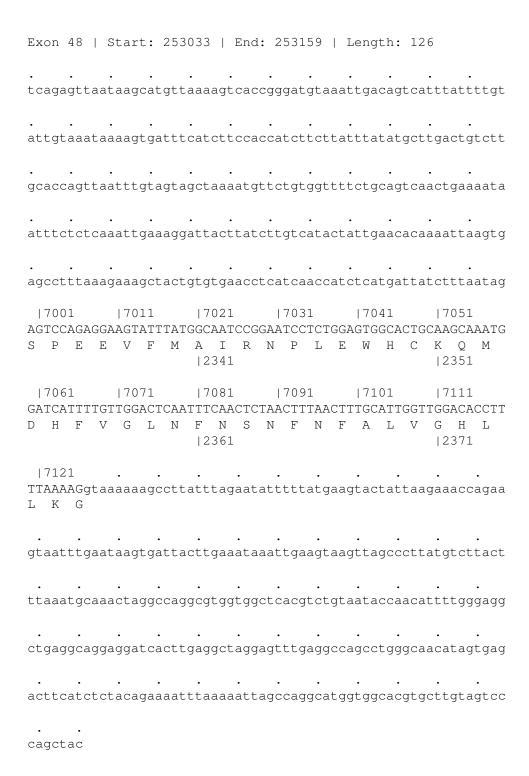
 ${\tt tgtgctattttgtacttaatgcttaaataaaaa}$ 

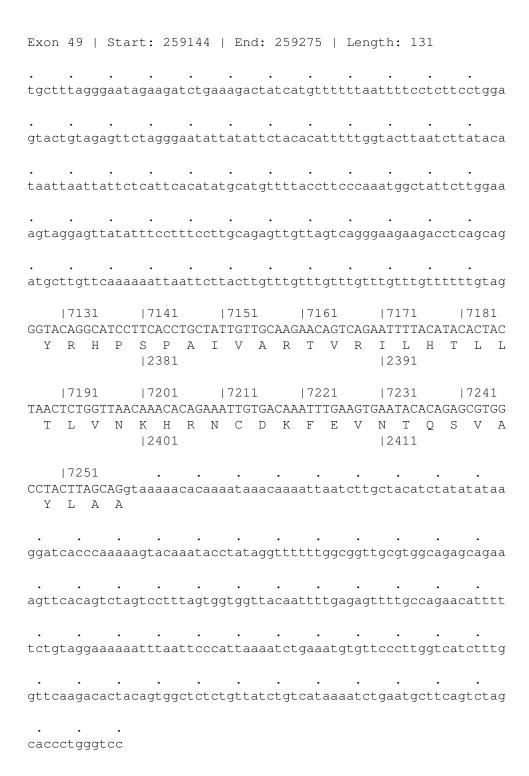
Exo	n '	44		St	art	: 2	478	43	E	nd:	24	1790	) 4		Le	ngt	h:	61				
BE	AW	ARE	]:	Fl	ank	ing	in	tro	n i	S S	shar	red	wi	th	b	oth	ad	jac	ent	ex	ons	
		•							•													
cac	tt	gca	ıtç	gga	ctg	tgt	tat	tgg	taa	caç	ggto	cact	ta	at	ga	cat	cat	aat	aaa	cat	tat	
																					1	65
tta	aa	caç	ŋtt	ct	aaa	aac	att	tat	gta	caa	ıtat	gta	att	са	ga	gta	tcc	cct	ttt	tta	.gGC A	
				65	91		6	601		I	661	. 1			66	21		6	631		1	66
ATG	CA:	ΓGA	\G <i>I</i>	AGA	TAT	TCC	AAC	GTG	CAA	GT0	GCI	GGZ	ACC	AG	TG	GAC	AGA	ACT	AGC	TCA	AAG	j
С	M	F	}	D	Ι	Р	T  2	C 201	K	W	L	D	Q		W	Τ	Ε	_	A 211	Q	R	
gta	tg	cc	cta	aaa	tta	aat	ata	agt	tgt	aaa	aat	ato	gca	ta	tt	gtt	gaa	aat	aca	gct	att	
act	at:	a t c	rat	ca																		



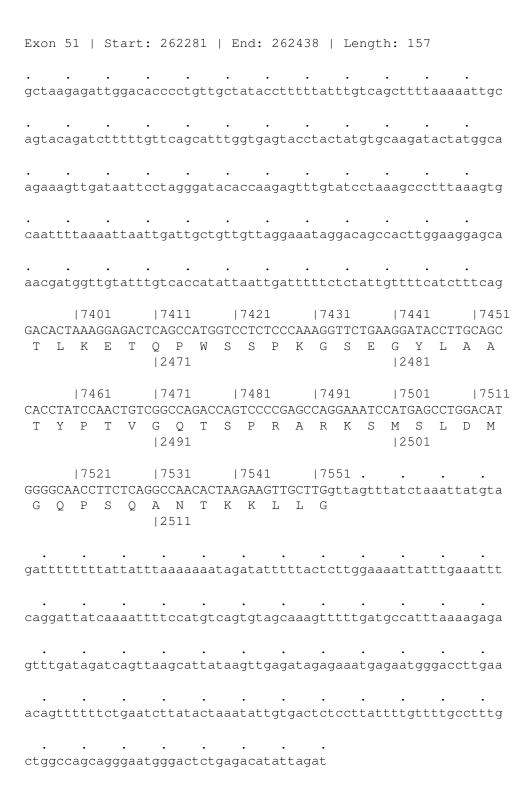


Exon 47   Start: 250529   End: 250669   Length: 140
tgacaaaagatacaaaagagactactctagaagaatcaacaaaccttggtgactggattt
ttttgaaagagactatgtcatgattcatcttactagcctcaaacatatcttctttgccag
6861   6871   6881   6891   6901   6911   GACTCGCCTCTGCACAAAGCCCTCTTTTGGGTAGCTGTGGCTGTGCTGCAGCTTGATGAG D S P L H K A L F W V A V A V L Q L D E   2291   2301
6921
6981  6991
tcatccttacagaatgagcat

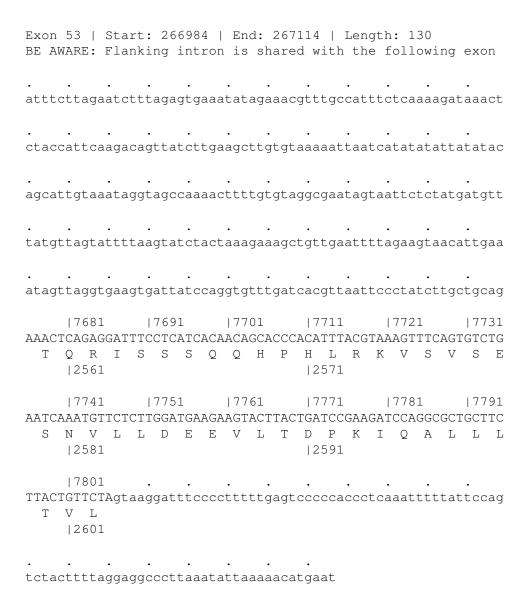




Exon 50   Start: 260207   End: 260342   Length: 135
tgttttaagtcacacttgtgatttgttaaattttttaacctgccaccgttttccttttag
7261  7271  7281  7291  7301  7311  CTTTACTTACAGTGTCTGAAGAAGTTCGAAGTCGCTGCAGCCTAAAACATAGAAAGTCAC  L L T V S E E V R S R C S L K H R K S L   2421  2431
7321  7331  7341  7351  7361  7371 TTCTTCTTACTGATATTTCAATGGAAAATGTTCCTATGGATACATATCCCATTCATCATG L L T D I S M E N V P M D T Y P I H H G  2441    2451
7381  7391
ggggaagggcctgggg

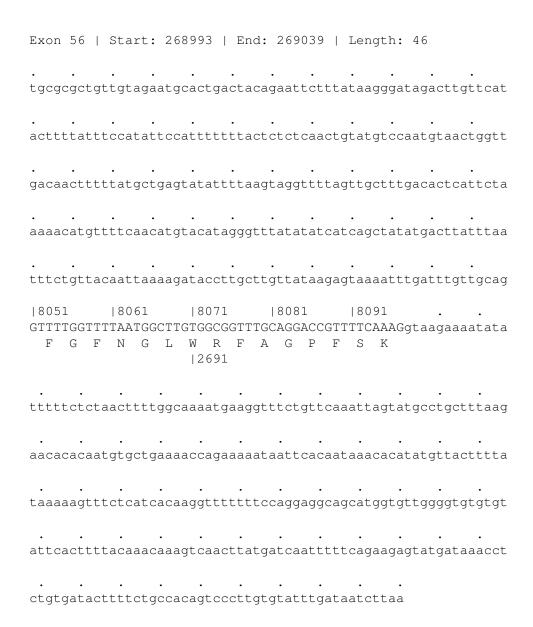


Exon	52		Sta	rt:	26	648	4	En	ıd:	266	606		Len	gth	: 1	22			
atca	tat	ttg	ttg:	att	tac	ctc	cag	tgt	.agt	:ttg	ıgtt	tac	ctc	cag	tgt	aca	gaa	tac	aa
tctc	agt	tta	att	tgc	acc	agt	aag	gtg	rcaa	acct	atc	ctg	aaa	cag	aaa	gct	atg	gga	ac
aaaa	· ccc	ttt	· gaga	aaga	atg	gaa	aat	aaa	ıgga	aaag	saaa	ctg	ctc	cag	gga	tgt	att	• aga	gc
tttc	· ttt	gag	tcc	tca	gtg	aaa	gct	taa	aca	actt	tat	gtc	caa	aca	ttt	tct	ttt	tag	tg
tatt	ccc	att	tata	aga	cac	tgt	agt	taa	ıtga	aact	.tgc	ata	ttc	tta	act	ttt	gtt	tat	ag
GAAC T	AAG R	GAA K			ГGA		СТТ	GAI	'ATC			AAA K	591 GGC' A 531		TAA	760 AAG R	GCA	AGA	
TGGA E	ATC. S	AGG G	621 GAT I 541	CAC	AAC.		CCC	CAA	AA:	rgae	GAG R	AGT V		AGA.	AAC			TGA	7671 AA M
TGGg E	tga	• gaa	aca	aagt	tat	tga	tct	aga	ıtca	attg	ſaaa	ata	agg	tgg	• gag	agt	aca	tga	aa
gtca	tgt	tta	ttt	tcc	agc	cat	ttc	tta	ıgaa	atct	tta	• gag	tga	aat	ata	gaa	acg	ttt	gc
catt	tct	caa	• aaga	ata	aac	tct	acc	att	.caa	agac	agt	tat	ctt	gaa	gct	tgt	gta	aaa	at
taat	cat	ata	tat	tata	ata	cag	cat	tgt	aaa	atag	ıgta	gcc	aaa	act <sup>.</sup>	ttt	gtg	tag	gcg	aa
tagt											aag						gct	gtt	ga
att																			





Exon 55   Start: 268504   End: 268646   Length: 142
7911  7921  7931  7941  7951  7961 GCATAATTTGTTGGACTCTAAGATCAACACCCTGTTATCATTGTGCCAAGATCCAAATTT H N L L D S K I N T L L S L C Q D P N L  2641   2651
7971  7981  7991  8001  8011  8021  GTTAAATCCAATCCATGGAATTGTGCAGAGTGTGGTGTACCATGAAGAATCCCCACCACA L N P I H G I V Q S V V Y H E E S P P Q  2661   2671
8031  8041
cttatttaatttctgttacaatt



Exc	on !	57	S	tar	t:	270	511	I	End	1: 2	707	27	L	eng	th:	21	6		
· tt	ggaa	• aaa	ttg	gct	.aga	cat	cat	tcc	tgg	tga	ttg	· tat	tgt	ctc	agt	att	aca	· ttc	agtc
tgt	cctt	tgt:	gca	tgç	jctt	tca	• gaa	aat	gca	ggt	tca	tct	gga	agc	ttt	aag	ctg	aat	agaa
ct	ccct	• tgt	tgt	aag	stcc	tat	ggt	agt	cta	taa	ata	tta	ctc	cac	tcc	cct	ttt	tta	atga
taa	agta	aat	aca	aaç	Igaa	gaa	• .aaa	tag	taa	.att	aag	tcc	aaa	caa	aat	taa	tat	ttt	tggc
tto	caga	atg	ggg	att	tac	tta	• aaa	aaa	.agg	·	taa	aat	aat	ttc	cta	ttt	tcc	att	acag
CAA Q	AACA T		AAT I		811 CAGA D					'TAT' I	TGT V				814 TGA D		CTT L	81 GAT' I	51 TGAC D
AC0 T	GTA( Y				817 SAAT I			81 AGA E		CAG S	TGA E	191 AGA E 731			820 CCT L		TCC P	82 CAC T	11 ATCT S
CCT P	· TA( Y	221 CCC' P 741	TCC	TGC	823 CACT L	GCA	.GAG	82 CCA Q	GCT	TAG S	TAT I	251 CAC T 751	TGC				CCT L	82 TTC S	71 TAAT N
TC(	CAT( M	281 GAC T 761			829 TGC A				GCA	TTC S	CCC P			gta	aat	gtg	atc	ttt	atat
gad	ctti	tga	gca	aca	ıata	taa	gac	acc	·	·att	agg	· aat	tcc	ctt	gtg	atc	agt	tta <sup>.</sup>	tagc
aaa	atti	ttg	ctc	ctt	.ttt	ctt	atg	aga	.ttc	acc	tta	cat	ttc	ttc	ttt	acc	ttg	taa	ctga

Exon 58   Sta	art: 28403	/   End: 2	8//01   Le	ngth: 3664	
ttttctgtgttag		 tagttagcat		· · ctacataaag	tacacaat
atggtaacctgc					
· · · · gtgtgtagtagg					
· · · caaaatcgcctaa		· · cctagaatgt		· · ttaagcgaca	· catgactg
caatgaaattca			· · · agtaactggc		
8321 GAATCGACAAGGA I D K E	AGAACGTTGA	ACTCTCCCCT		ACTGTAACAG	TGGACGAA
CTCGCCACGGAT	CCGCAAGCCA	AGTGCAGAAG	8411 CAAAGAAGCG Q R S A	CTGGCAGTTT	CAAACGTA
ATAGCATTAAGAA			*11 GCTTTCTTTT		
*41 GGGCTCTTCACTA			*71 TGCCCTTTCC		
*101 CACTTCCTGTTT			*131 TGCCATGTTG		
*161 GAAGCCTTGCCTA			*191 TTTAACTTTT		
*221			*251 TGCAAAGAAA		

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TTTAACTGAGAAATCTCAATTGTAAGAGAGGATGAATTCTTGAATACTGCTACTACTGGC
  | * 341 | * 351
                 | *361
                         | *371
                                | *381
                                        | *391
{\tt CAGTGATGAAAGCCATTTGCACAGAGCTCTGCCTTCTGTGGTTTTCCCTTCTTCATCCTA}
                                        | * 451
  | * 401 | * 411
                | *421
                        | *431
                                | * 4 4 1
CAGAGTAAAGTGTTAGTCCTATTTATACATTTTTCAAGATACAAGTTTATGAGAGAAATA
  | * 461 | * 471
               | * 481 | * 491
                                L * 501
ACTGAAAGAACCATAGAGGTCAAGCCTCAGTGACTTGACACCATAAAGCCACAGACAAGG
  | *581
         | *591
                 | * 601
                         | *611
                                 | * 621
{\tt TACTTGGGGGGGGGGGGGGGGAATTTCATATTTTATAGTGGATTCTTAAGAAATACTAA}
         | * 651
                | * 661 | * 671
                                | * 681
  | * 641
                                        | * 691
CACTTGAGTATTAGCAATAATTACAGGAAAATAAGTGCGACCACATATATCTTAACATTA
                | *721
                        | * 731 | * 741
  | *701 | *711
                                        l *751
\tt CTGAATTAAAACTATGGCTTCTAAGTCCTTATCCAAACTCAGTCATCCAAACTAGTTTAT
  l * 761
        l *771
                l * 781
                        | * 791 | * 801 | * 811
\verb|TTTTTCTCCAGTTGATTATCTTTTAATTTTTAATTTTGCTAAAGGTGGTTTTTTTGTGT|
  I * 881
         | *891
                 | *901
                         | * 911
                                 | * 921
                                        | * 931
\tt TTCCCCTCCCCCTCTTCTTTCCTAACTAATTCTGAGCAGGGTAATCAGTGAACAAAGTGT
               | * 961
         | * 951
                        | * 971
                                | * 981
                                        | * 991
  I * 941
TGAAAATTGTTCCCAGAAGGTAATTTTCATAGATGTTTGCATTAGCTCCATAGCAAAATG
  GAATGGTACGTGACATTTAGGGTAGCTGATATTTTTATTTTGTTAAATAATTTCCAAGAA
         | *1071 | *1081
                        l *1091
                                | *1101 | *1111
TAGAGTATGGTGTATATTATAAATTTCTTTGATAAGATGTATTTTGAATGTCTTTTAATC
  | *1121 | *1131 | *1141 | *1151 | *1161 | *1171
TTCCTCCTCTCCAAAAAAATCAGAAACCTCTTTAAGAAAACATGTAGGTTATATATG
```

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CTAGAATTGCATTTAATCACTGTGAAAAGACTGGTCAGCCTGCATTAGTATGACAGTAGG
  | *1241 | *1251
                | *1261 | *1271
                              | *1281
                                      | *1291
GGGGCTGTTAGAATTGCTGCTATACTGGTGGTATGGATTATCATGGCATTGGAATTTTCA
  | *1301 | *1311 | *1321 | *1331
                              | *1341 | *1351
TAGTAATGCAGATCCAATTTCTTTGTGGTACCTGCAGTTTACAAAATAATTTGACTTCAG
  | *1401 | *1411
| *1421 | *1431 | *1441 | *1451 | *1461 | *1471
TATTAATCCCTCTACTCCCAGGTTCCCTTTATATGTTAAGATATAATGGCTTTGAGGGGG
  | *1481
        | *1491
                | *1501
                       | *1511
                               | *1521
                                      | *1531
GAAAAAATAAACCTAGGGGAGAGGGGAGTTTCCTGTAGTGCTGTTTCATTAGAGGATTTC
  | *1541 | *1551
                | * 1561 | * 1571
                              | *1581
                                      | *1591
AGTAAATTAAATTCCACAGCTAATTCAATAAATAATGGTACATTTAAGTGTTCTGATTTT
                                      | *1651
  | *1601 | *1611 | *1621 | *1631
                              | *1641
| *1661 | *1671 | *1681 | *1691
                              | *1701 | *1711
TGGTTTTGATACTCAGAAATAACAAGAATTTAATTTTTTAAATTTGTTTACAGTCCTGGG
  | *1721 | *1731 | *1741 | *1751 | *1761 | *1771
AAAAGTAAGAATTATTTGCCAAAATAAGAGGAAAGAAAACCTTAGTATTAATGAGTT
  I * 1781
        | *1791
                | *1801
                       | *1811
                              | *1821
                                      | *1831
TACCATAGAATTGTTGGAAATACTGAAGACAGGTGCAATTTACTAAACTTTTGTTTTTAA
                | *1861 | *1871
                              | *1881
  | *1841 | *1851
                                      | *1891
ACTATTGTAGAGGCTGCATTAGAAGAAAATGTTTATAATGACAGAGCAACTATGACTATA
  | *1951
TAAAAAAGCTGAAATTAGAACTGTGTTTAGAAATAGATCAGTAACCCAGTGCCAAGGATG
        l *1971
               |*1981 |*1991
                              I * 2001
AGTTTCTAGGCCCTGGAATAGCAGGCAGTGTAAGCCTTTGATAACTTTAGTTCGATGTTT
```

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TTCTTGTTTGTTTGTTTGGTTGCATATGATAGTGGGTGTTATGCTATTTTGCTCT
  | *2141
       | *2151
              | * 2161 | * 2171
                          | *2181
                                 | *2191
TCCCATCAAAATAAAGAAACTTCCAGAGGTTTACTGTTAAAAAATACTGATATTTCCATAA
  | *2241 | *2251
ACGGGTTTACCAAGGGTGTAGTATTTCATACCGCCTGAAATGATCAGCATTGGCACAAAT
  1*2261
       TTTGAAAACTTAACTAAGGTTTAAAATTTACCTTGTTTAAAGAACTTCTGACTTTTGAGG
  | *2381
       | *2391
              | *2401
                    | *2411
                          | *2421
                                 | *2431
AAAATCTAGCTTTCCAAGTAACTAAAATGTACATGAGATAAACCTCTCACCACTATGTGT
  | * 2441 | * 2451
              | * 2461 | * 2471
                          | *2481
                                 | *2491
CCCTTGAGAAATGCAACACTTTTTTAGTCTTCATACTTGTAATCTATAAAAGAAATTCTG
  | *2541
                                 | *2551
AAGTTTAGACCAAGTTGCCCATTTCTGCGTAATTGACATAAGTTCTGTTAAAAATATTAT
  l * 2561
       |*2571 |*2581 |*2591
                          | *2601 | *2611
AAGTAATTCGTTTCGGTTTGTAGATGTTTCCCCTGACTTGTTAAAGAGGAAACCAGGAAC
  TCAGTCATGTTTTTGTCCTGGATAATCTACCTGTTATGCCAGTACTCCCATCCGAGGGGC
  L*2681
       | *2691
              | *2701
                    | *2711
                          | *2721
                                 | *2731
ATGCCCTTAGTTGCCCAGATGGAGATGCAGTTCAGTAGATTTGGGGCAAAGTGGCTACAG
  | *2741
       | *2751
              | *2761
                    | *2771
                          | *2781
                                 | *2791
\tt CTCTGTCTTCCATTCACTCAACACCTGTTCATGACTGAGCCAGGTGCCCAGGACACATCC
 | *2851
l *2881
                    l *2891
       l *2871
                          l *2901
TGTTTCTACATCCTTCCCCGACTCCCAGGCATAATGAGGCATGTCTTACTCAATGTTATG
```

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|*2981 |*2991 |*3001 |*3011 |*3021 |*3031
| *3091
ATATTCACCTGTAAATAGTTTGTGTAAAATTTGACAAAAAAGTATATTTACTATACTGT
 CATGGATAACAACAAAAATTTGATTATTCTCGTGTTAGTATTGTTAACTTCTTTTTGCGA
  \tt CTGCGTTACATCATTTAAAGAAAATGCTGTGTATTGTAAACTTAAATTGTATATGATAAC
 | *3281
       l *3291
              | *3301
                    | *3311
                           | *3321
\verb|TTACTGTCCTTTCCATCCGGGCCTAAACTTTGGCAGTTCCTTTGTCTACAACCTTGTTAA|
 TACTGTAAACAGTTGTACGCCAGCAGGAAAAATACTGCCCAACAGACAAAATCGATCATT
 | *3451
GTAGGGGAAAATCATAGAAATCCATTTCAGATCTTTATTGTTCCTCACCCCATTTTCCTC
  I * 3461
       | * 3471 | * 3481
                    | *3491
                           | * 3501 | * 3511
\tt CTTGTGTATGTACTTCCCCCACCCCCTTTTTTTTAAGTAAAATGTAAATTCAATCTGCTC
  {\tt TAAGAtatgaggagttatttaatttcttcagatgtatcgagctctgttttcttccccccg}
agtcctcccaatcttttgaaacattaaggccattttccttaaggatgtttttggctctcc
\verb|tactccccgtgagaaagatctttccatttccagaacttctccacactaaaagtgaaatat|
ttttgtgaaatgcttttttagggcctgccaaactcaggtgagtctgttctctgggataag
ctggcttctcttaaaatgaagccagtcagaaatgtcagggcatcccaagattgaccagtc
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agagg

LRG Parser: Version: 1.1, Version Date: 11/02/2015

Reader: Version: 1, Version Date: 11/02/2015 Writer: Version: 1, Version Date: 11/02/2015 Control: Version: 1, Version Date: 11/02/2015