Gene: ASL - Sequence: NG\_009288.1 Date: January 29, 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: 5000 | End: 5068 | Length: 68  $\tt gggcctgatgtcatagcctctacccctggcccgagtctccagtcccctgcgtgtctgctg$ . . . . . . . . .  $\verb|accacagcacgaacgccagcgcactaccctcctcaaccccagcccaggccccttccccgt|$ cggggtcccccaaccctttccccgcccgcttccccgccccggggccgcttagcctccag  $\verb|ctcagcgggaggtatcccgcccacggccaggattggaggatggaggcaacgcccacccc|$  $\tt gccgggcggcctcctattggcgcggccgtcgccaggggtggggacaggaccggcggctgc$ |-99 |-89 |-79 l-69  $\verb|cgtggcgcgcgctcacgtccgcgtccccaagggctgcgctccctcaagcgcagtgcccag|\\$  $\verb| aactcggagccagcccggcccggggaccctgctggccaaggaggtcgtcagtccggtct| \\$  ${\tt tgtcttccagacccggaggaccgaagcttccggacgacgacgaggaaccgcccaacatggcct}$  $\verb|cggaggtgagtgaggactccggtcctcctagcctccaaaggagagagtgggg|$ 

gcgccagac

Exon 2 | Start: 5250 | End: 5305 | Length: 55 . . .  $\verb|ctcctattggcgcggccgtcgccaggggtggggacaggaccggcggctgctgacgccatc|\\$  $\verb|ccggccagaaaagccctggccagtggcggcgcacactatccgtgcggccaggcggagg|$ tgagtgcgcggccggatgggcgggacggcgtggaggacgccgagcaccgtggcgcg $\verb|cgctcacgtccccaagggctgcgctccctcaagcgcagtgcccagaactcggag|$  $\verb|ccagcccggcccgggggaccctgctggccaaggaggtcgtcagtccggtcttgtcttcca|\\$ l-39 1-29 |-19 |-9 |1 |11 .  ${\tt ACCCGGAGGACCGAAGCTTCCGGACGACGAGGAACCGCCCAACATGGCCTCGGAGgtgag}$ M A S E 11  ${\tt tgggacctcggggactccggtcctcctagcctccaaaggagagagtgggggcgccagacc}$ tgcctcgggccaccctgctgggaatcgccctccaggaagcaattttgaaaattacctagg $\tt ggactcaccagtatccgcaggcagcccttgtggcaaacccaccaccaccaccacctactaggg$ . . . . . . 

 $\verb|cctgggaggcagagtttgcagtgagctgagatggcaccactgtactccagcctggccgac|\\$ . . . .  $\tt gttcccatgctcactcccagggtggtgactctgggaaggtctcagcctccttgtctgccc$  ${\tt agttagaatgatctgatgcccctgctaccatcagacttgataagtttcccaaagactctt}$ tg caagaag cact gttct gg agg gg gg agg agg act a att gttctt gctctcct gg cca|31 |41 |51 |61 AGTGGGAAGCTTTGGGGTGCCGGTTTGTGGGTGCAGTGGACCCCATCATGGAGAAGTTC S G K L W G G R F V G A V D P I M E K F |11 81 |91 101 |111 |121 |131  ${\tt AACGCGTCCATTGCCTACGACCGGCACCTTTGGGAGGTGGATGTTCAAGGCAGCAAAGCC}$ N A S I A Y D R H L W E V D V Q G S K A 131 141 |151 |161 |171 |141 181  ${\tt TACAGCAGGGGCCTGGAGAAGGCAGGGCTCCTCACCAAGGCCGAGATGGACCAGATACTC}$ Y S R G L E K A G L L T K A E M D Q I L |51 |61 201 . . . . . .  ${\tt CATGGCCTAGACAAGgtacttgccgtggcccaagccccacccaaggccccttccctgtgg}$ H G L D K  $\verb|ccccaggctcccaccaaatccctgagcaaacagtgcagtgttgcccatctgtggtttcac|$ 

Exon 3 | Start: 11014 | End: 11209 | Length: 195

 $\verb|attgaactaattatatactcaagtgctgtttaactgtgtgccttgatgactgcctctctc|\\$ 

agggatagggtgggac
Exon 4   Start: 11579   End: 11663   Length: 84
${\tt agcaaacagtgcagtgttgcccatctgtggtttcacattgaactaattatatactcaagt}$
gggctctcttggctgctgatgcctgctcacctgaccccggcattgctgctacccactaca
211  221  231  241  251  261
GTGGCTGAGGAGTGGGCCCAGGGCACCTTCAAACTGAACTCCAATGATGAGGACATCCAC V A E E W A Q G T F K L N S N D E D I H  71    81
271  281  291

cctagcactttgggaggctgaggtgggaggattgcttgagaccaggagttcgagaccagc
caggcctcagcagaaatggcgagag
Exon 5   Start: 12091   End: 12148   Length: 57
${\tt agccaggcaccctggctcatgcctataatcctagcactttgggaggctgaggtgggagga}$
301  311  321  331  341 GAGCTCATTGGTGCAACGGCAGGGAAGCTGCACACGGGACGGAGCCGGAATGACCAGgtg
E L I G A T A G K L H T G R S R N D Q

tcctacagggacacccagggggcagacagaggtgtgatggaagcctgaacaggagacc
Exon 6   Start: 12288   End: 12386   Length: 98
351
411  421  431  441
TGGGAGCTCATTAGGACCATGGTGGATCGGGCAGAGGCgtgagtcctacagggacaccca W E L I R T M V D R A E A  141
gggggcagacagaggtgtgatggaagcctgaacaggagacctagggggcaggggtgaaca

 $\verb|cactttgggaggccgaggttgggttggatcacctgaggtca|\\$ Exon 7 | Start: 15796 | End: 15874 | Length: 78 . . . . . . .  $\verb|ctattctggcccctgctcggagatgctgagtgacagaggctggacttggggtgtttctgg|\\$  ${\tt caaagcctcactgcaggaagccccacagctcaggcccagtccttggttcacacggtccca}$  $\verb|cttccagcttcttttgcccttaagactgatttgtccctgggagatcaccagatccctcat|\\$  $\verb|tcaggtggagtgctgcagcgtgacactttttccaggggtgacccaggcctgcagggttcc|$  ${\tt agtgtcacaggccttgcatgagcctccacccgagcttctgctcctcctcccaca}$ 451 |461 |471 |481 |491 1501  $\tt GGAACGTGATGTTCTCTCCCGGGGTACACCCATTTGCAGAGGGCCCAGCCCATCCGCTG$ ERDVLFPGYTHLQRAQPIRW 151 1161 |521 . . |511  ${\tt GAGCCACTGGATTCTGAGgtgagccaggtgaggtgcaggggctgtgctagaggggaggac}$ S H W I L S |171 . . . . . .  $\verb|cccggctgccctgaccctcgccctggcttcccacagccacgccgtggcactgacccg|$ agactctgagcggctgctggaggtgcggaagcggatcaatgtcctgcccctggggaggtg $\tt ggtgaggctccagtgccccgagggcctggtgggggggggtggctgctgcatagccttagggatt$ 

 $\tt gacagagctgggaagtgcagagtgggacagaaaaccgccttatctgctcagcgggggact$ 

. ctgcatggagccccagctc

ggagatcaccagatccctcattcaggtggagtgctgcagcgtgacactttttccaggggt $\tt gacccaggcctgcagggttccagtgtcacaggcaggccttgcatgagcctccacccgagc$  $\verb|ttctgctcctctcccacagggaacgtgatgttctcttcccggggtacacccatttgc|$ agagggcccagcccatccgctggagccactggattctgaggtgagccaggtgaggtgcag $\tt gggctgtgctagaggggaggaccccggctgccctgaccctcctgcccctggcttcccaca$ |531 |541 |551 |561 |571 |581  $\tt CCACGCCGTGGCACTGACCCGAGACTCTGAGCGGCTGCTGGAGGTGCGGAAGCGGATCAA$ H A V A L T R D S E R L L E V R K R I N 181 191 |591  ${\tt TGTCCTGCCCTGGGGAGgtgggtgaggctccagtgccccgagggcctggtgggtggc}$ V L P L G S 201 . • . • tgctgcatagccttagggattgacagagctgggaagtgcagaagtgcagaagacagaaaaccgcc $\verb|ttatctgctcagcggggactctgcatggagccccagctctcgctaaggtgacgaccaag|$  $\verb|ccattgaatgttctgagcagggccagagccctccagcaaggctcctggcaagcccagcc|\\$ tgctgccctcagcctgacatgtgggaacatgtgtcaggagacaagtgtcctgcacccagg

Exon 8 | Start: 15955 | End: 16033 | Length: 78

gtgacttagtgcttgggga

Exon	9	5	3ta	rt:	16	5545	5	End	<b>d</b> :	16	598	I	Lei	ngtl	h:	53				
caag	cco	cago	cct	gct	gco	cctc	ag	cctg	gac	atg	gtg	gga	aca	atg	tgt	cag	gag	aca	agt	gtc
ctgc		rcad		t or a		art		tta	mma		a a o	t at	++-	· Fort	ແແລ			raaa		a ort
Cugo	act	Jua	555	uga	.000	, ag c	,80	oog	568	Sacc	ug	ug (	, 0 0	og o	55ª	.cac	. U U E	,555	acac	ugu
attc	tg1	tac	cca	agg	aga	acte	gg	ccag	ggg	gaag	gag	gct	aaį	gcg	cca	ggt	ggt	tgc	cct	ggc
aacc	agg	gact	ttg	gtt	cto	ctgt	gt	gtgo	cgt	tc	gtg	tgt	gt	gtg	tgt	gtg	tgt	gtg	tgt	gtg
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tgtg	tgt	tgt	зtс	agg	gct	cgcc	tg	ccag	gga	igco	cct	ggt	ca	cca	tga	atc	cct	gtc	cct	gca
TGGG	GC		611 TGC		CA <i>I</i>	62  ATCC		TGG(		63: TG0		CGA		641 GCT	GCT	CCG	165 AGC		tgaı	gac
	A	Ι	A	G	N	P	L	G	V	7 I 21:	) :	R	E	L	L	R	A	E	.0.6	<b>J</b>
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gtcc	tgo		ctc	ctc	cco	cage	ggaį	gaat	tca	cco	ctc	ago	ac	ccg	cca	.aga	cct	gca	gaca	aca
•																				
cctg	aaa	acca	aga	ggg	cag	ggg	gcc <sup>-</sup>	tgtg	ggc	tco	ctg	gte	gaa	acc	ttc	att	cat	tgc	ctat	tgg
gcac	tga	agg	tca	tca	.agt	tca	ıgg	ggto	cac	tca	atg	gca	ıgg	gat	gcc	tgg	tac	tga:	gaga	act
cagg	gct	tcc1	tgc	ctc	cct	cct	gg	gact	tgt	gca	aaa	aga	itc	cct	ccc	ccc	ago	etgt	tgc	ccc
38			5				550		0	5		O.					0	0	0	
accc	tga	atca	agg	gga	ggg	gggc	tg:	ggca	· aac	cta	agt	tgg	· ggg	gaga	agg	ggg	cca	actc		

agcacccgccaagacctgcagacacacctgaaaccagagggcaggggcctgtggctcctg $\tt gtgaaaccttcattgcctatgggcactgaggtcatcaagttcaggggtcactcatg$ agatccctcccccagctgttgccccaccctgatcaggggaggggggctgggcaacctagttgggggagaggggccactccctgtcctccagcttagccctgcttcctcccacccccca661 671 |681 691 701 AACTCAACTTTGGGGCCATCACTCTCAACAGCATGGATGCCACTAGTGAGCGGGACTTTG L N F G A I T L N S M D A T S E R D F V |221 231 TGGgtgagtcctggggagccagtcccctgccctgtgcctcactttagtccttcagcccag $\verb|cttctcccagtttcctcccacacctccacggacaggctggttgtggtgatattgtacac|\\$ tgaagtataaaccttaaatgggtaaagtgggtggggcatggtggttcaccatgcccagcatgg caggtgcctgtaatcccagctactcaggagttctgaggccagagaatcacttgaacccagg

Exon 10 | Start: 16940 | End: 17003 | Length: 63

 ${\tt caaaaaacacgctaggtgcaatggcttacgtttgtaatcctagcactttgggaggccaaa}$  $\tt gcagaaggattgcttgagcccacaagtttcagaacagcttgggcgacatagcacgacccc$  $\verb|atctttgcgaaaaatgaaaatttagccgggtcccccaccgcctaacctcctcctgcccc|$  $\verb|ctgtatggtcaggctgggggatgggaaggcctggtgactgggaaccttttctccca|\\$ 721 |731 |741 751 |761  $\tt CCGAGTTCCTGTTCTGGGCTTCGCTGTGCATGACCCATCTCAGCAGGATGGCCGAGGACC$ E F L F W A S L C M T H L S R M A E D L 1241 |781 |791 |801 |811 |821 |831  ${\tt TCATCCTCTACTGCACCAAGGAATTCAGCTTCGTGCAGCTCTCAGATGCCTACAGgtaag}$ I L Y C T K E F S F V Q L S D A Y S 261 271  $\verb|ccctgaactgccacctccatctgccgctgccggcctctgtatcccccgccgccgcggac|$  $\verb|gtggctgccttcctcccgtcccacccttcgccagacctggccattgcggcgctggacc|$ agccaagggtccagccccttcagcgccagcacctctgtccccagcacgggaagcagcctg  $\verb|atgccccagaagaaaaaccccgacagtttggagctgatccggagcaaggctgggcgtgtg|$ 

Exon 11 | Start: 18018 | End: 18133 | Length: 115

 $\tt ggaaccttttctcccagccgagttcctgttctgggcttcgctgtgcatgacccatctcag$  ${\tt caggatggccgaggacctcatcctctactgcaccaaggaattcagcttcgtgcagctctc}$ . agatgcctacaggtaagccctgaactgccacctccatctgccgctgccggcctctgtatc $\verb|ccccgccgccgcggacgtggctgccttcctcccgtccacccctccgccagacctggc|$  $\verb|cattgcggcgctggaccagccaagggtccagccccttcagcgccagcacctctgtccca|\\$ 851 1861 871 881  $\tt CACGGGAAGCAGCCTGATGCCCCAGAAGAAAAACCCCGACAGTTTGGAGCTGATCCGGAG$ T G S S L M P Q K K N P D S L E L I R S |281 K A G R V F G R 1301  $\verb|cgcagtgtgccgggctcctgatgaccctcaagggacttcccagcacctacaacaaagact|\\$ tacaggtgcgaggccggggggggcctggctagtacgtgccagttctcagggctctggcac $\verb|actcaggcagggccccaccccgggattgccatacatcctcccatcctgtgcacacagctc|$ . . . . . .

Exon 12 | Start: 18302 | End: 18387 | Length: 85

 $\verb|catccgtggctgcccttgaactctct|\\$ 

921   931   941   951   961   971   TGTGCCGGGCTCCTGATGACCCTCAAGGGACTTCCCAGCACCTACAACAAAGACTTACAG C A G L L M T L K G L P S T Y N K D L Q   311   321
ggcagggccccaccccgggattgccatacatcctcccatcctgtgcacacagctccatcc
gtggctgcccttgaactctctgcccttcctttgttggggtattgagtgttcttcccatgg
g

Exon 13 | Start: 18487 | End: 18547 | Length: 60

13

Exon 14 | Start: 18823 | End: 18907 | Length: 84

981   991   1001   1011   1021   1031   GAGGACAAGGAAGCTGTGTTTGAAGTGTCAGACACTATGAGTGCCGTGCTCCAGGTGGCCE D K E A V F E V S D T M S A V L Q V A   1331   1341
1041  1051  1061
cccaggcactggggtgggcatgcggggaggtggccttgggaggaggtgaggtgggctg
gaggacctggggcagggaaggaggtgtgctcgctcctgctcctggggaacagggaaaag
gacagaaactgctgccatgcagtggaagtagatgagactcagggggcctggggcctgtca
aatggcctgaccagaactctttaaaaaaagaaaatctaaacaaaaggccaggtgcagtgg
ctcatgcctggaatctcacactttg

Exon 15 | Start: 21217 | End: 21298 | Length: 81

aga	acc	ctg	tct	cct	aaa	aca	gaa	aac	aaa	atc	ctc	cag	gaa	aca	tct	ga	tgc	atg	ctg	aag	a
ta	agg	act	ctt	tga	aaa	cat	aaa	ggc	cag	gta	aaa	cat	aca	agg	cca	igt:	aag	tgt	tca	tag	С
ac	atg	taa	ata	tta	tcg	ata	att	atg	gaga	aag	atg	gtt	caa	agt	tga	nga	gtg	aga	.cag	agc	С
ga	gtg	ggt	aag	aga	gta	tct	gcc	caa	ıggo	cag	gga	tgt	cct	tgg	cag	gag	ggg	cag	gtc	ctg	<b>5</b>
gc	ctg	gca	gct	tca	gat	ссс	agg	gtc	cco	cag	ggc	tca	cca	act	cgc	cc	acc	tgt	gcc	ccc	a
AT'	TCA H	CCA Q	10 AGA E		CAT M	GGG G	081 ACA Q 61	GGC			GCC	CCG D	AC/	L10: ATG(	CTG	GC( A	CAC T	111 TGA D 71			1121 C
TA' Y	ΓΤΑ· Υ	CCT	11: GGT V		CAA K	AGG G	141 Ggt 81	aag	tgt	tgt:	agc	ago	cag	ggg	gga	ugg	gtg	;agg	gaga	tgg	50
gt	gcc	ccc	ccc	aga	ggg	tgg	ggg	ago	tca	agg	aat	ggg	tgo	caa	gce	gc	cca	.gcc	tgg	tgg	С
tc	acc	cct	gta	atc	cca	gca	ctt	tgg	gaa	agc	cga	ggt	ggg	gcgį	ggt	ca	ctt	gag	gcc	agg	a
gt	tcg	aga	cca	gcc	tgg	tca	aca	tgg	tga	aaa	ccc	cgt	cto	ctt	ttg	gat	gta	.aaa	ata	caa	С
aa	tta	gct	ggg	tgt	ggt	ggc	aca	ctc	ctg	gta	atc	cca	gtt	tac	tce	ggg	agg	ctg	gagg	cag	5
aga	aat	tga	ttg	aac	tgg	gag	gt														

Exon 16 | Start: 21768 | End: 21875 | Length: 107

	g
gtgtggtggcacactcctgtaatcccagttactcgggaggctgaggcaggagaattgat	;t
	:a
	ıa
	;a
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	.201 .G .01
1211   1221   1231   1241	
	g
cgccctggcccacctcttcctctccccagccccctgttctcgggcgacgtgatctgc	;g
	;a
	:c
tcccacacctgccccctaataaagtgggcgcgagaggaggctgctgtg	

Exon 17 | Start: 21979 | End: 22555 | Length: 576

aaaaaaaaaaaaggaagg	ggggtgcagg	gcaatggaggo	cagatcaggg	 catggagaaa	.cctgc
ctcagcgccatcttcc	tccctggcac	ccagatgcca	attccgccag	 gcccacgagg	cctcc
gggaaagctgtgttcat	tggccgagac			 cagctgtcac	tgcag
gagctgcagaccatcag	 ggtacggccc	 atccccttcc	ccatgctgc	 ctcctaggaa	gtgag
	ccagggtggc	 ctggcgccct	ggcccacct	 cttcctctct	cccca
1251  1261 CCCCCTGTTCTCGGGCC	1271 GACGTGATCT				
	D V I C				Q Y
TGGTGCCCTGGGCGGC	1331 ACTGCGCGCT T A R S	CCAGCGTCGA			CGGGC
GCTACTGCAGGCACAG	1391  CAGGCCTAGG Q A *				
+41  -		+61   CCCCAGCCTC			+91 TTCGG
+101  - GGCTGGCCAGTGGGGA					+151 TCCCA
+161  - GCACTTTGGAAGGGCAA	+171   AGGTGCGAGG				+211 TGGGC
+221  -	+231   CATCTCTACT	-		•	+271  GGCCC
+281  -	+291	+301	+311	+321	+331

AIGCAIAIAGICC	JAGCIACIIG	TAAGGCTGAG	GIGAGAGGA	CACTIGIGCC	CAGGI
+341 GAGGCTGCAGTGA	· ·	•	•	+381 GGATAACAGA	-
+401 CTATCTCTAAAAA		+421 AACGAAAAAT		· cggagaaaac	tgggo
ggcaatgagagtc		agggaagagg	ggggctccca	tcatagcctc	tgcto
ccaggccccatcc					
	ccttcagaca	gggtatcaca	igtgacctcc	taggccagga	gcgat
tcacgcctgtaat					
	cctagcattt	tgggaggcct	gggcaacag	gaagactcca	actad
attaaaaaaaca					
	tgaatgaaag	caaaaacaaa	lacaactagc	caaactgggc	gcgg†