**Supplemental Figure 1**

**SFG-m19(myc)(mCD28TM)m28mz-IRES-mIL12f**

ATGGCCTCACCGTTGACCCGCTTTCTGTCGCTGAACCTGCTGCTGCTGGGTGAGTCGATTATCCTGGGGAGTGGAGAAGCTGAAGTCCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGACCTGGGACCTCTGTGAAGTTATCTTGCAAAGTTTCTGGCGATACCATTACATTTTACTACATGCACTTTGTGAAGCAAAGGCCTGGACAGGGTCTGGAATGGATAGGAAGGATTGATCCTGAGGATGAAAGTACTAAATATTCTGAGAAGTTCAAAAACAAGGCGACACTCACTGCAGATACATCTTCCAACACAGCCTACCTGAAGCTCAGCAGCCTGACCTCTGAGGACACTGCAACCTATTTTTGTATCTACGGAGGATACTACTTTGATTACTGGGGCCAAGGGGTCATGGTCACAGTCTCCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATCCAGATGACACAGTCTCCAGCTTCCCTGTCTACATCTCTGGGAGAAACTGTCACCATCCAATGTCAAGCAAGTGAGGACATTTACAGTGGTTTAGCGTGGTATCAGCAGAAGCCAGGGAAATCTCCTCAGCTCCTGATCTATGGTGCAAGTGACTTACAAGACGGCGTCCCATCACGATTCAGTGGCAGTGGATCTGGCACACAGTATTCTCTCAAGATCACCAGCATGCAAACTGAAGATGAAGGGGTTTATTTCTGTCAACAGGGTTTAACGTATCCTCGGACGTTCGGTGGCGGCACCAAGCTGGAATTGAAACGGGCGGCCGCAGAACAGAAACTGATCTCTGAAGAAGACCTGATTGAGTTCATGTACCCTCCGCCTTACCTAGACAACGAGAGGAGCAATGGAACTATTATTCACATAAAAGAGAAACATCTTTGTCATACTCAGTCATCTCCTAAGCTGTTTTGGGCACTGGTCGTGGTTGCTGGAGTCCTGTTTTGTTATGGCTTGCTAGTGACAGTGGCTCTTTGTGTTATCTGGACAAATAGTAGAAGGAACAGACTCCTTCAAAGTGACTACATGAACATGACTCCCCGGAGGCCTGGGCTCACTCGAAAGCCTTACCAGCCCTACGCCCCTGCCAGAGACTTTGCAGCGTACCGCCCCAGAGCAAAATTCAGCAGGAGTGCAGAGACTGCTGCCAACCTGCAGGACCCCAACCAGCTCTACAATGAGCTCAATCTAGGGCGAAGAGAGGAATATGACGTCTTGGAGAAGAAGCGGGCTCGGGATCCAGAGATGGGAGGCAAACAGCAGAGGAGGAGGAACCCCCAGGAAGGCGTATACAATGCACTGCAGAAAGACAAGATGGCAGAAGCCTACAGTGAGATCGGCACAAAAGGCGAGAGGCGGAGAGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGCACTGCCACCAAGGACACCTATGATGCCCTGCATATGCAGACCCTGGCCCCTCGCTAACAGCCACTCGAGGATCCGCCCCTCTCCCTCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGGAATAAGGCCGGTGTGCGTTTGTCTATATGTTATTTTCCACCATATTGCCGTCTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTCTTCTTGACGAGCATTCCTAGGGGTCTTTCCCCTCTCGCCAAAGGAATGCAGGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCTTTGCAGGCAGCGGAACCCCCCACCTGGCGACAGGTGCCTCTGCGACCAAAGGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCCAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATGCCCAGAAGGTACCCCATTGTATGGGATCTGATCTGGGGCCTCGGTACACATGCTTTACATGTGTTTAGTCGAGGTTAAAAAAACGTCTAGGCCCCCCGAACCACGGGGACGTGGTTTTCCTTTGAAAAACACGATGATAATATGGCCACAAACTG**CCATGGGTCCTCAGAAGCTAACCATCTCCTGGTTTGCCATCGTTTTGCTGGTGTCTCCACTCATGGCCATGTGGGAGCTGGAGAAAGACGTTTATGTTGTAGAGGTGGACTGGACTCCCGATGCCCCTGGAGAAACAGTGAACCTCACCTGTGACACGCCTGAAGAAGATGACATCACCTGGACCTCAGACCAGAGACATGGAGTCATAGGCTCTGGAAAGACCCTGACCATCACTGTCAAAGAGTTTCTAGATGCTGGCCAGTACACCTGCCACAAAGGAGGCGAGACTCTGAGCCACTCACATCTGCTGCTCCACAAGAAGGAAAATGGAATTTGGTCCACTGAAATTTTAAAAAATTTCAAAAACAAGACTTTCCTGAAGTGTGAAGCACCAAATTACTCCGGACGGTTCACGTGCTCATGGCTGGTGCAAAGAAACATGGACTTGAAGTTCAACATCAAGAGCAGTAGCAGTCCCCCCGACTCTCGGGCAGTGACATGTGGAATGGCGTCTCTGTCTGCAGAGAAGGTCACACTGGACCAAAGGGACTATGAGAAGTATTCAGTGTCCTGCCAGGAGGATGTCACCTGCCCAACTGCCGAGGAGACCCTGCCCATTGAACTGGCGTTGGAAGCACGGCAGCAGAATAAATATGAGAACTACAGCACCAGCTTCTTCATCAGGGACATCATCAAACCAGACCCGCCCAAGAACTTGCAGATGAAGCCTTTGAAGAACTCACAGGTGGAGGTCAGCTGGGAGTACCCTGACTCCTGGAGCACTCCCCATTCCTACTTCTCCCTCAAGTTCTTTGTTCGAATCCAGCGCAAGAAAGAAAAGATGAAGGAGACAGAGGAGGGGTGTAACCAGAAAGGTGCGTTCCTCGTAGAGAAGACATCTACCGAAGTCCAATGCAAAGGCGGGAATGTCTGCGTGCAAGCTCAGGATCGCTATTACAATTCCTCATGCAGCAAGTGGGCATGTGTTCCCTGCAGGGTCCGATCCGGTGGCGGTGGCTCGGGCGGTGGTGGGTCGGGTGGCGGCGGATCTAGGGTCATTCCAGTCTCTGGACCTGCCAGGTGTCTTAGCCAGTCCCGAAACCTGCTGAAGACCACAGATGACATGGTGAAGACGGCCAGAGAAAAGCTGAAACATTATTCCTGCACTGCTGAAGACATCGATCATGAAGACATCACACGGGACCAAACCAGCACATTGAAGACCTGTTTACCACTGGAACTACACAAGAACGAGAGTTGCCTGGCTACTAGAGAGACTTCTTCCACAACAAGAGGGAGCTGCCTGCCCCCACAGAAGACGTCTTTGATGATGACCCTGTGCCTTGGTAGCATCTATGAGGACTTGAAGATGTACCAGACAGAGTTCCAGGCCATCAACGCAGCACTTCAGAATCACAACCATCAGCAGATCATTCTAGACAAGGGCATGCTGGTGGCCATCGATGAGCTGATGCAGTCTCTGAATCATAATGGCGAGACTCTGCGCCAGAAACCTCCTGTGGGAGAAGCAGACCCTTACAGAGTGAAAATGAAGCTCTGCATCCTGCTTCACGCCTTCAGCACCCGCGTCGTGACCATCAACAGGGTGATGGGCTATCTGAGCTCCGCCTGACTAC**

mCD8 signal peptide

anti-mCD19 scFv

myc tag

mCD28\_Transmembrane and Intracellular

mZeta

IRES

**mIL12f**

**SFG-m19(myc)(mCD28TM)mBBmz**

ATGGCCTCACCGTTGACCCGCTTTCTGTCGCTGAACCTGCTGCTGCTGGGTGAGTCGATTATCCTGGGGAGTGGAGAAGCTGAAGTCCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGACCTGGGACCTCTGTGAAGTTATCTTGCAAAGTTTCTGGCGATACCATTACATTTTACTACATGCACTTTGTGAAGCAAAGGCCTGGACAGGGTCTGGAATGGATAGGAAGGATTGATCCTGAGGATGAAAGTACTAAATATTCTGAGAAGTTCAAAAACAAGGCGACACTCACTGCAGATACATCTTCCAACACAGCCTACCTGAAGCTCAGCAGCCTGACCTCTGAGGACACTGCAACCTATTTTTGTATCTACGGAGGATACTACTTTGATTACTGGGGCCAAGGGGTCATGGTCACAGTCTCCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATCCAGATGACACAGTCTCCAGCTTCCCTGTCTACATCTCTGGGAGAAACTGTCACCATCCAATGTCAAGCAAGTGAGGACATTTACAGTGGTTTAGCGTGGTATCAGCAGAAGCCAGGGAAATCTCCTCAGCTCCTGATCTATGGTGCAAGTGACTTACAAGACGGCGTCCCATCACGATTCAGTGGCAGTGGATCTGGCACACAGTATTCTCTCAAGATCACCAGCATGCAAACTGAAGATGAAGGGGTTTATTTCTGTCAACAGGGTTTAACGTATCCTCGGACGTTCGGTGGCGGCACCAAGCTGGAATTGAAACGGGCGGCCGCAGAACAGAAACTGATCTCTGAAGAAGACCTGGCAATTGAGTTCATGTACCCTCCGCCTTACCTAGACAACGAGAGGAGCAATGGAACTATTATTCACATAAAAGAGAAACATCTTTGTCATACTCAGTCATCTCCTAAGCTGTTTTGGGCACTGGTCGTGGTTGCTGGAGTCCTGTTTTGTTATGGCTTGCTAGTGACAGTGGCTCTTTGTGTTATCTGGACAaaatggatcaggaaaaaattcccccacatattcaagcaaccatttaagaagaccactggagcagctcaagaggaagatgcttgtagctgccgatgtccacaggaagaagaaggaggaggaggaggctatgagctgAGAGCAAAATTCAGCAGGAGTGCAGAGACTGCTGCCAACCTGCAGGACCCCAACCAGCTCTACAATGAGCTCAATCTAGGGCGAAGAGAGGAATATGACGTCTTGGAGAAGAAGCGGGCTCGGGATCCAGAGATGGGAGGCAAACAGCAGAGGAGGAGGAACCCCCAGGAAGGCGTATACAATGCACTGCAGAAAGACAAGATGGCAGAAGCCTACAGTGAGATCGGCACAAAAGGCGAGAGGCGGAGAGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGCACTGCCACCAAGGACACCTATGATGCCCTGCATATGCAGACCCTGGCCCCTCGC

mCD8 signal peptide

anti-mCD19 scFv

myc tag

mCD28\_Transmembrane

mBB

mZeta

**SFG\_m19(myc)(m28TM)m28mz**

ATGGCCTCACCGTTGACCCGCTTTCTGTCGCTGAACCTGCTGCTGCTGGGTGAGTCGATTATCCTGGGGAGTGGAGAAGCTGAAGTCCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGACCTGGGACCTCTGTGAAGTTATCTTGCAAAGTTTCTGGCGATACCATTACATTTTACTACATGCACTTTGTGAAGCAAAGGCCTGGACAGGGTCTGGAATGGATAGGAAGGATTGATCCTGAGGATGAAAGTACTAAATATTCTGAGAAGTTCAAAAACAAGGCGACACTCACTGCAGATACATCTTCCAACACAGCCTACCTGAAGCTCAGCAGCCTGACCTCTGAGGACACTGCAACCTATTTTTGTATCTACGGAGGATACTACTTTGATTACTGGGGCCAAGGGGTCATGGTCACAGTCTCCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATCCAGATGACACAGTCTCCAGCTTCCCTGTCTACATCTCTGGGAGAAACTGTCACCATCCAATGTCAAGCAAGTGAGGACATTTACAGTGGTTTAGCGTGGTATCAGCAGAAGCCAGGGAAATCTCCTCAGCTCCTGATCTATGGTGCAAGTGACTTACAAGACGGCGTCCCATCACGATTCAGTGGCAGTGGATCTGGCACACAGTATTCTCTCAAGATCACCAGCATGCAAACTGAAGATGAAGGGGTTTATTTCTGTCAACAGGGTTTAACGTATCCTCGGACGTTCGGTGGCGGCACCAAGCTGGAATTGAAACGGGCGGCCGCAGAACAGAAACTGATCTCTGAAGAAGACCTGATTGAGTTCATGTACCCTCCGCCTTACCTAGACAACGAGAGGAGCAATGGAACTATTATTCACATAAAAGAGAAACATCTTTGTCATACTCAGTCATCTCCTAAGCTGTTTTGGGCACTGGTCGTGGTTGCTGGAGTCCTGTTTTGTTATGGCTTGCTAGTGACAGTGGCTCTTTGTGTTATCTGGACAAATAGTAGAAGGAACAGACTCCTTCAAAGTGACTACATGAACATGACTCCCCGGAGGCCTGGGCTCACTCGAAAGCCTTACCAGCCCTACGCCCCTGCCAGAGACTTTGCAGCGTACCGCCCCAGAGCAAAATTCAGCAGGAGTGCAGAGACTGCTGCCAACCTGCAGGACCCCAACCAGCTCTACAATGAGCTCAATCTAGGGCGAAGAGAGGAATATGACGTCTTGGAGAAGAAGCGGGCTCGGGATCCAGAGATGGGAGGCAAACAGCAGAGGAGGAGGAACCCCCAGGAAGGCGTATACAATGCACTGCAGAAAGACAAGATGGCAGAAGCCTACAGTGAGATCGGCACAAAAGGCGAGAGGCGGAGAGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGCACTGCCACCAAGGACACCTATGATGCCCTGCATATGCAGACCCTGGCCCCTCGC

mCD8 signal peptide

anti-mCD19 scFv

myc tag

mCD28\_Transmembrane and intracellular

mZeta

**SFG-m19(myc)(mCD28TM)mz**

ATGGCCTCACCGTTGACCCGCTTTCTGTCGCTGAACCTGCTGCTGCTGGGTGAGTCGATTATCCTGGGGAGTGGAGAAGCTGAAGTCCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGACCTGGGACCTCTGTGAAGTTATCTTGCAAAGTTTCTGGCGATACCATTACATTTTACTACATGCACTTTGTGAAGCAAAGGCCTGGACAGGGTCTGGAATGGATAGGAAGGATTGATCCTGAGGATGAAAGTACTAAATATTCTGAGAAGTTCAAAAACAAGGCGACACTCACTGCAGATACATCTTCCAACACAGCCTACCTGAAGCTCAGCAGCCTGACCTCTGAGGACACTGCAACCTATTTTTGTATCTACGGAGGATACTACTTTGATTACTGGGGCCAAGGGGTCATGGTCACAGTCTCCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATCCAGATGACACAGTCTCCAGCTTCCCTGTCTACATCTCTGGGAGAAACTGTCACCATCCAATGTCAAGCAAGTGAGGACATTTACAGTGGTTTAGCGTGGTATCAGCAGAAGCCAGGGAAATCTCCTCAGCTCCTGATCTATGGTGCAAGTGACTTACAAGACGGCGTCCCATCACGATTCAGTGGCAGTGGATCTGGCACACAGTATTCTCTCAAGATCACCAGCATGCAAACTGAAGATGAAGGGGTTTATTTCTGTCAACAGGGTTTAACGTATCCTCGGACGTTCGGTGGCGGCACCAAGCTGGAATTGAAACGGGCGGCCGCAGAACAGAAACTGATCTCTGAAGAAGACCTGATTGAGTTCATGTACCCTCCGCCTTACCTAGACAACGAGAGGAGCAATGGAACTATTATTCACATAAAAGAGAAACATCTTTGTCATACTCAGTCATCTCCTAAGCTGTTTTGGGCACTGGTCGTGGTTGCTGGAGTCCTGTTTTGTTATGGCTTGCTAGTGACAGTGGCTCTTTGTGTTATCTGGACAAGAGCAAAATTCAGCAGGAGTGCAGAGACTGCTGCCAACCTGCAGGACCCCAACCAGCTCTACAATGAGCTCAATCTAGGGCGAAGAGAGGAATATGACGTCTTGGAGAAGAAGCGGGCTCGGGATCCAGAGATGGGAGGCAAACAGCAGAGGAGGAGGAACCCCCAGGAAGGCGTATACAATGCACTGCAGAAAGACAAGATGGCAGAAGCCTACAGTGAGATCGGCACAAAAGGCGAGAGGCGGAGAGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGCACTGCCACCAAGGACACCTATGATGCCCTGCATATGCAGACCCTGGCCCCTCGC

mCD8 signal peptide

anti-mCD19 scFv

myc tag

mCD28\_Transmembrane

mZeta

**SFG-m19(myc)(mCD28TM)mBBmz-IRES-mIL12f**

ATGGCCTCACCGTTGACCCGCTTTCTGTCGCTGAACCTGCTGCTGCTGGGTGAGTCGATTATCCTGGGGAGTGGAGAAGCTGAAGTCCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGACCTGGGACCTCTGTGAAGTTATCTTGCAAAGTTTCTGGCGATACCATTACATTTTACTACATGCACTTTGTGAAGCAAAGGCCTGGACAGGGTCTGGAATGGATAGGAAGGATTGATCCTGAGGATGAAAGTACTAAATATTCTGAGAAGTTCAAAAACAAGGCGACACTCACTGCAGATACATCTTCCAACACAGCCTACCTGAAGCTCAGCAGCCTGACCTCTGAGGACACTGCAACCTATTTTTGTATCTACGGAGGATACTACTTTGATTACTGGGGCCAAGGGGTCATGGTCACAGTCTCCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATCCAGATGACACAGTCTCCAGCTTCCCTGTCTACATCTCTGGGAGAAACTGTCACCATCCAATGTCAAGCAAGTGAGGACATTTACAGTGGTTTAGCGTGGTATCAGCAGAAGCCAGGGAAATCTCCTCAGCTCCTGATCTATGGTGCAAGTGACTTACAAGACGGCGTCCCATCACGATTCAGTGGCAGTGGATCTGGCACACAGTATTCTCTCAAGATCACCAGCATGCAAACTGAAGATGAAGGGGTTTATTTCTGTCAACAGGGTTTAACGTATCCTCGGACGTTCGGTGGCGGCACCAAGCTGGAATTGAAACGGGCGGCCGCAGAACAGAAACTGATCTCTGAAGAAGACCTGGCAATTGAGTTCATGTACCCTCCGCCTTACCTAGACAACGAGAGGAGCAATGGAACTATTATTCACATAAAAGAGAAACATCTTTGTCATACTCAGTCATCTCCTAAGCTGTTTTGGGCACTGGTCGTGGTTGCTGGAGTCCTGTTTTGTTATGGCTTGCTAGTGACAGTGGCTCTTTGTGTTATCTGGACAaaatggatcaggaaaaaattcccccacatattcaagcaaccatttaagaagaccactggagcagctcaagaggaagatgcttgtagctgccgatgtccacaggaagaagaaggaggaggaggaggctatgagctgAGAGCAAAATTCAGCAGGAGTGCAGAGACTGCTGCCAACCTGCAGGACCCCAACCAGCTCTACAATGAGCTCAATCTAGGGCGAAGAGAGGAATATGACGTCTTGGAGAAGAAGCGGGCTCGGGATCCAGAGATGGGAGGCAAACAGCAGAGGAGGAGGAACCCCCAGGAAGGCGTATACAATGCACTGCAGAAAGACAAGATGGCAGAAGCCTACAGTGAGATCGGCACAAAAGGCGAGAGGCGGAGAGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGCACTGCCACCAAGGACACCTATGATGCCCTGCATATGCAGACCCTGGCCCCTCGCGATCCGCCCCTCTCCCTCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGGAATAAGGCCGGTGTGCGTTTGTCTATATGTTATTTTCCACCATATTGCCGTCTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTCTTCTTGACGAGCATTCCTAGGGGTCTTTCCCCTCTCGCCAAAGGAATGCAGGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCTTTGCAGGCAGCGGAACCCCCCACCTGGCGACAGGTGCCTCTGCGACCAAAGGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCCAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATGCCCAGAAGGTACCCCATTGTATGGGATCTGATCTGGGGCCTCGGTACACATGCTTTACATGTGTTTAGTCGAGGTTAAAAAAACGTCTAGGCCCCCCGAACCACGGGGACGTGGTTTTCCTTTGAAAAACACGATGATAATATGGCCACAAACTG**CCATGGGTCCTCAGAAGCTAACCATCTCCTGGTTTGCCATCGTTTTGCTGGTGTCTCCACTCATGGCCATGTGGGAGCTGGAGAAAGACGTTTATGTTGTAGAGGTGGACTGGACTCCCGATGCCCCTGGAGAAACAGTGAACCTCACCTGTGACACGCCTGAAGAAGATGACATCACCTGGACCTCAGACCAGAGACATGGAGTCATAGGCTCTGGAAAGACCCTGACCATCACTGTCAAAGAGTTTCTAGATGCTGGCCAGTACACCTGCCACAAAGGAGGCGAGACTCTGAGCCACTCACATCTGCTGCTCCACAAGAAGGAAAATGGAATTTGGTCCACTGAAATTTTAAAAAATTTCAAAAACAAGACTTTCCTGAAGTGTGAAGCACCAAATTACTCCGGACGGTTCACGTGCTCATGGCTGGTGCAAAGAAACATGGACTTGAAGTTCAACATCAAGAGCAGTAGCAGTCCCCCCGACTCTCGGGCAGTGACATGTGGAATGGCGTCTCTGTCTGCAGAGAAGGTCACACTGGACCAAAGGGACTATGAGAAGTATTCAGTGTCCTGCCAGGAGGATGTCACCTGCCCAACTGCCGAGGAGACCCTGCCCATTGAACTGGCGTTGGAAGCACGGCAGCAGAATAAATATGAGAACTACAGCACCAGCTTCTTCATCAGGGACATCATCAAACCAGACCCGCCCAAGAACTTGCAGATGAAGCCTTTGAAGAACTCACAGGTGGAGGTCAGCTGGGAGTACCCTGACTCCTGGAGCACTCCCCATTCCTACTTCTCCCTCAAGTTCTTTGTTCGAATCCAGCGCAAGAAAGAAAAGATGAAGGAGACAGAGGAGGGGTGTAACCAGAAAGGTGCGTTCCTCGTAGAGAAGACATCTACCGAAGTCCAATGCAAAGGCGGGAATGTCTGCGTGCAAGCTCAGGATCGCTATTACAATTCCTCATGCAGCAAGTGGGCATGTGTTCCCTGCAGGGTCCGATCCGGTGGCGGTGGCTCGGGCGGTGGTGGGTCGGGTGGCGGCGGATCTAGGGTCATTCCAGTCTCTGGACCTGCCAGGTGTCTTAGCCAGTCCCGAAACCTGCTGAAGACCACAGATGACATGGTGAAGACGGCCAGAGAAAAGCTGAAACATTATTCCTGCACTGCTGAAGACATCGATCATGAAGACATCACACGGGACCAAACCAGCACATTGAAGACCTGTTTACCACTGGAACTACACAAGAACGAGAGTTGCCTGGCTACTAGAGAGACTTCTTCCACAACAAGAGGGAGCTGCCTGCCCCCACAGAAGACGTCTTTGATGATGACCCTGTGCCTTGGTAGCATCTATGAGGACTTGAAGATGTACCAGACAGAGTTCCAGGCCATCAACGCAGCACTTCAGAATCACAACCATCAGCAGATCATTCTAGACAAGGGCATGCTGGTGGCCATCGATGAGCTGATGCAGTCTCTGAATCATAATGGCGAGACTCTGCGCCAGAAACCTCCTGTGGGAGAAGCAGACCCTTACAGAGTGAAAATGAAGCTCTGCATCCTGCTTCACGCCTTCAGCACCCGCGTCGTGACCATCAACAGGGTGATGGGCTATCTGAGCTCCGCCTGACTAC**

mCD8 signal peptide

anti-mCD19 scFv

myc tag

mCD28\_Transmembrane

mBB

mZeta

IRES

**mIL12f**

**SFG-m19(myc)(mCD28TM)mz-IRES-mIL12f**

ATGGCCTCACCGTTGACCCGCTTTCTGTCGCTGAACCTGCTGCTGCTGGGTGAGTCGATTATCCTGGGGAGTGGAGAAGCTGAAGTCCAGCTGCAGCAGTCTGGGGCTGAGCTTGTGAGACCTGGGACCTCTGTGAAGTTATCTTGCAAAGTTTCTGGCGATACCATTACATTTTACTACATGCACTTTGTGAAGCAAAGGCCTGGACAGGGTCTGGAATGGATAGGAAGGATTGATCCTGAGGATGAAAGTACTAAATATTCTGAGAAGTTCAAAAACAAGGCGACACTCACTGCAGATACATCTTCCAACACAGCCTACCTGAAGCTCAGCAGCCTGACCTCTGAGGACACTGCAACCTATTTTTGTATCTACGGAGGATACTACTTTGATTACTGGGGCCAAGGGGTCATGGTCACAGTCTCCTCAGGTGGAGGTGGATCAGGTGGAGGTGGATCTGGTGGAGGTGGATCTGACATCCAGATGACACAGTCTCCAGCTTCCCTGTCTACATCTCTGGGAGAAACTGTCACCATCCAATGTCAAGCAAGTGAGGACATTTACAGTGGTTTAGCGTGGTATCAGCAGAAGCCAGGGAAATCTCCTCAGCTCCTGATCTATGGTGCAAGTGACTTACAAGACGGCGTCCCATCACGATTCAGTGGCAGTGGATCTGGCACACAGTATTCTCTCAAGATCACCAGCATGCAAACTGAAGATGAAGGGGTTTATTTCTGTCAACAGGGTTTAACGTATCCTCGGACGTTCGGTGGCGGCACCAAGCTGGAATTGAAACGGGCGGCCGCAGAACAGAAACTGATCTCTGAAGAAGACCTGGCAATTGAGTTCATGTACCCTCCGCCTTACCTAGACAACGAGAGGAGCAATGGAACTATTATTCACATAAAAGAGAAACATCTTTGTCATACTCAGTCATCTCCTAAGCTGTTTTGGGCACTGGTCGTGGTTGCTGGAGTCCTGTTTTGTTATGGCTTGCTAGTGACAGTGGCTCTTTGTGTTATCTGGACAAGAGCAAAATTCAGCAGGAGTGCAGAGACTGCTGCCAACCTGCAGGACCCCAACCAGCTCTACAATGAGCTCAATCTAGGGCGAAGAGAGGAATATGACGTCTTGGAGAAGAAGCGGGCTCGGGATCCAGAGATGGGAGGCAAACAGCAGAGGAGGAGGAACCCCCAGGAAGGCGTATACAATGCACTGCAGAAAGACAAGATGGCAGAAGCCTACAGTGAGATCGGCACAAAAGGCGAGAGGCGGAGAGGCAAGGGGCACGATGGCCTTTACCAGGGTCTCAGCACTGCCACCAAGGACACCTATGATGCCCTGCATATGCAGACCCTGGCCCCTCGCGATCCGCCCCTCTCCCTCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGGAATAAGGCCGGTGTGCGTTTGTCTATATGTTATTTTCCACCATATTGCCGTCTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTCTTCTTGACGAGCATTCCTAGGGGTCTTTCCCCTCTCGCCAAAGGAATGCAGGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCTTTGCAGGCAGCGGAACCCCCCACCTGGCGACAGGTGCCTCTGCGACCAAAGGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCCAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATGCCCAGAAGGTACCCCATTGTATGGGATCTGATCTGGGGCCTCGGTACACATGCTTTACATGTGTTTAGTCGAGGTTAAAAAAACGTCTAGGCCCCCCGAACCACGGGGACGTGGTTTTCCTTTGAAAAACACGATGATAATATGGCCACAAACTG**CCATGGGTCCTCAGAAGCTAACCATCTCCTGGTTTGCCATCGTTTTGCTGGTGTCTCCACTCATGGCCATGTGGGAGCTGGAGAAAGACGTTTATGTTGTAGAGGTGGACTGGACTCCCGATGCCCCTGGAGAAACAGTGAACCTCACCTGTGACACGCCTGAAGAAGATGACATCACCTGGACCTCAGACCAGAGACATGGAGTCATAGGCTCTGGAAAGACCCTGACCATCACTGTCAAAGAGTTTCTAGATGCTGGCCAGTACACCTGCCACAAAGGAGGCGAGACTCTGAGCCACTCACATCTGCTGCTCCACAAGAAGGAAAATGGAATTTGGTCCACTGAAATTTTAAAAAATTTCAAAAACAAGACTTTCCTGAAGTGTGAAGCACCAAATTACTCCGGACGGTTCACGTGCTCATGGCTGGTGCAAAGAAACATGGACTTGAAGTTCAACATCAAGAGCAGTAGCAGTCCCCCCGACTCTCGGGCAGTGACATGTGGAATGGCGTCTCTGTCTGCAGAGAAGGTCACACTGGACCAAAGGGACTATGAGAAGTATTCAGTGTCCTGCCAGGAGGATGTCACCTGCCCAACTGCCGAGGAGACCCTGCCCATTGAACTGGCGTTGGAAGCACGGCAGCAGAATAAATATGAGAACTACAGCACCAGCTTCTTCATCAGGGACATCATCAAACCAGACCCGCCCAAGAACTTGCAGATGAAGCCTTTGAAGAACTCACAGGTGGAGGTCAGCTGGGAGTACCCTGACTCCTGGAGCACTCCCCATTCCTACTTCTCCCTCAAGTTCTTTGTTCGAATCCAGCGCAAGAAAGAAAAGATGAAGGAGACAGAGGAGGGGTGTAACCAGAAAGGTGCGTTCCTCGTAGAGAAGACATCTACCGAAGTCCAATGCAAAGGCGGGAATGTCTGCGTGCAAGCTCAGGATCGCTATTACAATTCCTCATGCAGCAAGTGGGCATGTGTTCCCTGCAGGGTCCGATCCGGTGGCGGTGGCTCGGGCGGTGGTGGGTCGGGTGGCGGCGGATCTAGGGTCATTCCAGTCTCTGGACCTGCCAGGTGTCTTAGCCAGTCCCGAAACCTGCTGAAGACCACAGATGACATGGTGAAGACGGCCAGAGAAAAGCTGAAACATTATTCCTGCACTGCTGAAGACATCGATCATGAAGACATCACACGGGACCAAACCAGCACATTGAAGACCTGTTTACCACTGGAACTACACAAGAACGAGAGTTGCCTGGCTACTAGAGAGACTTCTTCCACAACAAGAGGGAGCTGCCTGCCCCCACAGAAGACGTCTTTGATGATGACCCTGTGCCTTGGTAGCATCTATGAGGACTTGAAGATGTACCAGACAGAGTTCCAGGCCATCAACGCAGCACTTCAGAATCACAACCATCAGCAGATCATTCTAGACAAGGGCATGCTGGTGGCCATCGATGAGCTGATGCAGTCTCTGAATCATAATGGCGAGACTCTGCGCCAGAAACCTCCTGTGGGAGAAGCAGACCCTTACAGAGTGAAAATGAAGCTCTGCATCCTGCTTCACGCCTTCAGCACCCGCGTCGTGACCATCAACAGGGTGATGGGCTATCTGAGCTCCGCCTGACTAC**

mCD8 signal peptide

anti-mCD19 scFv

myc tag

mCD28\_Transmembrane

mZeta

IRES

**mIL12f**

**vexGFP-E2A-**

ATGGTCagcaagggcgaggagctgttcaccggggtggtgcccatcctggtcgagctggacggcgacgtaaacggccacaagttcagcgtgtccggcgagggcgagggcgatgccacctacggcaagctgaccctgaagttcatctgcaccaccggcaagctgcccgtgccctggcccaccctcgtgaccaccTtCaGctacggcgtgcagtgcttcagccgctaccccgaccacatgaagcagcacgacttcttcaagtccgccatgcccgaaggctacgtccaggagcgcaccatcAGcttcaaggacgacggcaactacaagacccgcgccgaggtgaagttcgagggcgacaccctggtgaaccgcatcgagctgaagggcatcgacttcaaggaggacggcaacatcctggggcacaagctggagtacaactacaacagccacaacgtctatatcaCggccgacaagcagaagaacggcatcaaggCgaacttcaagatccgccacaacatcgaggacggcagcgtgcagctcgccgaccactaccagcagaacacccccatcggcgacggccccgtgctgctgcccgacaaccactacctgTTcaTccagtccgccctgagcaaagaccccaacgagaagcgcgatcacatggtcctgctggagttcgtgaccgccgccgggatcactcAcggcatggacgagctgtacaagGGCAGCGGCCAATGTACCAACTATGCCTTGCTGAAACTTGCTGGAGACGTTGAATCCAATCCTGGCCCT

**vexGFP**

**E2A**