SEQUENCE LISTING

<110> Frendewey, David
Auerbach, Wojtek
Lai, Ka-Man Venus
Mujica, Alexander O.
Lee, Jeffrey D.
Droguett, Gustavo
Trzaska, Sean
Hunt, Charleen
Gagliardi, Anthony
Kuno, Junko
Valenzuela, David M.
Yancopoulos, George D.

<120> Methods and Compositions for the
Targeted Modification of a Genome

<130> 057766/453460

<150> US 61/914,768
<151> 2013-12-11

<150> US 62/017,416
<151> 2014-06-26

<150> US 62/029,261
<151> 2014-07-25

<150> US 62/052,906
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ggcaccgagu cggugcuuuu 80

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 1 5 10 15
His Trp Lys His Gly Ala Gly Ser Pro Leu Pro Ile Thr Pro Val Asn
            20 25 30
Ala Thr Cys Ala Ile Arg His Pro Cys His Gly Asn Leu Met Asn Gln
        35 40 45
Ile Lys Asn Gln Leu Ala Gln Leu Asn Gly Ser Ala Asn Ala Leu Phe

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    50                  55                  60
Ile Ser Tyr Tyr Thr Ala Gln Gly Glu Pro Phe Pro Asn Asn Val Glu
65                  70                  75                  80
Lys Leu Cys Ala Pro Asn Met Thr Asp Phe Pro Ser Phe His Gly Asn
                85                  90                  95
Gly Thr Glu Lys Thr Lys Leu Val Glu Leu Tyr Arg Met Val Ala Tyr
            100                 105                 110
Leu Ser Ala Ser Leu Thr Asn Ile Thr Arg Asp Gln Lys Val Leu Asn
        115                 120                 125
Pro Thr Ala Val Ser Leu Gln Val Lys Leu Asn Ala Thr Ile Asp Val
    130                 135                 140
Met Arg Gly Leu Leu Ser Asn Val Leu Cys Arg Leu Cys Asn Lys Tyr
145                 150                 155                 160
Arg Val Gly His Val Asp Val Pro Pro Val Pro Asp His Ser Asp Lys
                165                 170                 175
Glu Ala Phe Gln Arg Lys Lys Leu Gly Cys Gln Leu Leu Gly Thr Tyr
            180                 185                 190
Lys Gln Val Ile Ser Val Val Val Gln Ala Phe
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<220>
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<400> 11
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<210> 12
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<220>
<223> ZFN1b binding site

<400> 12
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<210> 13
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<212> DNA
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<220>
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<400> 13
ttcaccctcc gcacc 15

<210> 14
<211> 7
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<223> ZFN2 cutting site

<400> 14
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<210> 16
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ttctgg 6

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

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Ser Gly Cys Gln Leu Gln Lys Lys Glu Ile His Leu Tyr Gln Thr Phe
        115                 120                 125
Val Val Gln Leu Gln Asp Pro Arg Glu Pro Arg Arg Gln Ala Thr Gln
    130                 135                 140
Met Leu Lys Leu Gln Asn Leu Val Ile Pro Trp Ala Pro Glu Asn Leu
145                 150                 155                 160
Thr Leu His Lys Leu Ser Glu Ser Gln Leu Glu Leu Asn Trp Asn Asn
                165                 170                 175
Arg Phe Leu Asn His Cys Leu Glu His Leu Val Gln Tyr Arg Thr Asp
            180                 185                 190
Trp Asp His Ser Trp Thr Glu Gln Ser Val Asp Tyr Arg His Lys Phe
        195                 200                 205
Ser Leu Pro Ser Val Asp Gly Gln Lys Arg Tyr Thr Phe Arg Val Arg
    210                 215                 220
Ser Arg Phe Asn Pro Leu Cys Gly Ser Ala Gln His Trp Ser Glu Trp
225                 230                 235                 240
Ser His Pro Ile His Trp Gly Ser Asn Thr Ser Lys Glu Asn Pro Phe
                245                 250                 255
Leu Phe Ala Leu Glu Ala Val Val Ile Ser Val Gly Ser Met Gly Leu
            260                 265                 270
Ile Ile Ser Leu Leu Cys Val Tyr Phe Trp Leu Glu Arg Thr Met Pro
        275                 280                 285
Arg Ile Pro Thr Leu Lys Asn Leu Glu Asp Leu Val Thr Glu Tyr His
    290                 295                 300
Gly Asn Phe Ser Ala Trp Ser Gly Val Ser Lys Gly Leu Ala Glu Ser
305                 310                 315                 320
Leu Gln Pro Asp Tyr Ser Glu Arg Leu Cys Leu Val Ser Glu Ile Pro
                325                 330                 335
Pro Lys Gly Gly Ala Leu Gly Glu Gly Pro Gly Ala Ser Pro Cys Asn
            340                 345                 350
Gln His Ser Pro Tyr Trp Ala Pro Pro Cys Tyr Thr Leu Lys Pro Glu
        355                 360                 365
Thr
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<210> 21
<211> 368
<212> PRT
<213> Rattus norvegicus

<400> 21

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 1               5                  10                  15
Leu Leu Leu Arg Val Gly Trp Ser Ser Lys Val Leu Met Ser Ser Gly
            20                  25                  30
Asn Glu Asp Thr Lys Ser Asp Leu Leu Leu Thr Ser Met Asp Leu Lys
        35                  40                  45
His Leu Ser Val Pro Thr Leu Pro Leu Pro Glu Val Gln Cys Phe Val
    50                  55                  60
Phe Asn Val Glu Tyr Met Asn Cys Thr Trp Asn Ser Ser Ser Glu Pro
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65                  70                  75                  80
Gln Pro Thr Asn Leu Thr Met His Tyr Arg Tyr Lys Gly Ser Asp Asn
                85                  90                  95
Asn Thr Phe Gln Glu Cys Ser His Tyr Leu Phe Ser Lys Glu Ile Thr
            100                 105                 110
Ser Gly Cys Gln Ile Gln Lys Glu Asp Ile Gln Leu Tyr Gln Thr Phe
        115                 120                 125
Val Val Gln Leu Gln Asp Pro Gln Lys Pro Gln Arg Arg Ala Glu Gln
    130                 135                 140
Lys Leu Asn Leu Gln Asn Leu Val Ile Pro Trp Ala Pro Glu Asn Leu
145                 150                 155                 160
Thr Leu Tyr Asn Leu Ser Glu Ser Gln Val Glu Leu Arg Trp Lys Ser
                165                 170                 175
Arg Tyr Ile Glu Arg Cys Leu Gln Tyr Leu Val Gln Tyr Arg Ser Asn
            180                 185                 190
Arg Asp Arg Ser Trp Thr Glu Gln Ile Val Asp His Glu Pro Arg Phe
        195                 200                 205
Ser Leu Pro Ser Val Asp Glu Gln Lys Leu Tyr Thr Phe Arg Val Arg
    210                 215                 220
Ser Arg Phe Asn Pro Ile Cys Gly Ser Thr Gln Gln Trp Ser Lys Trp
225                 230                 235                 240
Ser Gln Pro Ile His Trp Gly Ser His Thr Ala Glu Glu Asn Pro Ser
                245                 250                 255
Leu Phe Ala Leu Glu Ala Val Leu Ile Pro Val Gly Thr Met Gly Leu
            260                 265                 270
Ile Ile Thr Leu Ile Phe Val Tyr Cys Trp Leu Glu Arg Met Pro Arg
        275                 280                 285
Ile Pro Ala Ile Lys Asn Leu Glu Asp Leu Val Thr Glu Tyr His Gly
    290                 295                 300
Asn Phe Ser Ala Trp Ser Gly Val Ser Lys Gly Leu Thr Glu Ser Leu
305                 310                 315                 320
Gln Pro Asp Tyr Ser Glu Arg Phe Cys His Val Ser Glu Ile Pro Pro
                325                 330                 335
Lys Gly Gly Ala Leu Gly Glu Gly Pro Gly Gly Ser Pro Cys Ser Leu
            340                 345                 350
His Ser Pro Tyr Trp Pro Pro Pro Cys Tyr Ser Leu Lys Pro Glu Ala
        355                 360                 365
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of IL-2 gamma receptor from human

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 1               5                  10                  15
Pro Leu Leu Gly Val Gly Leu Asn Thr Thr Ile Leu Thr Pro Asn Gly
            20                  25                  30
Asn Glu Asp Thr Thr Ala Asp Phe Phe Leu Thr Thr Met Pro Thr Asp
        35                  40                  45
Ser Leu Ser Val Ser Thr Leu Pro Leu Pro Glu Val Gln Cys Phe Val
    50                  55                  60
Phe Asn Val Glu Tyr Met Asn Cys Thr Trp Asn Ser Ser Ser Glu Pro
65                  70                  75                  80
Gln Pro Thr Asn Leu Thr Leu His Tyr Trp Tyr Lys Asn Ser Asp Asn
                85                  90                  95
Asp Lys Val Gln Lys Cys Ser His Tyr Leu Phe Ser Glu Glu Ile Thr
            100                 105                 110
Ser Gly Cys Gln Leu Gln Lys Lys Glu Ile His Leu Tyr Gln Thr Phe
        115                 120                 125
Val Val Gln Leu Gln Asp Pro Arg Glu Pro Arg Arg Gln Ala Thr Gln
    130                 135                 140
Met Leu Lys Leu Gln Asn Leu Val Ile Pro Trp Ala Pro Glu Asn Leu
145                 150                 155                 160
Thr Leu His Lys Leu Ser Glu Ser Gln Leu Glu Leu Asn Trp Asn Asn
                165                 170                 175
Arg Phe Leu Asn His Cys Leu Glu His Leu Val Gln Tyr Arg Thr Asp
            180                 185                 190
Trp Asp His Ser Trp Thr Glu Gln Ser Val Asp Tyr Arg His Lys Phe
        195                 200                 205
Ser Leu Pro Ser Val Asp Gly Gln Lys Arg Tyr Thr Phe Arg Val Arg
    210                 215                 220
Ser Arg Phe Asn Pro Leu Cys Gly Ser Ala Gln His Trp Ser Glu Trp
225                 230                 235                 240
Ser His Pro Ile His Trp Gly Ser Asn Thr Ser Lys Glu Asn Pro Phe
                245                 250                 255
Leu Phe Ala Leu Glu Ala Val Leu Ile Pro Val Gly Thr Met Gly Leu
            260                 265                 270
Ile Ile Thr Leu Ile Phe Val Tyr Cys Trp Leu Glu Arg Met Pro Arg
        275                 280                 285
Ile Pro Ala Ile Lys Asn Leu Glu Asp Leu Val Thr Glu Tyr His Gly
    290                 295                 300
Asn Phe Ser Ala Trp Ser Gly Val Ser Lys Gly Leu Thr Glu Ser Leu
305                 310                 315                 320
Gln Pro Asp Tyr Ser Glu Arg Phe Cys His Val Ser Glu Ile Pro Pro
                325                 330                 335
Lys Gly Gly Ala Leu Gly Glu Gly Pro Gly Gly Ser Pro Cys Ser Leu
            340                 345                 350
His Ser Pro Tyr Trp Pro Pro Pro Cys Tyr Ser Leu Lys Pro Glu Ala
        355                 360                 365
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<220>
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guide RNA (gRNA)

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<223> n= A, T, C or G

<220>
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<222> (0)...(0)
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gtagatcgct ttccactacc 20

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gaactccact gctcgtgagc 20

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