

## Supplementary Figure 1

### 139 CAR:

139 scFv (signal peptide underlined)

Linker sequence

CD28 segment (transmembrane domain underlined)

CD3-zeta segment

P2A self-cleaving peptide (followed by the gene for the ZsGreen reporter, which had no effect on CAR expression or function)

MVLLVTSLLLCELPHPAFLLIIPDIQMTQSPSSLSASVGDRVITTCRASQGIRNNLAWYQQKPGK  
APKRLIYAASNLSQSGVPSRFTGSGSGTEFTLIVSSLQPEDFATYYCLQHHSYPLTSGGGTKVEI  
KRTGSTSGSGKPGSGEGSEVQVLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLE  
WVSAISGSGGSTNYADSVKGRFTISRDNKNTLYLQMNSLRAEDTAVYYCAGSSGWSEYWGQGT  
LVTVSSAAAIEVMYPPPYLDNEKSNGTIIHVKGKHLCPSPFPGPSKPFWVLVVVGGVLACYSL  
LVTVAFLIFWVRSKRSLRLHSDYMNMTPRRPGPTRKHYQPYAPPRDFAAYRSRVKFSRSADAPA  
YQQGQNQLYNEINLGRREEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGM  
KGERRRGKGDGLYQGLSTATKDTYDALHMQUALPPRATNFSLLKQAGDVEENPG

### CD4 CAR:

CD4, D1D2 (signal peptide underlined)

Linker sequence

CD28 segment (transmembrane domain underlined)

CD3-zeta segment

MNRGVPFRHLLLVQLALPAATQGKKVVLGKKGDTVELTCTASQKKSIFHWKNSNQIKILGN  
QGSFLTGKPSKLNDRADSRSLWDQGNFPLIIKLNKIEDSDTYICEVEDQKEEVQLLVFGLTAN  
SDTHLLQGQSLTTLTLESPPGSSPSVQCRSPRGKNIQGGKTLVSQLELQDSGTWTCTVLQNQKK  
VEFKIDIVLAFQKASAAAIEVMYPPPYLDNEKSNGTIIHVKGKHLCPSPFPGPSKPFWVLV  
VGGVLACYSLLVTVAFILFVWVRSKRSLRLHSDYMNMTPRRPGPTRKHYQPYAPPRDFAAYRSRV  
KFSRSADAPAYQQGQNQLYNEINLGRREEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDK  
MAEAYSEIGMKGERRRGKGDGLYQGLSTATKDTYDALHMQUALPPR

## CD4-MBL CAR:

CD4, D1D2 (signal peptide underlined)

Linker sequence

Carbohydrate recognition domain of mannose-binding lectin (MBL)

CD28 segment (transmembrane domain underlined)

CD3-zeta segment

P2A self-cleaving peptide (followed by the gene for the ZsGreen reporter, which had no effect on CAR expression or function)

```
MNRGVPPERHLLLVLQLALLPAATQGKKVVLGKKGDTVELTCTASQKKS IQFHWKNSNQIKILGN
QGSFLTGKPSKLNDRADSRRLWDQGNFPLI IKNLKI ESDTYICEVEDQKEEVQLLVFGLTAN
SDTHLLQGQSLTTLTLESPPGSSPSVQCRSPRGKNIQGGKTL SVSQLELQDSGTWTCTVLQNQKK
VEFKIDIVVLA FQKASGGGGSKQVGNKFFLTNGEIMTFEKVKALCVKFQASVATPRNAAENGAI
QNLIKEEAF LGITDEKTEGQFVDLTGNRLTYTNWNEGE PNNAGSDEDCVLLLKNGQWNDVPCST
SHLAVCEFP IAAAIEVMYPPPYLDNEKSNGTIIHVKGKHLCPSP LFPGPSKPFWVLVVVGGVLA
CYSLLVTVAFIIFWVRSKR SRLLHSDYMNMTPRRPGPTRKHYPYAPPRDFAAYRSRVKFSRSA
DAPAYQQGQNQLYNE LNLGRREEYDVLDKRRGRDP EMGGKPRRKNPQEGLYNELQKDKMAEAYS
EIGMKGERRRGK GHDGLYQGLSTATKDTYDALHMQALPPRATNFSLLKQAGDVEENPG
```

## CD4-R5Nt CAR:

CD4, D1D2 (signal peptide underlined)

Linker sequence

CCR5 Nt segment

CD28 segment (transmembrane domain underlined)

CD3-zeta segment

```
MVRGVPPERHLLLVLQLALLPAATQGKKVVLGKKGDTVELTCTASQKKS IQFHWKNSNQIKILGN
QGSFLTGKPSKLNDRADSRRLWDQGNFPLI IKNLKI ESDTYICEVEDQKEEVQLLVFGLTAN
SDTHLLQGQSLTTLTLESPPGSSPSVQCRSPRGKNIQGGKTL SVSQLELQDSGTWTCTVLQNQKK
VEFKIDIVVLA FQKASGGGSGGGGS DYQVSSPIYDINYYTSEPSQKINVKAAAIEVMYPPPYL
DNEKSNGTIIHVKGKHLCPSP LFPGPSKPFWVLVVVGGVLACYSLLVTVAFIIFWVRSKR SRLL
HSDYMNMTPRRPGPTRKHYPYAPPRDFAAYRSRVKFSRSADAPAYQQGQNQLYNE LNLGRREE
YDVLDKRRGRDP EMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGK GHDGLYQGLST
ATKDTYDALHMQALPPR
```

### CD4-R5Nt(Y/A) CAR:

CD4, D1D2 (signal peptide underlined)

Linker sequence

CCR5 Nt segment with 4 Y-to-A substitutions

CD28 segment (transmembrane domain underlined)

CD3-zeta segment

MVRGVPERHLLLVLQALALLPAATQGKKVVLGKKGDTVELTCTASQKKS IQFHWKNSNQIKILGN  
QGSFLTKGPSKLNDRADSRRLWDQGNFPLI IKNLKI ESDTYICEVEDQKEEVQLLVFGLTAN  
SDTHLLQGQSLTTLTLESPPGSSPSVQCRSPRGKNIQGGKTL SVSQLELQDSGTWTCTVLQNQKK  
VEFKIDIVVLAFAQKASGGGSGGGGS DAQVSSPIADINAATSEPSQKINVKAAAIEVMYPPPYL  
DNEKSNGTIIHVKGKHLCPSPFPGPSKPFWVLVVGGVLACYSLLVTVAFIIFWVRSKRSRLL  
HSDYMNMTPRRPGPTRKHYPYAPPRDFAAYRSRVKFSRSADAPAYQQGQNQLYNELNLGRREE  
YDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGH DGLYQGLST  
ATKDTYDALHMQUALPPR

### CD4-MBL-R5Nt CAR:

CD4, D1D2 (signal peptide underlined)

Linker sequence

Carbohydrate recognition of domain of mannose-binding lectin (MBL)

CCR5 Nt segment

CD28 segment (transmembrane domain underlined)

CD3-zeta segment

MNRGVPERHLLLVLQALALLPAATQGKKVVLGKKGDTVELTCTASQKKS IQFHWKNSNQIKILGN  
QGSFLTKGPSKLNDRADSRRLWDQGNFPLI IKNLKI ESDTYICEVEDQKEEVQLLVFGLTAN  
SDTHLLQGQSLTTLTLESPPGSSPSVQCRSPRGKNIQGGKTL SVSQLELQDSGTWTCTVLQNQKK  
VEFKIDIVVLAFAQKASGGGSKQVGNKFFLTNGEIMTFEKVKALCVKFQASVATPRNAAENGAI  
QNLIKEEAF LGITDEKTEGQFVDLTGNRLTYTNWNEGE PNNAGSDEDCVLLLKNGQWNDVPCST  
SHLAVCEFP IGGGSDYQVSSPIYDINYTSEPSQKINVKAAAIEVMYPPPYLDNEKSNGTIIH  
VKGKHLCPSPFPGPSKPFWVLVVGGVLACYSLLVTVAFIIFWVRSKRSRLLHSDYMNMTPRR  
PGPTRKHYPYAPPRDFAAYRSRVKFSRSADAPAYQQGQNQLYNELNLGRREEYDVLDKRRGRD  
PEMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGKGH DGLYQGLSTATKDTYDALHM  
QUALPPR