

pFUSE-CHlg-mM

Plasmid featuring the constant region of the mouse IgM (allele 1) heavy chain

Catalog code: pfuse-mchm

For research use only

Version 24J28-MM-v37

PRODUCT INFORMATION

Content:

- 20 µg of pFUSE-CHlg-mM plasmid provided as lyophilized DNA.
- 1 ml of Zeocin® (100 mg/ml)

Storage and Stability:

- Product is shipped at room temperature.
- Lyophilized DNA should be stored at -20°C and is stable 3 months.
- Resuspended DNA should be stored at -20°C and is stable up to 1 year.
- Store Zeocin® at 4 °C or at -20 °C. The expiry date is specified on the product label.

Quality control:

- Plasmid construct has been confirmed by restriction analysis and sequencing.
- Plasmid DNA was purified by ion exchange chromatography.

Materials required for antibody generation & isotype switching

- pFUSE2-CLlg plasmid that features the constant region of the kappa or lambda light chains. pFUSE2-CLlg plasmids are selectable with blasticidin (sold separately, see RELATED PRODUCTS).
- pFUSE-CHlg plasmid for the constant region of the heavy chain, this plasmid is selectable with Zeocin®.

GENERAL PRODUCT USE

pFUSE-CLlg and pFUSE-CHlg plasmids are designed to change a monoclonal antibody from one isotype to another, therefore, enabling the generation of antibodies with the same antigen affinity but with different effector functions (increased or reduced ADCC and CDC). Furthermore, they can be used to produce entire antibodies from Fab or scFv fragments.

pFUSE-CHlg and pFUSE2-CLlg express the constant regions of the heavy (CH) and light (CL) chains, respectively. They contain a multiple cloning site (MCS) upstream of these constant regions to enable the cloning of the variable (VH and VL) regions of a given antibody. Transfection of mammalian cell lines with the recombinant pFUSE-CHlg and pFUSE2-CLlg pair allows to generate an antibody that can be purified from the supernatant using the appropriate affinity chromatography.

Features of pFUSE-CHlg and pFUSE2-CLlg plasmids

- **hEF1-HTLV prom** is a composite promoter comprising the Elongation Factor-1α (EF-1α) core promoter¹ and the R segment and part of the U5 sequence (R-U5') of the Human T-Cell Leukemia Virus (HTLV) Type 1 Long Terminal Repeat². The EF-1α promoter exhibits a strong activity and yields long lasting expression of a transgene *in vivo*. The R-U5' has been coupled to the EF-1α core promoter to enhance stability of RNA.
- **MCS:** The multiple cloning site contains several restriction sites that are compatible with many other enzymes, thus facilitating cloning.
- **SV40 pAn:** the Simian Virus 40 late polyadenylation signal enables efficient cleavage and polyadenylation reactions resulting in high levels of steady-state mRNA³.
- **ori:** a minimal *E. coli* origin of replication to limit vector size, but with the same activity as the longer Ori.
- **CMV enh / hFerL prom:** This composite promoter combines the human cytomegalovirus immediate-early gene 1 enhancer and the core promoter of the human ferritin light chain gene. This ubiquitous promoter drives the expression of the Zeocin®-resistance gene in mammalian cells.
- **EM2KC** is a bacterial promoter that enables the constitutive expression of the antibiotic resistance gene in *E. coli*. EM2KC is located within an intron and is spliced out in mammalian cells.
- **βGlo pAn:** The human beta-globin 3' UTR and polyadenylation sequence allows efficient arrest of the transgene transcription⁴.

pFUSE-CHlg-mM specific features

- **Mouse IGHM*01 (IgM allele1 heavy chain constant region):** When cloning your heavy chain variable region of choice in the MCS, care must be taken to insert the gene in-frame and to preserve the integrity of the heavy chain constant region.
- **Zeo:** Resistance to Zeocin® is conferred by the *Sh ble* gene from *Streptoalloteichus hindustanus*. The same resistance gene confers selection in both mammalian cells and *E. coli*.

References:

1. Kim DW, *et al.* 1990. Use of the human elongation factor 1 alpha promoter as a versatile and efficient expression system. *Mol Cell Biol.* 10(2):217-23.
2. Takebe Y, *et al.* 1988. SR alpha promoter: an efficient and versatile mammalian cDNA expression system composed of the simian virus 40 early promoter and the R-U5 segment of human T-cell leukemia virus type 1 long terminal repeat. *Mol Cell Biol.* 8(1):466-72.
3. Carswell S, & Alwine JC. 1989. Efficiency of utilization of the simian virus 40 late polyadenylation site: effects of upstream sequences. *Mol Cell Biol.* 9(10):4248-58.
4. Yu J, & Russell JE. 2001. Structural and functional analysis of an mRNP complex that mediates the high stability of human beta-globin mRNA. *Mol Cell Biol.* 21(17):5879-88.

TECHNICAL SUPPORT

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PROTOCOL

Obtaining VH and VL sequences

The antibody sequence can be obtained by phage display or from an antibody producing hybridoma. To obtain the cDNA sequence of the VH and VL regions from an antibody producing hybridoma, total RNA or mRNA is extracted and reverse transcribed to cDNA. PCR is performed with 5' degenerate primers to anneal to the unknown VH and VL regions and the 3' primers designed to anneal to the "known" CH and CL regions. Alternatively 5' RACE can be used. The resulting amplicons must be sequenced.

Plasmid resuspension

Quickly spin the tube containing the lyophilized plasmid to pellet the DNA. To obtain a plasmid solution at 1 $\mu\text{g}/\mu\text{l}$, resuspend the DNA in 20 μl of sterile H₂O. Store resuspended plasmid at -20°C.

Cloning into pFUSE-CHIg and pFUSE2-CLIg

Once the VH and VL sequence are known, inserts for cloning into the plasmids can be generated. In pFUSE-CHIg-mM, the constant region of the mouse IgM heavy chain is preceded by a multiple cloning site containing five restriction sites: AgeI, EcoRI, EcoRV, XhoI, and NheI. The first four restriction sites can be used for insertion of the 5' end of the variable region including the native signal sequence. If the immunoglobulin signal sequence is unknown, pFUSEss plasmids containing a signal sequence should be used. In pFUSE-CHIg-mM, NheI must be used for insertion of the 3' end of the variable region. NheI must be reconstituted to maintain the integrity of the constant region. Therefore we recommend to introduce by PCR an NheI site at the 3' end of the variable region in frame with the constant region.

When generating the insert for VL, a BstAPI (pFUSE2-CLIg-mk; mouse kappa), or AvrII (pFUSE2-CLIg-ml1 / pFUSE2-CLIg-ml2; mouse lambda) site must be introduced at the 3' end. There is a choice of restriction sites at the 5' end.

Note: The 5' end of the variable region should encompass the native ATG initiation codon and the region immediately after which corresponds to the signal sequence. For proper initiation of translation, make sure that your insert contains a Kozak translation initiation sequence upstream of the ATG initiation codon such as (G/A)NNATG.

Choice of strategies for the transfection

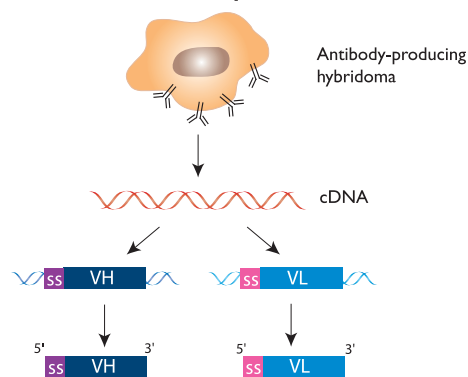
Transfect cells using a transfection agent, such as LyoVec™, with the plasmid coding for light chain and select the best clone. Following selection of the best clone, the plasmid coding for the heavy chain clone can be transfected into this clone.

OR

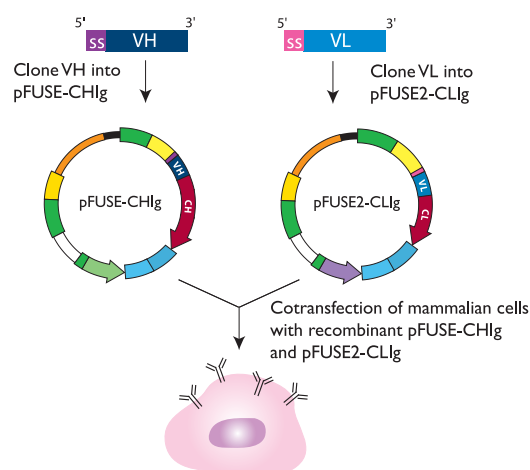
A cotransfection can be performed with the plasmid coding for the light chain and the plasmid coding for the heavy chain. Since the pFUSE2-CLIg and pFUSE-CHIg plasmids share the same plasmid backbone, the appropriate heavy chain to light chain ratio can be easily determined by varying the quantities of pFUSE2-CLIg and pFUSE-CHIg plasmids. We recommend using a ratio of 3:2 of pFUSE2-CLIg:pFUSE-CHIg plasmids. pFUSE2-CLIg plasmids feature the constant region of a kappa or lambda light chain. pFUSE2-CLIg plasmids are selectable with blasticidin. pFUSE-CHIg plasmids are selectable with Zeocin®.

Antibody generation using pFUSE-CHIg & pFUSE-CLIg

1- Obtention of VH and VL sequences



2- Cloning into pFUSE-CHIg and pFUSE-CLIg



To check for production of your antibody after transfection, you may take an aliquot of growth medium and perform SDS-PAGE, protein-specific ELISA, or the bioactivity assay of choice to determine that your cells are producing your antibody of interest.

The resulting IgM antibody that can be purified from the supernatant using the appropriate affinity chromatography.

RELATED PRODUCTS

Product	Catalog Code
pFUSE2-CLIg-mk	pfuse2-mclk
pFUSE2-CLIg-ml1	pfuse2-mcll1
pFUSE2-CLIg-ml2	pfuse2-mcll2
LyoVec™	lyec-12
Protein L / Agarose	gel-protl-2
Zeocin®	ant-zn-1

TECHNICAL SUPPORT

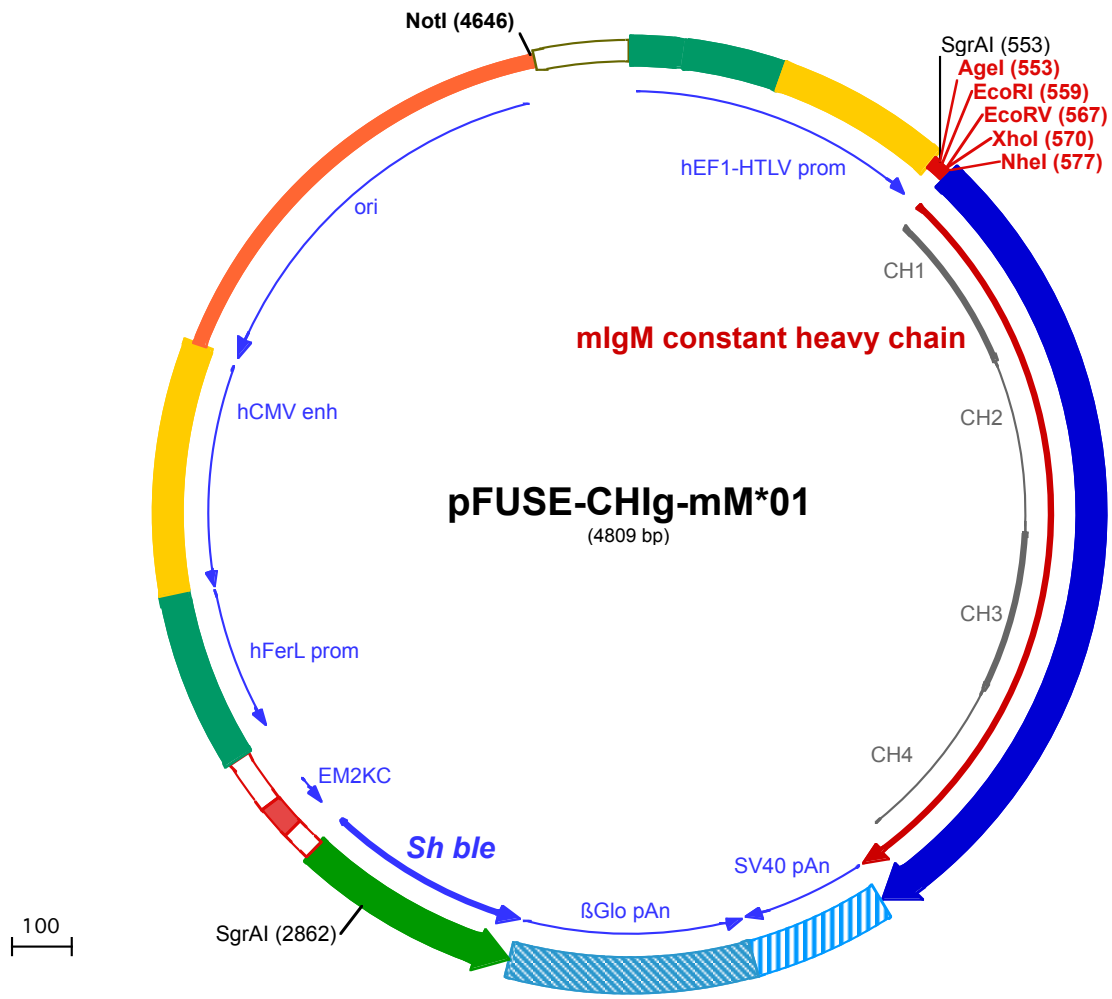
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1 GGATCTGCATCGCTCCGGTGCCCGTCAGTGGGAGAGCGCACATGCCACAGTCCCGGAGAAGTTGGGGGAGGGGTCGGCAATTGAACGGGTGCCTA
 101 GAGAAGGTGGCGCGGGGTAAACTGGGAAAGTGATGTCGTGACTGGCTCCGCCTTTTTCCCGAGGGTGGGGGAGAACCCTATATAAGTGCAGTAGTCGCC
 201 GTGAACGTTCTTTTTCGCAACGGGTTTGCCGCCAGAACACAGCTGAAGCTTCGAGGGCTCGCATCTCTCTTCACGCGCCCGCCCTACCTGAGGCC
 301 GCCATCCACGCCGTTGAGTCCGCTTCTGCCGCTCCCGCTGTGGTGCCTCTGAAGTGCCTCCGCGTCTAGGTAAGTTTAAAGCTCAGGTCGAGACC
 401 GGGCCTTTGTCCGGCGCTCCCTTGAGCCTACCTAGACTCAGCCGGCTCTCCACGCTTTCCTGACCCCTGCTTGTCTAACTCTACGCTTTGTTTCGTTT

 501 TCTGTTCTGCGCCGTTACAGATCCAAGCTGTGACCGCGCTACCTGAGATCACCGGTGAATTCGATATCTCGAGTGCCTAGCTCAGAGAGTCAAGTCTCTC
 EcoRI (559) XhoI (570)
 Agel (553) SgrAI (553) EcoRV (567) NheI (577)
 1 S S E S Q S F
 601 CCAATGTCTTCCCCTCGTCTCCTGCGAGAGCCCCGTCTGATAAAGTCTGGTGGCCATGGGCTGCCTGGCCCGGACTTCTGCCAGCACCATT
 8 P N V F P L V S C E S P L S D K N L V A M G C L A R D F L P S T I
 701 CCTCACCTGGAAGTACCAGAACAACACTGAAGTCATCCAGGATCAGAACCTTCCAACACTGAGGACAGGGGCAAGTACCTAGCCACCTCGCAGGT
 41 S F T W N Y Q N N T E V I Q G I R T F P T L R T G G K Y L A T S Q V
 801 GTTGTCTCTCCAAGAGCATCCTTGAAGTTCAGATGAATACCTGGTATGAAAAATCCACTACGAGGCAAAAACAGAGATCTGCATGTGCCATTCCA
 74 L L S P K S I L E G S D E Y L V C K I H Y G G K N R D L H V P I P
 901 GCTGTGCGAGAGATGAA^CCCCAATGTAATGTGTTCTGCCACACGGGATGGCTTCTGCGCCTGCACCACGCAAGTCTAAACTCATCTGCGAGGCCA
 108 A V A E M N P N V N V F V P P R D G F S G P A P R K S K L I C E A
 1001 CGAACTTCACTCCAAAACCGATCACAGTATCCTGGCTAAAGGATGGGAAGCTCGTGAATCTGGCTTACCACAGATCCGGTACCATCGAGAACAAGG
 141 T N F T P K P I T V S W L K D G K L V E S G F T T D P V T I E N K G
 1101 ATCCACACCCAAACCTACAAGTCCATAAGCACACTTACCATCTCTGAAATCGACTGGCTGAACCTGAATGTGTACACCTGCCGTGGATCACAGGGGT
 174 S T P Q T Y K V I S T L T I S E I D W L N L N V Y T C R V D H R G
 1201 CTCACCTTCTGAAGAAGCTGCTCCTCCACATGTGTGCCAGTCCCTCCACAGACATCCTAACCTTACCATCCCCCTCTTTGCCGACATCTTCTCA
 208 L T F L K N V S S T C A A S P S T D I L T F T I P P S F A D I F L
 1301 GCAAGTCCGTAACCTGACCTGTCTGGTCTCAAACCTGGCAACCTATGAAACCTGAATATCTCTGGGCTTCTCAAAGTGGTGAACACTGGAAACCA
 241 S K S A N L T C L V S N L A T Y E T L N I S W A S Q S G E P L E T K
 1401 AATTAATCATGGAAAGCCATCCCAATGGCACCTTCAAGTCTAAGGGTGTGGCTAGTGTGTTGTGGAAGACTGGAATAACAGGAAGGAATTTGTGTGT
 274 I K I M E S H P N G T F S A K G V A S V C V E D W N N R K E F V C
 1501 ACTGTGACTCACAGGGATCTGCCTTCCACAGAAATTCATCTCAAACCCAATGAGGTGCACAAACATCCACCTGCTGTGTACCTGCTGCCACCAG
 308 T V T H R D L P S P Q K K F I S K P N E V H K H P P A V Y L L P P
 1601 CTCGTGAGCAACTGAACCTGAGGGAGTCAGCCACAGTCACCTGCCTGGTGAAGGGCTTCTCTCCTGCAGACATCAGTGTGAGTGGCTTCCAGAGAGGGCA
 341 A R E Q L N L R E S A T V T C L V K G F S P A D I S V Q W L Q R G Q
 1701 ACTCTTGCCTCAAGAGAAGTATGTGACCAAGTGCCTGATGCCAGACCTGGGGCCCAAGGCTTCTACTTTACCACAGCATCCTGACTGTGACAGAGGAG
 374 L L P Q E K Y V T S A P M P E P G A P G F Y F T H S I L T V T E E
 1801 GAATGAACTCCGGAGAGACCTATACCTGIGTTGTAGGCACGAGGCCCTGCCACACCTGGTACCGAGAGGACCGTGGACAAGTCCACTGGTAAACCCA
 408 E W N S G E T Y T C V V G H E A L P H L V T E R T V D K S T G K P
 1901 CACTGTACAATGTCTCCCTGATCATGTCTGACACAGCGGCACCTGCTATTGACTCTAGCTGGCCAGACATGATAAGATACATTGATGAGTTTGGACAAA
 441 T L Y N V S L I M S D T G G T C Y •
 2001 CCACAAC TAGAATGCAGTGAATAAATGCTTTATTTGTGAAATTTGTGATGCTATTGCTTTATTTGTAACCATTATAAGCTGCAATAAACAAGTTAACAA
 2101 CAACAATTGCATTATTTATGTTTCAGGTTACAGGGGAGGTGTGGGAGGTTTTTAAAGCAAGTAAACCTCTACAATGTGGTATGGAATTAATTCTA
 2201 AAATACAGCATAGCAAACTTTAACCTCAAATCAAGCCTCTACTTGAATCCTTTTCTGAGGGATGAATAAGGCATAGGCATCAGGGGCTGTTGCCAATG
 2301 TGCATTAGCTGTTTGCAGCCTCACCTTCTTTCATGAGTAAAGATATAGTGTATTTTCCCAAGTGTGAACTAGCTCTTATTTCTTTATGTTTAAAT
 2401 GCACTGACCTCCACATTCCTTTTTAGTAAAATATTCAGAAATAATTTAAATACATCATTGCAATGAAAATAAATGTTTTTATTAGGCAGAAATCCAGA
 2501 TGCTCAAGGCCCTTATAATATCCCCAGTTTAGTAGTTGGACTTAGGGAACAAAGGAACCTTAAATAGAAATGGACAGCAAGAAAGCGAGCTTCTAGC

2601 TTATCCTCAGTCCTGCTCTCTGCCACAAAGTGACGCAGTTGCCGGCCGGTTCGCGCAGGGCGAACTCCCGCCCCACGGCTGCTCGCCGATCTCGGTC
125 ◀ • D Q E E A V F H V C N G A P D R L A F E R G W P Q E G I E T
2701 ATGGCCGGCCCGGAGGCGTCCCGGAAGTTCGTGGACACGACCTCCGACCACTCGGCCTACAGCTCGTCCAGGCCGCGCACCCACCCAGGCCAGGGTGT
93 ◀ M A P G S A D R F N T S V V E S W E A Y L E D L G R V W V W A L T N
SgrAI (2862)
2801 TGTCCGGCACCACTGGTCTGGACCGCGTATGAACAGGGTCACGTCGTCCCGACCACACCGGCGAAGTCGTCTCCACGAAGTCCCGGAGAACCC
60 ◀ D P V V Q D Q V A S I F L T V D D R V V G A F D D E V F D R S F G
2901 GAGCCGGTCGGTCCAGAACTCGACCGCTCCGGCGACGTCGCGCGGGTGAACCGGAAACGGCACTGGTCAACTTGGCCATGATGGCTCCTCctgtcagg
27 ◀ L R D T W F E V A G A V D R A T L V P V A S T L K A M
3001 agaggaagagagaaggttagtacaattgCTATAGTGAGTTGATTATACTATGCAGATATACTATGCCAATGATTAATTGTCAAAGTGGGCTGCagg
◀
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3201 GAAGCTTGAGACAGACCCGCGGGACCCGGAAGTGCAGGGGACGTGGCTAGGGCGGCTTCTTTTATGGTGCGCCGGCCCTCGGAGGCAGGGCGCTCGGG
◀
3301 GAGGCCTAGCGCCAATCTGCGGTGGCAGGAGGCGGGGCCGAAGGCCGTGCCTGACCAATCCGGAGCAGATAGGAGTCTCAGCCCCCGCCCAAAGCAA
◀
3401 GGGGAAGTCACGCGCTGTAGCGCCAGCGTGTGTGAAATGGGGGCTTGGGGGGTGGGGCCCTGACTAGTCAAAACAAACTCCATTGACGTCAATGG
◀
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3601 GATGTACTGCCAAGTAGGAAAGTCCATAAGGTCATGTACTGGCATAATGCCAGGGCGGCCATTTACCGTCATTGACGTCAATAGGGGGCGTACTTGGC
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3701 ATATGATACACTTGATGTACTGCCAAGTGGGCAGTTTACCCTAAATACTCCACCCATTGACGTCAATGGAAAGTCCCTATTGGCGTTACTATGGGAACAT
◀
3801 ACGTCATTATTGACGTCAATGGGCGGGGTCGTTGGGCGGTGACGCCAGGCGGGCCATTTACCGTAAGTTATGTAACGCCTGCAGGTTAATTAAGAACATG
◀
3901 TGAGCAAAGGCCAGCAAAGGCCAGGAACCGTAAAAAGCCGCGTTGCTGGCGTTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAAATCGAC
◀
4001 GCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAAGATACCAGGCGTTTCCCCCTGGAAGTCCCTCGTGCCTCTCTGTTCCGACCCCTGCCGCT
◀
4101 TACCGGATACCTGTCCGCTTTCTCCCTTCGGGAAGCGTGGCGTTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTCGTTCCGCTCCAAG
◀
4201 CTGGGCTGTGTGCACGAACCCCGTTGAGCCGACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAAGTCCAAACCGGTAAGACACGACTTATCGCCAC
◀
4301 TGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAGAGTTCCTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGAAC
◀
4401 AGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGGAAGAGGTTGGTAGCTCTTGATCCGGCAAACAACACCCTGGTAGCGGTGTTTT
◀
4501 TTTGTTTGAAGCAGCAGATTACGCGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTCTACGGGTCTGACGCTCAGTGGAACGAAAACCTCAC
◀
NotI (4646)
4601 GTTAAGGGATTTTGGTATGGCTAGTTAATTAACATTTAAATCAGCGGCCGCAATAAAATATCTTTATTTTCATTACATCTGTGTGTTGGTTTTTGTGT
◀
4701 GAATCGTAACTAACATACGCTCTCCATCAAACAAAACGAAACAAAACAACTAGCAAATAGGCTGTCCCAAGTGAAGTGCAGGTGCCAGAACATTTCC
4801 TCTATCGAA