Figure 1a

Variable Heavy Chain DNA

3684_ VH3 (SEQ ID NO: 1):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTCATTGGATGTCTTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCAATGGTATCTTTTCTGATGGTAGCGCTACCTAT
TATGCGGATAGCGTGAAAGGCCGTTTTACCATTTCACGTGATAATTCGAAAAACACCCTG
TATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTTTT
CAGGGTTATGGTGGTGGTTTTGATTATTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4251_VH3 (SEQ ID NO: 2):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTCATTGGATGTCTTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCAATATTTGGCGTGGTCCTTATATTTATTATGCTG
ATTCTGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCCTGTATCTGCA
AATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTTTTCAGGGTTA
TGGTGGTGGTTTTGATTATTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

3929_ VH3 (SEQ ID NO: 3):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATCTCTTATTCTGGTAGCGAGACCTATTAT
GCGGATAGCGTGAAAGGCCGTTTTACCATTTCACGTGATAATTCGAAAAACACCCTGTAT
CTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTGGTTTT
GGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4252_VH 3 (SEQ ID NO: 4):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATTGAGAATAAGTATGCTGGTGGTGCTACT
TATTATGCTGCTTCTGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCC
TGTATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTG
GTTTTGGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4287_ VH3 (SEQ ID NO: 5):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATTGAGAATAAGCGTGCTGGTGGTGCTACT
TTTTATGCTGCTTCCGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCC
TGTATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTG
GTTTTGGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4290_ VH3 (SEQ ID NO: 6):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATTGAGTCTAAGTGGGCTGGTGGTGCTACT
TATTATGCTGCTGGTGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCC
TGTATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTG
GTTTTGGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4302_VH3 (SEQ ID NO: 7):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATCTCTTATTCTGGTAGCGAGACCTATTAT
GCGGATAGCGTGAAAGGCCGTTTTACCATTTCACGTGATAATTCGAAAAACACCCTGTAT
CTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTGGTTTT
GGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4350_ VH3 (SEQ ID NO: 8):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATTGAGAATAAGCGTGCTGGTGGTGCTACT
TTTTATGCTGCTTCCGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCC
TGTATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTG
GTTTTGGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4354_ VH3 (SEQ ID NO: 9):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATTGAGTCTAAGTGGGCTGGTGGTGCTACT
TATTATGCTGCTGGTGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCC
TGTATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTG
GTTTTGGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

4357_ VH3 (SEQ ID NO: 10):

CAGGTGCAATTGGTGGAAAGCGGCGGCGGCCTGGTGCAACCGGGCGGCAGCCTGCGTCT
GAGCTGCGCGGCCTCCGGATTTACCTTTTCTTCTTATTGGATGAATTGGGTGCGCCAAGCC
CCTGGGAAGGGTCTCGAGTGGGTGAGCGGTATTGAGAATAAGTATGCTGGTGGTGCTACT
TATTATGCTGCTTCTGTTAAGGGTCGTTTTACCATTTCACGTGATAATTCGAAAAACACCC
TGTATCTGCAAATGAACAGCCTGCGTGCGGAAGATACGGCCGTGTATTATTGCGCGCGTG
GTTTTGGTACTGATTTTTGGGGCCAAGGCACCCTGGTGACGGTTAGCTCA

3682_VH1A (SEQ ID NO: 44)

CAGGTGCAATTGGTTCAGTCTGGCGCGGAAGTGAAAAAACCGGGCAGCAGCGTG
AAAGTGAGCTGCAAAGCCTCCGGAGGCACTTTTAATTCTTTTCTTATTTCTTGGGT
GCGCCAAGCCCCTGGGCAGGGTCTCGAGTGGATGGGCGGTATCATTCCGATTTTT
GGCACTGCGAATTACGCGCAGAAGTTTCAGGGCCGGGTGACCATTACCGCGGATG
AAAGCACCAGCACCGCGTATATGGAACTGAGCAGCCTGCGTAGCGAAGATACGG
CCGTGTATTATTGCGCGCGTAAGTTTATTTCTGATTCTTGGGGCCAAGGCACCCTG
GTGACGGTTAGCTCA

4283_VH1A (SEQ ID NO: 45)

CAGGTGCAATTGGTTCAGTCTGGCGCGGAAGTGAAAAAACCGGGCAGCAGCGTG
AAAGTGAGCTGCAAAGCCTCCGGAGGCACTTTTAATTCTTTTCTTATTTCTTGGGT
GCGCCAAGCCCCTGGGCAGGGTCTCGAGTGGATGGGCGCTATTTCTCCTTGGGAT
GGTGTTACTGGTTATGCTCAGAAGTTTCAGGGTCGGGTGACCATTACCGCGGATG
AAAGCACCAGCACCGCGTATATGGAACTGAGCAGCCTGCGTAGCGAAGATACGG
CCGTGTATTATTGCGCGCGTAAGTTTATTTCTGATTCTTGGGGCCAAGGCACCCTG
GTGACGGTTAGCTCA

4297_VH1A (SEQ ID NO: 46)

CAGGTGCAATTGGTTCAGTCTGGCGCGGAAGTGAAAAAACCGGGCAGCAGCGTG
AAAGTGAGCTGCAAAGCCTCCGGAGGCACTTTTAATTCTTTTCTTATTTCTTGGGT
GCGCCAAGCCCCTGGGCAGGGTCTCGAGTGGATGGGCGGTATCATTCCGATTTTT
GGCACTGCGAATTACGCGCAGAAGTTTCAGGGCCGGGTGACCATTACCGCGGATG
AAAGCACCAGCACCGCGTATATGGAACTGAGCAGCCTGCGTAGCGAAGATACGG
CCGTGTATTATTGCGCGCGTAAGTTTATTTCTGATTCTTGGGGCCAAGGCACCCTG
GTGACGGTTAGCTCA

4342_VH1A (SEQ ID NO: 47)

CAGGTGCAATTGGTTCAGTCTGGCGCGGAAGTGAAAAAACCGGGCAGCAGCGTG
AAAGTGAGCTGCAAAGCCTCCGGAGGCACTTTTAATTCTTTTCTTATTTCTTGGGT
GCGCCAAGCCCCTGGGCAGGGTCTCGAGTGGATGGGCGCTATTTCTCCTTGGGAT
GGTGTTACTGGTTATGCTCAGAAGTTTCAGGGTCGGGTGACCATTACCGCGGATG
AAAGCACCAGCACCGCGTATATGGAACTGAGCAGCCTGCGTAGCGAAGATACGG
CCGTGTATTATTGCGCGCGTAAGTTTATTTCTGATTCTTGGGGCCAAGGCACCCTG
GTGACGGTTAGCTCA

4357_VH codon-optimized (SEQ ID NO: 48)

CAGGTGCAGCTGGTCGAGTCTGGCGGCGGACTGGTGCAGCCTGGCGGCAGCCTG
AGACTGAGCTGTGCCGCCAGCGGCTTCACCTTCAGCAGCTACTGGATGAACTGGG
TGAGGCAGGCCCCTGGCAAGGGCCTGGAGTGGGTGTCCGGCATCGAGAACAAGT
ATGCCGGCGGAGCCACCTACTACGCCGCCAGCGTGAAGGGCCGGTTCACCATCAG
CCGGGACAACAGCAAGAACACCCTGTACCTGCAGATGAACAGCCTGAGGGCCGA
GGACACCGCCGTGTACTACTGTGCCAGGGGCTTCGGCACCGATTTCTGGGGCCAG
GGCACCCTGGTGACAGTCAGCTCA

Figure 1b

Variable Heavy Chain Peptide

(CDR Regions in **Bold**)

3684_ VH3 (SEQ ID NO: 11):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSHWMS**WVRQAPGKGLEWVS**NGIFSDGSATY**
YADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**FQGYGGGFDY**WGQGTLVTVSS

4251_VH3 (SEQ ID NO: 12):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSHWMS**WVRQAPGKGLEWVS**NIWRGPYIYYA**
DSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**FQGYGGGFDY**WGQGTLVTVSS

3929_ VH3 (SEQ ID NO: 13):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GISYSGSETYY**
ADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4252_VH 3 (SEQ ID NO: 14):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GIENKYAGGA**
TYYAASVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4287_VH 3 (SEQ ID NO: 15):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GIENKRAGGA**
TFYAASVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4290_VH 3 (SEQ ID NO: 16):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GIESKWAGGA**
TYYAAGVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4302_VH 3 (SEQ ID NO: 17):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GISYSGSETYY**
ADSVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4350_VH 3 (SEQ ID NO: 18):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GIENKRAGGA**
TFYAASVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4354_VH 3 (SEQ ID NO: 19):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GIESKWAGGA**
TYYAAGVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

4357_VH 3 (SEQ ID NO: 20):

QVQLVESGGGLVQPGGSLRLSCAAS**GFTFSSYWMN**WVRQAPGKGLEWVS**GIENKYAGGA**
TYYAASVKGRFTISRDNSKNTLYLQMNSLRAEDTAVYYCAR**GFGTDF**WGQGTLVTVSS

3682_VH1A (SEQ ID NO: 49)

QVQLVQSGAEVKKPGSSVKVSCKAS**GGTFNSFLIS**WVRQAPGQGLEWMG**GIIPIFG**
TANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARKFISDSWGQGTLVTV
SS

4283_VH1A (SEQ ID NO: 50)

QVQLVQSGAEVKKPGSSVKVSCKAS**GGTFNSFLIS**WVRQAPGQGLEWMG**AISPWD**
GVTGYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARKFISDSWGQGTLV
TVSS

4297_VH1A (SEQ ID NO: 51)

QVQLVQSGAEVKKPGSSVKVSCKAS**GGTFNSFLIS**WVRQAPGQGLEWMG**GIIPIFG**
TANYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARKFISDSWGQGTLVTV
SS

4342_VH1A (SEQ ID NO: 52)

QVQLVQSGAEVKKPGSSVKVSCKAS**GGTFNSFLIS**WVRQAPGQGLEWMG**AISPWD**
GVTGYAQKFQGRVTITADESTSTAYMELSSLRSEDTAVYYCARKFISDSWGQGTLV
TVSS

Figure 2a

Variable Light Chain DNA

3684_ VL lambda 3 (SEQ ID NO: 21):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATAATCTTCCTGGTAAGTATGTTCATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATTATGATTCTAATCGTCCCTCAGGCATCCCGGAACGCT
TTAGCGGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAA
GACGAAGCGGATTATTATTGCCAGTCTCGTACTCAGACTACTATTGTGTTTGGCGGCGGC
ACGAAGTTAACCGTTCTTGGCCAG

4251_ VL lambda 3 (SEQ ID NO: 22):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATAATCTTCCTGGTAAGTATGTTCATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATTATGATTCTAATCGTCCCTCAGGCATCCCGGAACGCT
TTAGCGGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAA
GACGAAGCGGATTATTATTGCCAGTCTCGTACTCAGACTACTATTGTGTTTGGCGGCGGC
ACGAAGTTAACCGTTCTTGGCCAG

3929_VL lambda 3 (SEQ ID NO: 23):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTTCTTGGGATTCTACTGGTCTTGTGTTTGGCGGCGGCACGAAG
TTAACCGTTCTTGGCCAG

4252_VL lambda 3 (SEQ ID NO: 24):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTTCTTGGGATTCTACTGGTCTTGTGTTTGGCGGCGGCACGAAG
TTAACCGTTCTTGGCCAG

4287_VL lambda 3 (SEQ ID NO: 25):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTTCTTGGGATTCTACTGGTCTTGTGTTTGGCGGCGGCACGAAG
TTAACCGTTCTTGGCCAG

4290_VL lambda 3 (SEQ ID NO: 26):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTTCTTGGGATTCTACTGGTCTTGTGTTTGGCGGCGGCACGAAG
TTAACCGTTCTTGGCCAG

4302_VL lambda 3 (SEQ ID NO: 27):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTGCTTGGGGTGATAAGGGTATGGTGTTTGGCGGCGGCACGAA
GTTAACCGTTCTTGGCCAG

4350_VL lambda 3 (SEQ ID NO: 28):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTGCTTGGGGTGATAAGGGTATGGTGTTTGGCGGCGGCACGAA
GTTAACCGTTCTTGGCCAG

4354_VL lambda 3 (SEQ ID NO: 29):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTGCTTGGGGTGATAAGGGTATGGTGTTTGGCGGCGGCACGAA
GTTAACCGTTCTTGGCCAG

4357_VL lambda 3 (SEQ ID NO: 30):

GATATCGAACTGACCCAGCCGCCTTCAGTGAGCGTTGCACCAGGTCAGACCGCGCGTATC
TCGTGTAGCGGCGATTCTATTGGTAAGAAGTATGCTTATTGGTACCAGCAGAAACCCGGG
CAGGCGCCAGTTCTTGTGATTTATAAGAAGCGTCCCTCAGGCATCCCGGAACGCTTTAGC
GGATCCAACAGCGGCAACACCGCGACCCTGACCATTAGCGGCACTCAGGCGGAAGACGA
AGCGGATTATTATTGCTCTGCTTGGGGTGATAAGGGTATGGTGTTTGGCGGCGGCACGAA
GTTAACCGTTCTTGGCCAG

3682_VL kappa 1 (SEQ ID NO: 53)

GATATCCAGATGACCCAGAGCCCGTCTAGCCTGAGCGCGAGCGTGGGTGATCGTG
TGACCATTACCTGCAGAGCGAGCCAGACTATTAATAATTATCTGAATTGGTACCA
GCAGAAACCAGGTAAAGCACCGAAACTATTAATTTATACTGCTTCTAATTTGCAA
AGCGGGGTCCCGTCCCGTTTTAGCGGCTCTGGATCCGGCACTGATTTTACCCTGAC
CATTAGCAGCCTGCAACCTGAAGACTTTGCGGTTTATTATTGCCAGCAGTATTCTG
GTTCTCCTATGACCTTTGGCCAGGGTACGAAAGTTGAAATTAAACGTACG

4283_VL kappa 1 (SEQ ID NO: 54)

GATATCCAGATGACCCAGAGCCCGTCTAGCCTGAGCGCGAGCGTGGGTGATCGTG
TGACCATTACCTGCAGAGCGAGCCAGACTATTAATAATTATCTGAATTGGTACCA
GCAGAAACCAGGTAAAGCACCGAAACTATTAATTTATACTGCTTCTAATTTGCAA
AGCGGGGTCCCGTCCCGTTTTAGCGGCTCTGGATCCGGCACTGATTTTACCCTGAC
CATTAGCAGCCTGCAACCTGAAGACTTTGCGGTTTATTATTGCCAGCAGTATTCTG
GTTCTCCTATGACCTTTGGCCAGGGTACGAAAGTTGAAATTAAACGTACG

4297_VL kappa 1 (SEQ ID NO: 55)

GATATCCAGATGACCCAGAGCCCGTCTAGCCTGAGCGCGAGCGTGGGTGATCGTG
TGACCATTACCTGCAGAGCGAGCCAGACTATTAATAATTATCTGAATTGGTACCA

GCAGAAACCAGGTAAAGCACCGAAACTATTAATTTATACTGCTTCTAATTTGCAA
AGCGGGGTCCCGTCCCGTTTTAGCGGCTCTGGATCCGGCACTGATTTTACCCTGAC
CATTAGCAGCCTGCAACCTGAAGACTTTGCGACCTATTATTGCCAGCAGTATTCTT
GGGTTCCTCATACCTTTGGCCAGGGTACGAAAGTTGAAATTAAACGTACG

4342_VL kappa 1 (SEQ ID NO: 56)

GATATCCAGATGACCCAGAGCCCGTCTAGCCTGAGCGCGAGCGTGGGTGATCGTG
TGACCATTACCTGCAGAGCGAGCCAGACTATTAATAATTATCTGAATTGGTACCA
GCAGAAACCAGGTAAAGCACCGAAACTATTAATTTATACTGCTTCTAATTTGCAA
AGCGGGGTCCCGTCCCGTTTTAGCGGCTCTGGATCCGGCACTGATTTTACCCTGAC
CATTAGCAGCCTGCAACCTGAAGACTTTGCGACCTATTATTGCCAGCAGTATTCTT
GGGTTCCTCATACCTTTGGCCAGGGTACGAAAGTTGAAATTAAACGTACG

4357_VL codon-optimized (SEQ ID NO: 57)

GACATCGAGCTGACCCAGCCCCCCAGCGTGTCTGTGGCCCCTGGCCAGACCGCCC
GGATCAGCTGCTCCGGCGACAGCATCGGCAAGAAGTACGCCTACTGGTATCAGCA
GAAGCCCGGCCAGGCCCCCGTGCTGGTGATCTACAAGAAGCGGCCCAGCGGCAT
CCCCGAGCGGTTCAGCGGCAGCAACAGCGGCAACACCGCCACCCTGACCATCAG
CGGCACCCAGGCCGAGGACGAGGCCGACTACTACTGCTCCGCCTGGGGCGACAA
GGGCATGGTGTTTGGCGGCGGAACAAAGTTAACCGTGCTGGGGCAG

Figure 2b

Variable Light Chain Peptide

(CDR Regions in **Bold**)

3684_ VL lambda 3 (SEQ ID NO: 31):

DIELTQPPSVSVAPGQTARISC**SGDNLPGKYVH**WYQQKPGQAPVLVIY**YDSNRPS**GIPERFSG
SNSGNTATLTISGTQAEDEADYYC**QSRTQTTI**VFGGGTKLTVLGQ

4251_ VL lambda 3 (SEQ ID NO: 32):

DIELTQPPSVSVAPGQTARISC**SGDNLPGKYVH**WYQQKPGQAPVLVIY**YDSNRPS**GIPERFSG
SNSGNTATLTISGTQAEDEADYYC**QSRTQTTI**VFGGGTKLTVLGQ

3929_VL lambda 3 (SEQ ID NO: 33):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SSWDSTGL**VFGGGTKLTVLGQ

4252_VL lambda 3 (SEQ ID NO: 34):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SSWDSTGL**VFGGGTKLTVLGQ

4287_VL lambda 3 (SEQ ID NO: 35):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SSWDSTGL**VFGGGTKLTVLGQ

4290_VL lambda 3 (SEQ ID NO: 36):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SSWDSTGL**VFGGGTKLTVLGQ

4302_VL lambda 3 (SEQ ID NO: 37):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SAWGDKGM**VFGGGTKLTVLGQ

4350_VL lambda 3 (SEQ ID NO: 38):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SAWGDKGM**VFGGGTKLTVLGQ

4354_VL lambda 3 (SEQ ID NO: 39):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SAWGDKGM**VFGGGTKLTVLGQ

4357_VL lambda 3 (SEQ ID NO: 40):

DIELTQPPSVSVAPGQTARISC**SGDSIGKKYAY**WYQQKPGQAPVLVIY**KKRPS**GIPERFSGSNS
GNTATLTISGTQAEDEADYYC**SAWGDKGM**VFGGGTKLTVLGQ

3682_VL kappa 1 (SEQ ID NO: 58)

DIQMTQSPSSLSASVGDRVTITC**RASQTINNYLN**WYQQKPGKAPKLLIY**TASNLQS**GVPSRFS
GSGSGTDFTLTISSLQPEDFAVYYC**QQYSGSPM**TFGQGTKVEIKRT

4283_VL kappa 1 (SEQ ID NO: 59)

DIQMTQSPSSLSASVGDRVTITC**RASQTINNYLN**WYQQKPGKAPKLLIY**TASNLQS**GVPSRFS
GSGSGTDFTLTISSLQPEDFAVYYC**QQYSGSPM**TFGQGTKVEIKRT

4297_VL kappa 1 (SEQ ID NO: 60)

DIQMTQSPSSLSASVGDRVTITC**RASQTINNYLN**WYQQKPGKAPKLLIY**TASNLQS**GVPSRFS
GSGSGTDFTLTISSLQPEDFATYYC**QQYSWVPH**TFGQGTKVEIKRT

4342 VL_kappa 1 (SEQ ID NO: 61)

DIQMTQSPSSLSASVGDRVTITC**RASQTINNYLN**WYQQKPGKAPKLLIY**TASNLQS**G
VPSRFSGSGSGTDFTLTISSLQPEDFATYYC**QQYSWVPH**TFGQGTKVEIKRT

Figure 3

Variable Heavy Chain Consensus Sequence

(CDR Regions in **Bold**)

VH3 Consensus (SEQ ID NO: 41):

QVQLVESGGG LVQPGGSLRL SCAAS**GFTFS SYAMS**WVRQA PGKGLEWVSA

ISGSGGSTYY ADSVKGRFTI SRDNSKNTLY LQMNSLRAED TAVYYCAR**WG**

GDGFYAMDYW GQGTLVTVS S

Figure 4

Variable Light Chain Consensus Sequence

(CDR Regions in **Bold**)

VL_λ3 Consensus (SEQ ID NO: 42):

DIELTQPPSV SVAPGQTARI SC**SGDALGDK YAS**WYQQKPG QAPVLVIY**DD**

SDRPSGIPER FSGSNSGNTA TLTISGTQAE DEADYYC**QQH YTTPP**VFGGG

TKLTVLG

Figure 5

Example of DNA sequence of Fab expression vector pMORPH®X9_MOR03929_FH
SEQ ID NO: 43

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Figure 6

