

1
SEQUENCE LISTING

<110> WuXi Biologics (shanghai) Co., Ltd.
WuXi Biologics Ireland Limited

<120> ENHANCED EXPRESSION SYSTEM AND METHODS OF USE THEREOF

<130> 6711-2018311IB

<150> 202010102211.1

<151> 2020-02-19

<150> PCT/CN2020/081464

<151> 2020-03-26

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<211> 43

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	gctcaagatg acatcagtcc catttgtcct aagccctggt gttgtatgga tggcaagcag	180
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<210> 31
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 <213> Artificial Sequence

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<223> A first PB transposase recognition site sequence

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 gttttattat atttacctt acatactaata aataaattca acaacaatt tatttatgtt 180
 tatttattta ttaaaaaaaaa acaaaaactc aaaatttctt ctataaagta acaaaact 238

<210> 32
 <211> 311
 <212> DNA
 <213> Artificial Sequence

<220>

<223> A second PB transposase recognition site sequence

<400> 32
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 ttgactcacg cggtcgttat agttcaaaat cagtgcact taccgcattg acaagcacgc 180
 ctacaggag ctccaagcgg cgactgagat gtcctaaatg cacagcgacg gattcgcgct 240
 atttagaaag agagagcaat atttcaagaa tgcatgcgtc aattttacgc agactatctt 300
 tctagggtta a 311

<210> 33
 <211> 594
 <212> PRT
 <213> Artificial Sequence

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<223> The second nucleic acid encoding a piggyBac transposase

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 His Val Ser Glu Asp Asp Val Gln Ser Asp Thr Glu Glu Ala Phe Ile
 35 40 45
 Asp Glu Val His Glu Val Gln Pro Thr Ser Ser Gly Ser Glu Ile Leu
 50 55 60
 Asp Glu Gln Asn Val Ile Glu Gln Pro Gly Ser Ser Leu Ala Ser Asn
 65 70 75 80
 Arg Ile Leu Thr Leu Pro Gln Arg Thr Ile Arg Gly Lys Asn Lys His
 85 90 95
 Cys Trp Ser Thr Ser Lys Ser Thr Arg Arg Ser Arg Val Ser Ala Leu
 100 105 110

Asn	Ile	Val	Arg	Ser	Gln	Arg	Gly	Pro	Thr	Arg	Met	Cys	Arg	Asn	Ile
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Ser	Glu	Ile	Val	Lys	Trp	Thr	Asn	Ala	Glu	Ile	Ser	Leu	Lys	Arg	Arg
145				150					155						160
Glu	Ser	Met	Thr	Gly	Ala	Thr	Phe	Arg	Asp	Thr	Asn	Glu	Asp	Glu	Ile
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Tyr	Ala	Phe	Phe	Gly	Ile	Leu	Val	Met	Thr	Ala	Val	Arg	Lys	Asp	Asn
		180						185				190			
His	Met	Ser	Thr	Asp	Asp	Leu	Phe	Asp	Arg	Ser	Leu	Ser	Met	Val	Tyr
	195						200					205			
Val	Ser	Val	Met	Ser	Arg	Asp	Arg	Phe	Asp	Phe	Leu	Ile	Arg	Cys	Leu
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Arg	Met	Asp	Asp	Lys	Ser	Ile	Arg	Pro	Thr	Leu	Arg	Glu	Asn	Asp	Val
225				230						235					240
Phe	Thr	Pro	Val	Arg	Lys	Ile	Trp	Asp	Leu	Phe	Ile	His	Gln	Cys	Ile
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Gln	Asn	Tyr	Thr	Pro	Gly	Ala	His	Leu	Thr	Ile	Asp	Glu	Gln	Leu	Leu
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Ser	Lys	Tyr	Gly	Ile	Lys	Ile	Leu	Met	Met	Cys	Asp	Ser	Gly	Thr	Lys
	290				295					300					
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Gly	Val	Pro	Leu	Gly	Glu	Tyr	Tyr	Val	Lys	Glu	Leu	Ser	Lys	Pro	Val
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His	Gly	Ser	Cys	Arg	Asn	Ile	Thr	Cys	Asp	Asn	Trp	Phe	Thr	Ser	Ile
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Pro	Leu	Ala	Lys	Asn	Leu	Leu	Gln	Glu	Pro	Tyr	Lys	Leu	Thr	Ile	Val
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			405					410					415		
Leu	Ser	Ser	Cys	Asp	Glu	Asp	Ala	Ser	Ile	Asn	Glu	Ser	Thr	Gly	Lys
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Pro	Gln	Met	Val	Met	Tyr	Tyr	Asn	Gln	Thr	Lys	Gly	Gly	Val	Asp	Thr
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Leu	Asp	Gln	Met	Cys	Ser	Val	Met	Thr	Cys	Ser	Arg	Lys	Thr	Asn	Arg
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Ser	Phe	Met	Arg	Lys	Arg	Leu	Glu	Ala	Pro	Thr	Leu	Lys	Arg	Tyr	Leu
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Asp	Asp	Ser	Thr	Glu
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<400> 34

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<220>
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<220>
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4068

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<211> 3949

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<213> Artificial Sequence

<220>

<223> Transcription regulatory element D

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<212> DNA

<213> Artificial Sequence

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<220>
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<220>
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<400> 41
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 gctgtagtag ttccctggta gagttttttg ggttacttat gtaactatca tatcatctgc 300
 aaacagtaaa aatttgactt cttcctttcc aatttgtatc cccttgttct cttttttgtt 360
 gtcataattgc cccagataga acttcaagta caagcagaag tcattctctt ctgcttcac 420
 tgtgttggga tgttcaggtc ttgctggcgt agagtcctta gattctagtgt gtgtcatatt 480
 gttttttctg ttattgaatg cgtttttata ttgttgtctt cccatctctt cttccagtgg 540
 gttcaggtgc cgtctcttcc tctcctgggtg tgtatgggtc caaggttctc tttggtggat 600

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cctctctagg	tgggggtggg	aactggacta	gcacagtgat	gtcatcagac	ttgaggttgc	720
ttggtcctca	gggggcaagt	tgatttgcct	gcagtcccca	ggacaggagt	tcccagagtg	780
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cctcatgact	taaagaatct	gaggtttttag	aatcaaactt	cagggaacat	catttagcaga	1140
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<210> 42

<211> 1886

<212> DNA

<213> Artificial Sequence

<220>

<223> Transcription regulatory element H

<400> 42

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gaaaattttt	gtggttttat	tgtatcatga	ggcattgaaa	catctgaaca	aatcaatatc	540
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ttcgagacag	ggtttctctg	tgtagctttg	gaacctatcc	tggcactcgc	tctagagacc	1860
aggctggcct	cgaactcaca	gagatc				1886

<210> 43
 <211> 1118
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Transcription regulatory element I

<400> 43
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 tgttagctga gagctctggg ttcgtggagc gactctgggt cagtgaataa gatagagagt 180
 gacatcagct ttgggcttcc acagcaaagt agctcacttg catgcaaaca gaaatgcaaa 240
 cacatgcaca aagcaaaaaca aaaggaacac aggccaaagg tgggtcattc ctataccatc 300
 ccctcagcag ggtgcagtcc ccacaccctg acccagttcc ctcatgatgt tagagaaaat 360
 aactttgccc ctttcaacga acatttcagc tccaagagaa cctggcccac tttgaaagct 420
 ttaattagaa atgtgcaatt acccggaaca gatgtctgtt gtgattgttg agacataggt 480
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 acagtgaagt actcatcacc ctaaaaaagt atcgaattcc agtcttcaga gttagctttc 720
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 gggtaatgtt gtgtgatgga tcagtcttat ttgttacttg tttactagta cttactgaga 1080
 ttgtcgatgg ctttaatgtc aacatgagtg tggagatc 1118

<210> 44
 <211> 1611
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Transcription regulatory element J

<400> 44
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 aaagatgaga tggtaggaac ttacatatca caagtgccaa ggcagggggac agtcagctaa 180
 gccaggtttc ctttaagtact gtggggggctc tgggagaatt gagacctgtc ttaccctgga 240
 ccaatggcca ttcaggatat ttcattgctcc agcaagcatc caatagttca ttgatattct 300
 cccaccaagg cagagttttg gatggacttt tccacctgta tggcctttca gtgtggcaaa 360
 ctttcatacc tgaaattcag gcaaagctcc tgaagtttgg aaaaccagg ctttactggg 420
 ctgggtcaact ggtctacatc tccttagtga tgacaatggc atgtcctccc atccctctga 480
 ctaagctgcc acaatgttcc tctgcctgca gcctgggttt cttagggata tgtctaggta 540
 agtcccctac agctccaaga ctactgtcta gcataaaagc tttgagaaca agactgagag 600
 tttagaggcc ttcattgcaat ctttggggaa catcagaccc agatgtcatg gctgggggtca 660
 catggtagtt gagaccatg ccctgcctgg actccatgca aggtcagaca gtgaactttg 720
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 ccctttgacc aatctgtacc tgaacccaag aagaaccagt tggaggagcc aggctgggaa 840

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gactgttagc	cagtacaatg	gctaggtggg	tggcaggacc	agaggagcat	agttgtatgt	1140
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cctaataattt	aacactttta	agaataacta	actgggttga	ctgtccaaaa	gccgcacatg	1560
tctaattggtg	ttgaatgtcc	attcttatct	agaaattgct	tagaagtgat	c	1611

<210> 45

<211> 1299

<212> DNA

<213> Artificial Sequence

<220>

<223> Transcription regulatory element K

<400> 45

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ggcgtgcact	taccctgctt	gtagaaagta	aattggcctg	tttagccatg	caatgctgtt	180
ttagtgcag	cattcctaga	gtaaaaagaa	cttttgatgc	cattgaacct	aaagctcaga	240
aatttggaat	gtaaagctgt	cattgcaaca	cacatttcta	aatctttacc	catgttttgg	300
aaaatacaat	aaattcagaa	attgtcagta	actgaattgc	tatgtcttaa	aagcattttac	360
tattgacatg	ttttgggaga	attaaagtta	gcttggaat	ttaaaaaaa	aatgaagaat	420
tcaaacatat	tgaaaaatag	attgatatta	gtaaatatta	atatctttta	catatagaag	480
tgtcatagtg	ccactctatt	acattgaatc	atthagactt	gttattttca	tagattttatt	540
ttataaattt	atTTTTTctg	ctaattctttt	tatttttaaat	tggttcttca	caatcttaag	600
tgacaaaata	ttctcaatat	tggcaattat	atattgcttt	tatatgcaaa	tttaaaatag	660
gatacataaa	ttgcaaatta	atTTTgttac	tgtaggaatt	atttgaaata	tactggctgt	720
agtcactaat	gtagattttac	aggattcatc	tttcaccatt	gtagttctgt	acccattctt	780
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ttttgtcagt	gccacccaaa	gacaagataa	acaaatactt	aaagaactga	tgaatgaaaa	960
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tctaccatta	gtagaatcat	tgttttccta	atgaaaggat	ggattctgtc	acatctccca	1140
aaaattagaa	tggtcctata	ttgtccattt	ctcaaatact	tttaattcat	aaataaccaa	1200
agtgtcagg	tgcattgacat	gttttggaact	acttgatttt	aggagcctaa	tattccctgg	1260
ttacccttta	aatgcaagca	ccatttcta	agctggatc			1299

<210> 46

<211> 1108

<212> DNA

<213> Artificial Sequence

<220>

<223> Transcription regulatory element L

<400> 46

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gctgagagct	ctgggttcgt	ggagcgactc	tggttcagt	aataagatag	agagtgcacat	180
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gcacaaagca	aaacaaaagg	aacacaggcc	aaaggtgggt	cattcctata	ccatcccctc	300
agcaggggtc	agtccccaca	ccctgaccca	gttccctcat	gatgttagag	aaaataactt	360
tgcccccttc	aacgaacatt	tcagctccaa	gagaacctgg	cccactttga	aagctttaat	420
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aatcacacag	cagtttgctg	ggttacagaa	ggttgcaagt	aactttaaaa	cacagttttt	540
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tgtgtcctgt	ccctgggatc	cagttgggtg	aaagagagaa	cggactcctg	caaggtggcc	840
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tgggctcacg	cataaggcac	tcactggact	ctactcttct	actctgtggt	tacttttttg	960
tgttcaagca	taccatacct	tgatctacat	gattttttact	ccaaagacac	agccagggtta	1020
atgttggtg	atggatcagt	cttattttgtt	acttgtttac	tagtacttac	tgagattgtc	1080
gatggcttta	atgtcaacat	gagtgtgg				1108

<210> 47

<211> 3619

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element A

<400> 47

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tgttcatgg	tggcaataat	tcttcaggaa	aatattttact	atcaatcagt	tatgagaaaa	120
gggactctgt	gtcgtaaaa	cagcacgttg	cttctcatac	caggaccatt	ttgcttcagc	180
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atgtacacaa	ggccactgat	gggcttattc	caaagaaaga	cagacctttc	ccactgtagg	420
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cagtcaataa	ccgctgtcca	tttaaagcta	caataaatat	agagctcatc	atgttcccca	720
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gggcagaggc	aggcagatc					3619

<210> 48

<211> 1114

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element B

<400> 48

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<210> 49

<211> 4068

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element C

<400> 49

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<210> 50

<211> 3949

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element D

<400> 50

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<210> 51

<211> 1128

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element E

<400> 51

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<210> 52

<211> 1352

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element F

<400> 52

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<210> 53

<211> 1246

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element G

<400> 53

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aggagacagc	tgaagctcag	catctggcaa	gacccaacag	ggtccctctg	ctaataatgt	120
tccctgagat	ttgattctaa	aacctcagat	tctttaagtc	atgaggtgac	atcctcacct	180
cagacttcta	aatcacctgt	gttctccttt	ctacaaatgg	gacaaacatc	catccaacat	240
tcaagtccaa	aacctgagag	tcatccttaa	tttctctttt	ccttttttagc	tccctaccga	300
ttctttttca	aaaatccacc	ctttctctca	atcttcacgt	catcagtttt	tagaaatagg	360
tcatttctct	ccctgagctt	atcatctgcc	tacatgaatc	tgaactctca	ttttaaaaat	420
cacatgtaga	gcttggtccc	tgccttgagc	ccgacttctg	cctgtccact	ctgggaactc	480
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gatgacatca	ctgtgctagt	ccagttccca	ccccaccta	gagagggagt	gccccagacc	600
cgcctgaacc	caccataaga	cccatacagag	tatcagaccc	tcttgcatcc	accaaagaga	660
accttgacc	catacacacc	aggagaggaa	gagacggcac	ctgaaccac	tggaagaaga	720
gatgggaaga	caacaatata	aaaacgcatt	caataacaga	aaaaacaata	tgacaccact	780
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agctaagtgg	aaggatacaa	gattaactca	aaaaatcact	agccctatta	tacacaggag	1080
ataaatgggc	tgagaaataa	atcagagaaa	catcatcctt	tacaatagcc	aaacaacata	1140
aaatatcttg	gggtaatgat	aaccaaacaa	gtgaaagacc	tgtctagcaa	gaactttgag	1200
tcttaaaaga	aagaaattaa	agaagatacc	agaaaatgga	aagatc		1246

<210> 54

<211> 1886

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element H

<400> 54

gatctctgtg	agttcgaggc	cagcctggtc	tctagagcga	gtgccaggat	aggttccaaa	60
gctacacaga	gaaaccctgt	ctcgaaaaac	caaaaaaaga	aaaaggaaaag	aaaagaatTT	120
agtgaaaaag	caacattgtg	catatgttat	gtgtgtttac	atgatgagtg	tattctgtgt	180
atgctacaac	actcatgtaa	aggtcagagg	aaatctctct	ctccttccaa	ctcgtatcac	240
tagtcttata	gggcaagtgc	ctttaccctt	tgagcacaac	cttgggtcttt	ttaagggtgtg	300
tgtccctgtg	tctggttcct	tcgtagtttg	atagtgtttc	caaagcttct	tcctaaagca	360
ggacaaattg	gctgagcctg	aatccgatat	gcgtgtggag	aggggcgggc	aatagggtgtg	420
tggaaagaga	gtgtctgtgc	ctctttatta	gaccagaag	cactacctac	aagtccagcc	480
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aaatatcata	cacaaatgag	cagggccgag	gtgggagtag	gtgcagtgcg	cttctgtcac	1140
cacgggtgtg	tgcatgatgt	ttggatgcta	gactagttgc	atctgacagg	agaagtttgt	1200
gttgtaggag	cgcatgcctt	ggaaagactt	aagtaatgca	aaagattgtc	ggtttttgtt	1260
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ctgctagaaa	gaccttgata	aatatggttt	cccatgttta	gattctatgg	gttgaagtcc	1800
cggatggacc	tgctctattc	ccaaaagggt	caggatcaca	ttcagagtgc	ccacattccc	1860
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<210> 55

<211> 1118

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element I

<400> 55

gatctccaca	ctcatgttga	cattaaagcc	atcgacaatc	tcagtaagta	ctagtaaaca	60
agtaacaaat	aagactgata	catcacacaa	cattaccctg	gctgtgtctt	tggagtaaaa	120
atcatgtaga	tcaaggatat	gtatgcttga	acacacaaaa	gtaaccacag	agtagaagag	180
tagagtcacg	tgatgtcctt	atgcgtgagc	ccacttcctt	ttttgcgttt	gttttttactt	240

aatgtctggc	agaattcagg	catgtaggtc	agaggccacc	ttgcaggagt	ccgttctctc	300
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tacctactga	gccatttcac	cactgacttg	gttttactga	aagctaactc	tgaagactgg	420
aattcgatac	tttttttaggg	tgatgagtca	ctcactgtac	agcctcagca	ctattgctga	480
agtacattac	cctcacaaac	caggcagccg	gagactcact	gcttacatgt	aatcgaggcc	540
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accttctgta	accacgcaaa	ctgctgtgtg	attctttaac	ctatgtctcc	acaatcacia	660
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<210> 56

<211> 1611

<212> DNA

<213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element J

<400> 56

gatcacttct	aagcaatttc	tagataagaa	tggacattca	acaccattag	acatgtgcgg	60
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tccctatgac	ctctattttg	acctttat	tcctgttctg	ggttttgctt	ctccagggtac	180
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aacccaaaca	aacaaacaaa	aacaaagcaa	ctttactaaa	aattccaagg	gaaatgaaga	360
aactatagat	ggaatgaaaa	caggcaaggg	catacctatt	cttataggca	gctagtgtta	420
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tatgtctctc	tggctcctgc	accacactag	ccattgtact	ggctaacagt	ctgggggggt	540
gggaataaga	gtggtggatt	acctaatagg	atgttcacag	taagtgtctc	atgcacacag	600
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<210> 57
 <211> 1299
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element K

<400> 57

gatccagcta	ttagaatggg	gcttgcattt	aaagggtaac	cagggaatat	taggctccta	60
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atatttgaga	aatggacaat	ataggaccat	tctaattttt	gggagatgtg	acagaatcca	180
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agtatttggt	tatcttgtct	ttgggtggca	ctgacaaaat	tgactaaaat	aaatattgta	420
ctttttccat	gttaatgtga	tttatgctac	tttaatctct	gacaaaacca	aaatgaaacc	480
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aagcattttg	ctggcccact	gaagacttct	tacatgccag	ggggaaaata	tcacacgtag	1260
ccctccaggc	tggggacaca	tgccgcttat	gtgcaaggg			1299

<210> 58
 <211> 1108
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Reverse complementary sequence of transcription regulatory element L

<400> 58

ccacactcat	gttgacatta	aagccatcga	caatctcagt	aagtactagt	aaacaagtaa	60
caaataagac	tgatccatca	cacaacatta	ccctggctgt	gtctttggag	taaaaatcat	120
gtagatcaag	gtatgggatg	cttgaacacc	aaaaagtaac	cacagagtag	aagagtagag	180
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cctgtgttcc	ttttgttttg	ctttgtgcat	gtgtttgcat	ttctgtttgc	atgcaagtga	900
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gatcctttct	cagccttcca	agtgctgaaa	ttgcaggtac	actactaagc	ccgtaggcct	1080
ttgtgtgggt	tctgcagatc	caaacttc				1108

<210> 59
 <211> 680
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Human CMV promoter

<400> 59						
gttgacattg	attattgact	agttattaat	agtaatcaat	tacgggggtca	ttagttcata	60
gccccatata	ggagttccgc	gttacataac	ttacggtaaa	tggcccgct	ggctgaccgc	120
ccaacgaccc	ccgcccattg	acgtcaataa	tgacgtatgt	tcccatagta	acgccaatag	180
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atcaagtgtg	tcatatgcc	agtacgcccc	ctattgacgt	caatgacggt	aaatggccc	300
cctggcatta	tgcccagtag	atgaccttat	gggactttcc	tacttggcag	tacatctacg	360
tattagtcat	cgctattacc	atggtgatgc	ggttttggca	gtacatcaat	gggcgtggat	420
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gtcagatcgc	ctggagacgc	catccacgct	gttttgacct	ccatagaaga	caccgggacc	660
gatccagcct	ccggactcta					680

<210> 60
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> 3'-ITR sequence of a transposon vector

<400> 60	
catgctgtaa	ttttacgcag actatctttc taggg
	35

<210> 61
 <211> 13
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> The sequence of the left terminal repeat of the wildtype piggyBac 5'-ITR

<400> 61	
ccctagaaag	ata
	13

<210> 62

<211> 31
 <212> DNA
 <213> Artificial Sequence

<220>

<223> The sequence of the 31-bp spacer of the wildtype piggyBac 5'-ITR

<400> 62
 atcatattgt gacgtacgtt aaagataatc a 31

<210> 63
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>

<223> The sequence of the left internal repeat of the wildtype piggyBac 5'-ITR

<400> 63
 tgcgtaaaaat tgacgcatg 19

<210> 64
 <211> 13
 <212> DNA
 <213> Artificial Sequence

<220>

<223> The sequence of the right terminal repeat of the wildtype piggyBac 3'-ITR

<400> 64
 tatcttttcta ggg 13

<210> 65
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>

<223> The sequence of the right internal repeat of the wildtype piggyBac 3'-ITR

<400> 65
 catgctcaa ttttacgca 19

<210> 66
 <211> 171
 <212> DNA
 <213> Artificial Sequence

<220>

<223> The 5'-internal domain sequence of the PB transposon recognition site

<400> 66
 tgttttatcg gtctgtatat cgaggtttat ttattaattt gaatagatat taagttttat 60

tatattttaca cttacatact aataataaat tcaacaaaca atttattttat gtttattttat 120
 ttatttaaaaa aaaacaaaaa ctcaaaattt cttctataaa gtaacaaaaac t 171

<210> 67
 <211> 272
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> The 3'-internal domain sequence of the PB transposon recognition site

<400> 67
 tatctataac aagaaaatat atatataata agttatcacg taagtagaac atgaaataac 60
 aatataatta tcgtatgagt taaatcttaa aagtcacgta aaagataatc atgcgtcatt 120
 ttgactcacg cggtcgttat agttcaaaat cagtgcact taccgcattg acaagcacgc 180
 ctacagggag ctccaagcgg cgactgagat gtcctaaatg cacagcgacg gattcgcgct 240
 atttagaaag agagagcaat atttcaagaa tg 272

<210> 68
 <211> 63
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> 5' inverted terminal repeat sequence

<400> 68
 ccctagaaaag ataatcatat tgtgacgtac gttaaagata atcatgcgta aaattgacgc 60
 atg 63

<210> 69
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> The sequence of the forward primer of the PCR reaction

<400> 69
 gcaaaaaagg gaataagggc gacacgg 27

<210> 70
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> The sequence of the reverse primer of the PCR reaction

<400> 70
 catagcccat atatggagtt ccgcgtta 28

<210> 71

<211> 447
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Amino acid sequence of the A chain of PD-L1

<400> 71

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Asn	Met	Thr	Ile	Glu	Cys	Lys	Phe	Pro	Val	Glu	Lys	Gln	Leu	Asp	Leu	20	25	30	
Ala	Ala	Leu	Ile	Val	Tyr	Trp	Glu	Met	Glu	Asp	Lys	Asn	Ile	Ile	Gln	35	40	45	
Phe	Val	His	Gly	Glu	Glu	Asp	Leu	Lys	Val	Gln	His	Ser	Ser	Tyr	Arg	50	55	60	
Gln	Arg	Ala	Arg	Leu	Leu	Lys	Asp	Gln	Leu	Ser	Leu	Gly	Asn	Ala	Ala	65	70	75	80
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Asn	Ala	Pro	Tyr	Asn	Lys	Ile	Asn	Gln	Arg	Ile	Leu	Val	Val	Asp	Pro	115	120	125	
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Cys	Gly	Cys	Lys	Pro	Cys	Ile	Cys	Thr	Val	Pro	Glu	Val	Ser	Ser	Val	225	230	235	240
Phe	Ile	Phe	Pro	Pro	Lys	Pro	Lys	Asp	Val	Leu	Thr	Ile	Thr	Leu	Thr	245	250	255	
Pro	Lys	Val	Thr	Cys	Val	Val	Val	Asp	Ile	Ser	Lys	Asp	Asp	Pro	Glu	260	265	270	
Val	Gln	Phe	Ser	Trp	Phe	Val	Asp	Asp	Val	Glu	Val	His	Thr	Ala	Gln	275	280	285	
Thr	Gln	Pro	Arg	Glu	Glu	Gln	Phe	Asn	Ser	Thr	Phe	Arg	Ser	Val	Ser	290	295	300	
Glu	Leu	Pro	Ile	Met	His	Gln	Asp	Trp	Leu	Asn	Gly	Lys	Glu	Phe	Lys	305	310	315	320
Cys	Arg	Val	Asn	Ser	Ala	Ala	Phe	Pro	Ala	Pro	Ile	Glu	Lys	Thr	Ile	325	330	335	
Ser	Lys	Thr	Lys	Gly	Arg	Pro	Lys	Ala	Pro	Gln	Val	Tyr	Thr	Ile	Pro	340	345	350	
Pro	Pro	Lys	Glu	Gln	Met	Ala	Lys	Asp	Lys	Val	Ser	Leu	Thr	Cys	Met				

Ile	Thr	Asp	Phe	Phe	Pro	Glu	Asp	Ile	Thr	Val	Glu	Trp	Gln	Trp	Asn
	370					375					380				
Gly	Gln	Pro	Ala	Glu	Asn	Tyr	Lys	Asn	Thr	Gln	Pro	Ile	Met	Asp	Thr
385					390					395					400
Asp	Gly	Ser	Tyr	Phe	Val	Tyr	Ser	Lys	Leu	Asn	Val	Gln	Lys	Ser	Asn
				405					410					415	
Trp	Glu	Ala	Gly	Asn	Thr	Phe	Thr	Cys	Ser	Val	Leu	His	Glu	Gly	Leu
			420					425					430		
His	Asn	His	His	Thr	Glu	Lys	Ser	Leu	Ser	His	Ser	Pro	Gly	Lys	
		435					440					445			

<210>	72
<211>	451
<212>	PRT
<213>	Artificial Sequence

<220>
<223> Amino acid sequence of the heavy chain (HC) of Adalimumab

<400>	72														
Glu 1	Val	Gln	Leu	Val	Glu	Ser	Gly	Gly	Gly	Leu	Val	Gln	Pro	Gly	Arg
			5						10					15	
Ser	Leu	Arg	Leu	Ser	Cys	Ala	Ala	Ser	Gly	Phe	Thr	Phe	Asp	Asp	Tyr
			20					25					30		
Ala	Met	His	Trp	Val	Arg	Gln	Ala	Pro	Gly	Lys	Gly	Leu	Glu	Trp	Val
		35					40					45			
Ser	Ala	Ile	Thr	Trp	Asn	Ser	Gly	His	Ile	Asp	Tyr	Ala	Asp	Ser	Val
	50					55				60					
Glu 65	Gly	Arg	Phe	Thr	Ile	Ser	Arg	Asp	Asn	Ala	Lys	Asn	Ser	Leu	Tyr
					70					75					80
Leu	Gln	Met	Asn	Ser	Leu	Arg	Ala	Glu	Asp	Thr	Ala	Val	Tyr	Tyr	Cys
				85					90					95	
Ala	Lys	Val	Ser	Tyr	Leu	Ser	Thr	Ala	Ser	Ser	Leu	Asp	Tyr	Trp	Gly
			100					105					110		
Gln	Gly	Thr	Leu	Val	Thr	Val	Ser	Ser	Ala	Ser	Thr	Lys	Gly	Pro	Ser
		115					120					125			
Val	Phe	Pro	Leu	Ala	Pro	Ser	Ser	Lys	Ser	Thr	Ser	Gly	Gly	Thr	Ala
	130					135					140				
Ala 145	Leu	Gly	Cys	Leu	Val	Lys	Asp	Tyr	Phe	Pro	Glu	Pro	Val	Thr	Val
				150						155					160
Ser	Trp	Asn	Ser	Gly	Ala	Leu	Thr	Ser	Gly	Val	His	Thr	Phe	Pro	Ala
				165					170					175	
Val	Leu	Gln	Ser	Ser	Gly	Leu	Tyr	Ser	Leu	Ser	Ser	Val	Val	Thr	Val
			180					185					190		
Pro	Ser	Ser	Ser	Leu	Gly	Thr	Gln	Thr	Tyr	Ile	Cys	Asn	Val	Asn	His
		195					200					205			
Lys	Pro	Ser	Asn	Thr	Lys	Val	Asp	Lys	Lys	Val	Glu	Pro	Lys	Ser	Cys
	210					215					220				
Asp 225	Lys	Thr	His	Thr	Cys	Pro	Pro	Cys	Pro	Ala	Pro	Glu	Leu	Leu	Gly
					230					235					240
Gly	Pro	Ser	Val	Phe	Leu	Phe	Pro	Pro	Lys	Pro	Lys	Asp	Thr	Leu	Met
				245					250					255	

35

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
260 265 270
Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
275 280 285
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
290 295 300
Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
305 310 315 320
Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
325 330 335
Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
340 345 350
Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
355 360 365
Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
370 375 380
Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
385 390 395 400
Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
405 410 415
Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
420 425 430
His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
435 440 445
Pro Gly Lys
450

<210> 73

<211> 214

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of the light chain (LC) of Adalimumab

<400> 73

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Arg Asn Tyr
20 25 30
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45
Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80
Glu Asp Val Ala Thr Tyr Tyr Cys Gln Arg Tyr Asn Arg Ala Pro Tyr
85 90 95
Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110
Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu Lys Ser Gly
115 120 125
Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala

130				135				140							
Lys	Val	Gln	Trp	Lys	Val	Asp	Asn	Ala	Leu	Gln	Ser	Gly	Asn	Ser	Gln
145				150				155				160			
Glu	Ser	Val	Thr	Glu	Gln	Asp	Ser	Lys	Asp	Ser	Thr	Tyr	Ser	Leu	Ser
165				170				175							
Ser	Thr	Leu	Thr	Leu	Ser	Lys	Ala	Asp	Tyr	Glu	Lys	His	Lys	Val	Tyr
180				185				190							
Ala	Cys	Glu	Val	Thr	His	Gln	Gly	Leu	Ser	Ser	Pro	Val	Thr	Lys	Ser
195				200				205							
Phe	Asn	Arg	Gly	Glu	Cys										
210															