SEQUENCE LISTING

<110> Humabs BioMed SA
Vir Biotechnology, Inc.
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Pang, Phillip S.
Corti, Davide

<120> COMBINATION HBV THERAPY

<130> 930485.401WO

<140> PCT
<141> 2019-12-19

<150> US 62/782,896
<151> 2018-12-20

<160> 109

<170> FastSEQ for Windows Version 4.0

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<213> Hepatitis B Virus

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<210> 2
<211> 18
<212> DNA
<213> Hepatitis B Virus

<220>
<223> Hepatitis B Virus genome, nucleotides 1579-1597 of
NC_003977.2

<400> 2
gtgtgcactt cgcttcac 18

<210> 3
<211> 19
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBV02, sense strand

<400> 3
gugugcacuu cgcuucaca 19

<210> 4
<211> 21
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBV02, antisense strand

<400> 4
ugugaagcga agugcacacu u 21

<210> 5
<211> 19
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide (HBV01, sense strand)

<400> 5
gugugcacuu cgcuucaca 19

<210> 6
<211> 21
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide (HBV01, antisense strand)

<400> 6
ugugaagcga agugcacacu u 21

<210> 7
<211> 19
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide (HBV02, sense strand)

<400> 7
gugugcacuu cgcuucaca 19

<210> 8
<211> 21
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<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide (HBV02, antisense strand)

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ugugaagcga agugcacacu u 21

<210> 9
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Membrane translocation sequence-containing peptide RFGF

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Ala Ala Val Ala Leu Leu Pro Ala Val Leu Leu Ala Leu Leu Ala Pro
1 5 10 15

<210> 10
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Membrane translocation sequence-containing peptide RFGF analogue

<400> 10
Ala Ala Leu Leu Pro Val Leu Leu Ala Ala Pro
 1   5   10

<210> 11
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> HIV Tat protein

<400> 11
Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg Pro Pro Gln
 1   5   10

<210> 12
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Drosophila Antennapedia protein

<400> 12
Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys
 1   5   10   15

<210> 13
<211> 226
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg S domain

<400> 13
Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
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Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
            20   25   30
Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Thr Val Cys
        35   40   45
Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
    50   55   60
Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65   70   75   80
Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
                85   90   95
Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly

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            100                 105                 110
Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Met Thr Thr Ala
        115                 120                 125
Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
    130                 135                 140
Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
145                 150                 155                 160
Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
                165                 170                 175
Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
            180                 185                 190
Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Ile
        195                 200                 205
Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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Tyr Ile
225
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<210> 14
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> J02203 (D, ayw3) HBsAg Antigenic Loop Sequence

<400> 14

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Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
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Ser Thr Gly Pro Cys Arg Thr Cys Met Thr Thr Ala Gln Gly Thr Ser
            20                  25                  30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50                  55                  60
Trp Ala Ser Ala Arg Phe Ser Trp
65                  70
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<210> 15
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> FJ899792 (D, adw2) HBsAg Antigenic Loop Sequence

<400> 15

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Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
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 1               5                  10                  15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20                  25                  30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50                  55                  60
Trp Ala Ser Ala Arg Phe Ser Trp
65                  70
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<210> 16
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> AM282986 (A) HBsAg Antigenic Loop Sequence

<400> 16

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 1               5                  10                  15
Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala Gln Gly Asn Ser
            20                  25                  30
Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys Tyr Leu Trp Glu
    50                  55                  60
Trp Ala Ser Val Arg Phe Ser Trp
65                  70
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<210> 17
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> D23678 (B1) HBsAg Antigenic Loop Sequence

<400> 17

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 1               5                  10                  15
Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20                  25                  30
Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Thr Asp Gly Asn Cys Thr
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys Tyr Leu Trp Glu
    50                  55                  60
Trp Ala Ser Val Arg Phe Ser Trp
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65 70

<210> 18
<211> 72
<212> PRT
<213> Hepatits B Virus

<220>
<223> AB117758 (C1) HBsAg Antigenic Loop Sequence

<400> 18
Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Thr Ser Thr Thr
1 5 10 15
Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala Gln Gly Thr Ser
20 25 30
Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
35 40 45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg Phe Leu Trp Glu
50 55 60
Trp Ala Ser Val Arg Phe Ser Trp
65 70

<210> 19
<211> 74
<212> PRT
<213> Hepatitis B Virus

<220>
<223> AB205192(E) HBsAg Antigenic Loop Sequence

<400> 19
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1 5 10 15
Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Leu Ala Gln Gly Thr Ser
20 25 30
Met Phe Pro Ser Cys Cys Cys Ser Lys Pro Ser Asp Gly Asn Cys Thr
35 40 45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
50 55 60
Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser
65 70

<210> 20
<211> 71
<212> PRT
<213> Hepatitis B Virus

<220>

<223> X69798 (F4) HBsAg Antigenic Loop Sequence

<400> 20
Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Thr Thr Thr
 1   5   10   15
Ser Thr Gly Pro Cys Thr Cys Thr Thr Leu Ala Gln Gly Thr Ser Met
            20   25   30
Phe Pro Ser Cys Cys Cys Ser Lys Pro Ser Asp Gly Asn Cys Thr Cys
        35   40   45
Ile Pro Ile Pro Ser Ser Trp Ala Leu Gly Lys Tyr Leu Trp Glu Trp
    50   55   60
Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 21
<211> 70
<212> PRT
<213> Hepatitis B Virus

<220>
<223> AF1 60501 (G) HBsAg Antigenic Loop Sequence

<400> 21
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Ser Thr Gly Pro Cys Thr Cys Thr Thr Pro Ala Gln Gly Asn Ser Met
            20   25   30
Tyr Pro Ser Cys Cys Cys Thr Pro Ser Asp Gly Asn Cys Thr Cys Ile
        35   40   45
Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys Tyr Leu Trp Glu Trp Ala
    50   55   60
Ser Val Arg Phe Ser Trp
65   70

<210> 22
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> AY090454 (H) HBsAg Antigenic Loop Sequence

<400> 22
Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Thr Thr Thr
 1   5   10   15
Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Leu Ala Gln Gly Thr Ser
            20   25   30

Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Tyr Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 23
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> AF241409 (I) HBsAg Antigenic Loop Sequence

<400> 23
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala Gln Gly Asn Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys Tyr Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 24
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> AB486012 (J) HBsAg Antigenic Loop Sequence

<400> 24
Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Thr Thr Thr
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Ser Thr Gly Pro Cys Arg Thr Cys Thr Ile Thr Ala Gln Gly Thr Ser
            20   25   30
Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Val Arg Phe Ser Trp
65   70

<210> 25

<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg Y100C/P120T HBsAg Antigenic Loop Sequence

<400> 25
Cys Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr
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Thr Gly Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr
            20   25   30
Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys
        35   40   45
Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 26
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg P120T HBsAg Antigenic Loop Sequence

<400> 26
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 27
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg P120T/S143L HBsAg Antigenic Loop Sequence

<400> 27
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Leu Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 28
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg C121 S HBsAg Antigenic Loop Sequence

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Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Ser Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 29
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg R122D HBsAg Antigenic Loop Sequence

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

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    50                  55                  60
Trp Ala Ser Ala Arg Phe Ser Trp
65                  70

<210> 30
<211> 71
<212> PRT
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<220>
<223> HBsAg R122I HBsAg Antigenic Loop Sequence


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Gly Thr Gly Pro Cys Ile Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20                  25                  30
Met Tyr Pro Ser Cys Cys Cys Thr Pro Ser Asp Gly Asn Cys Thr Cys
        35                  40                  45
Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu Trp
    50                  55                  60
Ala Ser Ala Arg Phe Ser Trp
65                  70

<210> 31
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg T123N HBsAg Antigenic Loop Sequence


<400> 31
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1               5                  10                  15
Gly Thr Gly Pro Cys Arg Asn Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20                  25                  30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50                  55                  60
Trp Ala Ser Ala Arg Phe Ser Trp
65                  70

<210> 32
<211> 72
<212> PRT
<213> Hepatitis B Virus
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<220>
<223> HBsAg Q129H HBsAg Antigenic Loop Sequence

<400> 32
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala His Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 33
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg Q129L HBsAg Antigenic Loop Sequence

<400> 33
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 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Leu Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 34
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg M1 33H HBsAg Antigenic Loop Sequence

<400> 34
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 1   5   10   15

Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
His Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 35
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg M1 33L HBsAg Antigenic Loop Sequence

<400> 35
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 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Leu Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 36
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg M133T HBsAg Antigenic Loop Sequence

<400> 36
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Thr Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 37
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg K141 E HBsAg Antigenic Loop Sequence

<400> 37
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Glu Pro Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 38
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg P142S HBsAg Antigenic Loop Sequence

<400> 38
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Ser Ser Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 39
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg S143K HBsAg Antigenic Loop Sequence

<400> 39
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Lys Asp Gly Asn Cys Thr
        35   40   45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50   55   60
Trp Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 40
<211> 71
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg D144A HBsAg Antigenic Loop Sequence

<400> 40
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Pro Ser Ala Gly Asn Cys Thr Cys
        35   40   45
Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu Trp
    50   55   60
Ala Ser Ala Arg Phe Ser Trp
65   70

<210> 41
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg G145R HBsAg Antigenic Loop Sequence

<400> 41
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1   5   10   15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20   25   30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Arg Asn Cys Thr

```
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50                  55                  60
Trp Ala Ser Ala Arg Phe Ser Trp
65                  70
```

<210> 42
<211> 72
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg N146A HBsAg Antigenic Loop Sequence

<400> 42

```
Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr
 1               5                  10                  15
Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser
            20                  25                  30
Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Ala Cys Thr
        35                  40                  45
Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu
    50                  55                  60
Trp Ala Ser Ala Arg Phe Ser Trp
65                  70
```

<210> 43
<211> 226
<212> PRT
<213> Hepatitis B Virus

<220>
<223> HBsAg Genotype D S domain (Genbank accession no.
FJ899792)

<400> 43

```
Met Glu Asn Val Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
 1               5                  10                  15
Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
            20                  25                  30
Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Thr Val Cys
        35                  40                  45
Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
    50                  55                  60
Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65                  70                  75                  80
Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
                85                  90                  95
```

```
Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
            100                 105                 110
Ser Ser Thr Thr Gly Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
        115                 120                 125
Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
    130                 135                 140
Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
145                 150                 155                 160
Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
                165                 170                 175
Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
            180                 185                 190
Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Thr
        195                 200                 205
Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
    210                 215                 220
Tyr Ile
225
```

<210> 44
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 CDRH1

<400> 44
Gly Arg Ile Phe Arg Ser Phe Tyr
 1   5

<210> 45
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 short CDRH2

<400> 45
Asn Gln Asp Gly Ser Glu Lys
 1   5

<210> 46
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 long CDRH2

<400> 46
Ile Asn Gln Asp Gly Ser Glu Lys
 1   5

<210> 47
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 CDRH3

<400> 47
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val
 1   5   10

<210> 48
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 CDRL1

<400> 48
Lys Leu Gly Asn Lys Asn
 1   5

<210> 49
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 short CDRL2

<400> 49
Glu Val Lys
 1

<210> 50
<211> 9
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 long CDRL2

<400> 50
Val Ile Tyr Glu Val Lys Tyr Arg Pro
 1   5

<210> 51
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 CDRL3

<400> 51
Gln Thr Trp Asp Ser Thr Thr Val Val
 1   5

<210> 52
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v35 CDRL3

<400> 52
Gln Thr Phe Asp Ser Thr Thr Val Val
 1   5

<210> 53
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 VH

<400> 53
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1   5   10   15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20   25   30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

```
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Ser Val Ser Ser
        115
```

<210> 54
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v31 VH

<400> 54

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20                  25                  30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Asn Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Thr Val Ser Ser
        115
```

<210> 55
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 VL

<400> 55

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
```

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

<210> 56
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v7 VL

<400> 56

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Cys Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100                 105
```

<210> 57
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v23 VL

<400> 57

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20                  25                  30
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
```

```
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105
```

<210> 58
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v34 VL

<400> 58

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100                 105
```

<210> 59
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v35 VL

<400> 59

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
```

Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
85 90 95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
100 105

<210> 60
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34_LC40S VL

<400> 60
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
20 25 30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
85 90 95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
100 105

<210> 61
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34_LC40A VL

<400> 61
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
20 25 30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80

```
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100                 105

<210> 62
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v23_LC40S VL

<400> 62
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20                  25                  30
Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100                 105

<210> 63
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v23_LC40A VL

<400> 63
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20                  25                  30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
```

Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
100 105

<210> 64
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v31_LC40S VL

<400> 64
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
20 25 30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
85 90 95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
100 105

<210> 65
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v31_L C40A VL

<400> 65
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
20 25 30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
85 90 95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
100 105

<210> 66
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v32_LC40S VL

<400> 66
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20   25   30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100   105

<210> 67
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v32_LC40A VL

<400> 67
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20   25   30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu
            100   105

<210> 68

<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v33_LC40S VL

<400> 68
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20   25   30
Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105

<210> 69
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v33_LC40A VL

<400> 69
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20   25   30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu
            100   105

<210> 70
<211> 449
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v35 HC

<400> 70
```
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20                  25                  30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Ser Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205
Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210                 215                 220
Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro
225                 230                 235                 240
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245                 250                 255
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260                 265                 270
Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275                 280                 285
Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290                 295                 300
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305                 310                 315                 320
Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys
                325                 330                 335
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340                 345                 350
```

```
Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr
        355                 360                 365
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
    370                 375                 380
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
                405                 410                 415
Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
            420                 425                 430
Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445
Lys
```

<210> 71
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v35-MLNS-GAALIE (g1M17, 1)
HC

<400> 71

```
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20                  25                  30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Ser Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
```

```
        195                 200                 205
Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210                 215                 220
Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Ala Gly Pro
225                 230                 235                 240
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245                 250                 255
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260                 265                 270
Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275                 280                 285
Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290                 295                 300
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305                 310                 315                 320
Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Leu Pro Glu Glu Lys
                325                 330                 335
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340                 345                 350
Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr
        355                 360                 365
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
    370                 375                 380
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
                405                 410                 415
Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Leu His Glu
            420                 425                 430
Ala Leu His Ser His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445
Lys


<210> 72
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v35-MLNS HC

<400> 72
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20                  25                  30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
```

```
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Ser Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205
Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210                 215                 220
Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro
225                 230                 235                 240
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245                 250                 255
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260                 265                 270
Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275                 280                 285
Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290                 295                 300
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305                 310                 315                 320
Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys
                325                 330                 335
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340                 345                 350
Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr
        355                 360                 365
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
    370                 375                 380
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
                405                 410                 415
Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Leu His Glu
            420                 425                 430
Ala Leu His Ser His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445
Lys
```

<210> 73
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v35 LC

<400> 73
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20   25   30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100   105   110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115   120   125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130   135   140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145   150   155   160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165   170   175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180   185   190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195   200   205
Thr Glu Cys Ser
    210

<210> 74
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v34 LC

<400> 74
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln

```
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210
```

<210> 75
<211> 128
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 VH

<400> 75

```
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Ser Thr Phe Thr Lys Tyr
            20                  25                  30
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Ser Ile Ser Gly Ser Val Pro Gly Phe Gly Ile Asp Thr Tyr Tyr
    50                  55                  60
Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Thr Ser Lys
65                  70                  75                  80
Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala
                85                  90                  95
Leu Tyr Tyr Cys Ala Lys Asp Val Gly Val Ile Gly Ser Tyr Tyr Tyr
```

```
            100                 105                 110
Tyr Ala Met Asp Val Trp Gly Gln Gly Thr Ala Val Thr Val Ser Ser
        115                 120                 125

<210> 76
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 VL

<400> 76
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
 1               5                  10                  15
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Gly Leu Ser Ser Ser
            20                  25                  30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45
Ile Tyr Ser Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Ala Tyr Ser Pro
                85                  90                  95
Arg Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105

<210> 77
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 CDRH1

<400> 77
Gly Ser Thr Phe Thr Lys Tyr Ala
 1               5

<210> 78
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 CDRH2

<400> 78
Ile Ser Gly Ser Val Pro Gly Phe
```

1 5

<210> 79
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 CDRH3

<400> 79
Leu Tyr Tyr Cys Ala Lys Asp Val Gly Val Ile Gly Ser Tyr Tyr Tyr
1 5 10 15
Tyr Ala Met Asp Val
20

<210> 80
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 CDRL1

<400> 80
Gln Gly Leu Ser Ser Ser Tyr
1 5

<210> 81
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 CDRL2

<400> 81
Ser Ala Ser
1

<210> 82
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC24 CDRL3

<400> 82
Gln Gln Tyr Ala Tyr Ser Pro Arg Trp Thr

```
 1               5                  10

<210> 83
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34 LC

<400> 83
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Cys Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 84
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v7 LC

<400> 84
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
```

```
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Cys Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210
```

<210> 85
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v23 LC

<400> 85

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20                  25                  30
Cys Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
```

```
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 86
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34_LC40S LC

<400> 86
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
```

```
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 87
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34_LC40A LC


<400> 87
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 88
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v23_LC40S LC
```

<400> 88
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20   25   30
Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100   105   110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115   120   125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130   135   140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145   150   155   160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165   170   175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180   185   190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195   200   205
Thr Glu Cys Ser
    210

<210> 89
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v23_LC40A LC

<400> 89
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20   25   30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60

```
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210
```

<210> 90
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v31_LC40S

<400> 90

```
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
```

```
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 91
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v31_LC40A LC


<400> 91
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Trp Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 92
```

<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v32_LC40S LC

<400> 92
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20   25   30
Ser Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35   40   45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50   55   60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65   70   75   80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85   90   95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100   105   110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115   120   125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130   135   140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145   150   155   160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165   170   175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180   185   190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195   200   205
Thr Glu Cys Ser
    210

<210> 93
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v32_LC40A LC

<400> 93
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1   5   10   15

```
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
            20                  25                  30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 94
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v33_LC40S LC


<400> 94
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20                  25                  30
Ser Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
```

```
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 95
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v33 _LC40A LC


<400> 95
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
 1               5                  10                  15
Thr Ala Ser Ile Thr Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Ala
            20                  25                  30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
        35                  40                  45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
    50                  55                  60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65                  70                  75                  80
Asp Glu Ala Asp Tyr Tyr Cys Gln Thr Phe Asp Ser Thr Thr Val Val
                85                  90                  95
Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly Gln Pro Lys Ala Ala
            100                 105                 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Gln Ala Asn
        115                 120                 125
Lys Ala Thr Leu Val Cys Leu Ile Ser Asp Phe Tyr Pro Gly Ala Val
    130                 135                 140
Thr Val Ala Trp Lys Ala Asp Ser Ser Pro Val Lys Ala Gly Val Glu
145                 150                 155                 160
Thr Thr Thr Pro Ser Lys Gln Ser Asn Asn Lys Tyr Ala Ala Ser Ser
                165                 170                 175
Tyr Leu Ser Leu Thr Pro Glu Gln Trp Lys Ser His Arg Ser Tyr Ser
            180                 185                 190
```

```
Cys Gln Val Thr His Glu Gly Ser Thr Val Glu Lys Thr Val Ala Pro
        195                 200                 205
Thr Glu Cys Ser
    210

<210> 96
<211> 217
<212> PRT
<213> Homo sapiens

<220>
<223> WT hIgG1 Fc

<400> 96
Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
 1               5                  10                  15
Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
            20                  25                  30
Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr
        35                  40                  45
Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
    50                  55                  60
Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His
65                  70                  75                  80
Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
                85                  90                  95
Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
            100                 105                 110
Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu
        115                 120                 125
Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
    130                 135                 140
Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn
145                 150                 155                 160
Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu
                165                 170                 175
Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val
            180                 185                 190
Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln
        195                 200                 205
Lys Ser Leu Ser Leu Ser Pro Gly Lys
    210                 215

<210> 97
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34+GAALIE HC
```

<400> 97
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1   5   10   15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20   25   30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50   55   60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65   70   75   80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100   105   110
Thr Thr Val Ser Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115   120   125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130   135   140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145   150   155   160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165   170   175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180   185   190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195   200   205
Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210   215   220
Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Ala Gly Pro
225   230   235   240
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245   250   255
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260   265   270
Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275   280   285
Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290   295   300
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305   310   315   320
Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Leu Pro Glu Glu Lys
                325   330   335
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340   345   350
Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr
        355   360   365
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu

```
    370                 375                 380
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
                405                 410                 415
Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
            420                 425                 430
Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445
Lys
```

<210> 98
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence HBC34v31+GAALIE HC

<400> 98

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20                  25                  30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Asn Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50                  55                  60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe
        115                 120                 125
Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu
    130                 135                 140
Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp
145                 150                 155                 160
Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175
Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser
            180                 185                 190
Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro
        195                 200                 205
Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
    210                 215                 220
```

```
Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Ala Gly Pro
225                 230                 235                 240
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
                245                 250                 255
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp
            260                 265                 270
Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
        275                 280                 285
Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val
    290                 295                 300
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
305                 310                 315                 320
Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Leu Pro Glu Glu Lys
                325                 330                 335
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
            340                 345                 350
Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr
        355                 360                 365
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
    370                 375                 380
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys
                405                 410                 415
Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu
            420                 425                 430
Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly
        435                 440                 445
Lys
```

<210> 99
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence murinized HBC34v7,
BC34-v7-mu-IgG2a - HC

<400> 99

```
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1               5                  10                  15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20                  25                  30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35                  40                  45
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50                  55                  60
```

```
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65                  70                  75                  80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100                 105                 110
Thr Thr Val Ser Val Ser Ser Ala Lys Thr Thr Ala Pro Ser Val Tyr
        115                 120                 125
Pro Leu Ala Pro Val Cys Gly Asp Thr Thr Gly Ser Ser Val Thr Leu
    130                 135                 140
Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Leu Thr Trp
145                 150                 155                 160
Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu
                165                 170                 175
Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Thr Ser Ser
            180                 185                 190
Thr Trp Pro Ser Gln Ser Ile Thr Cys Asn Val Ala His Pro Ala Ser
        195                 200                 205
Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Pro Thr Ile Lys
    210                 215                 220
Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro Asn Leu Leu Gly Gly Pro
225                 230                 235                 240
Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser
                245                 250                 255
Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser Glu Asp Asp
            260                 265                 270
Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val His Thr
        275                 280                 285
Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val
    290                 295                 300
Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu
305                 310                 315                 320
Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg
                325                 330                 335
Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val
            340                 345                 350
Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr
        355                 360                 365
Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr
    370                 375                 380
Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu
385                 390                 395                 400
Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys
                405                 410                 415
Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu
            420                 425                 430
Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly
        435                 440                 445
Lys
```

<210> 100
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence murinized HBC34v7,
BC34-v7-mu-IgG2a - LC

<400> 100
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
20 25 30
Cys Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
85 90 95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ser Ser
100 105 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Glu Thr Asn
115 120 125
Lys Ala Thr Leu Val Cys Thr Ile Thr Asp Phe Tyr Pro Gly Val Val
130 135 140
Thr Val Asp Trp Lys Val Asp Gly Thr Pro Val Thr Gln Gly Met Glu
145 150 155 160
Thr Thr Gln Pro Ser Lys Gln Ser Asn Asn Lys Tyr Met Ala Ser Ser
165 170 175
Tyr Leu Thr Leu Thr Ala Arg Ala Trp Glu Arg His Ser Ser Tyr Ser
180 185 190
Cys Gln Val Thr His Glu Gly His Thr Val Glu Lys Ser Leu Ser Arg
195 200 205
Ala Asp Cys Ser
210

<210> 101
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence murinized HBC34v35,
HBC34-v35-mu-IgG2a - HC

<400> 101
Glu Leu Gln Leu Val Glu Ser Gly Gly Gly Trp Val Gln Pro Gly Gly
 1   5   10   15
Ser Gln Arg Leu Ser Cys Ala Ala Ser Gly Arg Ile Phe Arg Ser Phe
            20   25   30
Tyr Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45
Ala Thr Ile Asn Gln Asp Gly Ser Glu Lys Leu Tyr Val Asp Ser Val
    50   55   60
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Phe
65   70   75   80
Leu Gln Met Asn Asn Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95
Ala Ala Trp Ser Gly Asn Ser Gly Gly Met Asp Val Trp Gly Gln Gly
            100   105   110
Thr Thr Val Ser Val Ser Ser Ala Lys Thr Thr Ala Pro Ser Val Tyr
        115   120   125
Pro Leu Ala Pro Val Cys Gly Asp Thr Thr Gly Ser Ser Val Thr Leu
    130   135   140
Gly Cys Leu Val Lys Gly Tyr Phe Pro Glu Pro Val Thr Leu Thr Trp
145   150   155   160
Asn Ser Gly Ser Leu Ser Ser Gly Val His Thr Phe Pro Ala Val Leu
                165   170   175
Gln Ser Asp Leu Tyr Thr Leu Ser Ser Ser Val Thr Val Thr Ser Ser
            180   185   190
Thr Trp Pro Ser Gln Ser Ile Thr Cys Asn Val Ala His Pro Ala Ser
        195   200   205
Ser Thr Lys Val Asp Lys Lys Ile Glu Pro Arg Gly Pro Thr Ile Lys
    210   215   220
Pro Cys Pro Pro Cys Lys Cys Pro Ala Pro Asn Leu Leu Gly Gly Pro
225   230   235   240
Ser Val Phe Ile Phe Pro Pro Lys Ile Lys Asp Val Leu Met Ile Ser
                245   250   255
Leu Ser Pro Ile Val Thr Cys Val Val Val Asp Val Ser Glu Asp Asp
            260   265   270
Pro Asp Val Gln Ile Ser Trp Phe Val Asn Asn Val Glu Val His Thr
        275   280   285
Ala Gln Thr Gln Thr His Arg Glu Asp Tyr Asn Ser Thr Leu Arg Val
    290   295   300
Val Ser Ala Leu Pro Ile Gln His Gln Asp Trp Met Ser Gly Lys Glu
305   310   315   320
Phe Lys Cys Lys Val Asn Asn Lys Asp Leu Pro Ala Pro Ile Glu Arg
                325   330   335
Thr Ile Ser Lys Pro Lys Gly Ser Val Arg Ala Pro Gln Val Tyr Val
            340   345   350
Leu Pro Pro Pro Glu Glu Glu Met Thr Lys Lys Gln Val Thr Leu Thr
        355   360   365
Cys Met Val Thr Asp Phe Met Pro Glu Asp Ile Tyr Val Glu Trp Thr
    370   375   380
Asn Asn Gly Lys Thr Glu Leu Asn Tyr Lys Asn Thr Glu Pro Val Leu

385 390 395 400
Asp Ser Asp Gly Ser Tyr Phe Met Tyr Ser Lys Leu Arg Val Glu Lys
405 410 415
Lys Asn Trp Val Glu Arg Asn Ser Tyr Ser Cys Ser Val Val His Glu
420 425 430
Gly Leu His Asn His His Thr Thr Lys Ser Phe Ser Arg Thr Pro Gly
435 440 445
Lys

<210> 102
<211> 212
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence murinized HBC34v35,
HBC34-v35-mu-IgG2a - LC

<400> 102
Ser Tyr Glu Leu Thr Gln Pro Pro Ser Val Ser Val Ser Pro Gly Gln
1 5 10 15
Thr Val Ser Ile Pro Cys Ser Gly Asp Lys Leu Gly Asn Lys Asn Val
20 25 30
Ala Trp Phe Gln His Lys Pro Gly Gln Ser Pro Val Leu Val Ile Tyr
35 40 45
Glu Val Lys Tyr Arg Pro Ser Gly Ile Pro Glu Arg Phe Ser Gly Ser
50 55 60
Asn Ser Gly Asn Thr Ala Thr Leu Thr Ile Ser Gly Thr Gln Ala Met
65 70 75 80
Asp Glu Ala Ala Tyr Phe Cys Gln Thr Phe Asp Ser Thr Thr Val Val
85 90 95
Phe Gly Gly Gly Thr Arg Leu Thr Val Leu Gly Gln Pro Lys Ser Ser
100 105 110
Pro Ser Val Thr Leu Phe Pro Pro Ser Ser Glu Glu Leu Glu Thr Asn
115 120 125
Lys Ala Thr Leu Val Cys Thr Ile Thr Asp Phe Tyr Pro Gly Val Val
130 135 140
Thr Val Asp Trp Lys Val Asp Gly Thr Pro Val Thr Gln Gly Met Glu
145 150 155 160
Thr Thr Gln Pro Ser Lys Gln Ser Asn Asn Lys Tyr Met Ala Ser Ser
165 170 175
Tyr Leu Thr Leu Thr Ala Arg Ala Trp Glu Arg His Ser Ser Tyr Ser
180 185 190
Cys Gln Val Thr His Glu Gly His Thr Val Glu Lys Ser Leu Ser Arg
195 200 205
Ala Asp Cys Ser
210

<210> 103

<211> 458
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence murinized HBC24, HBC24-mu-IgG2a
- HC

<400> 103
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
 1   5   10   15
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Ser Thr Phe Thr Lys Tyr
            20   25   30
Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45
Ala Ser Ile Ser Gly Ser Val Pro Gly Phe Gly Ile Asp Thr Tyr Tyr
    50   55   60
Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Thr Ser Lys
65   70   75   80
Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala
                85   90   95
Leu Tyr Tyr Cys Ala Lys Asp Val Gly Val Ile Gly Ser Tyr Tyr Tyr
            100   105   110
Tyr Ala Met Asp Val Trp Gly Gln Gly Thr Ala Val Thr Val Ser Ser
        115   120   125
Ala Lys Thr Thr Ala Pro Ser Val Tyr Pro Leu Ala Pro Val Cys Gly
    130   135   140
Asp Thr Thr Gly Ser Ser Val Thr Leu Gly Cys Leu Val Lys Gly Tyr
145   150   155   160
Phe Pro Glu Pro Val Thr Leu Thr Trp Asn Ser Gly Ser Leu Ser Ser
                165   170   175
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Asp Leu Tyr Thr Leu
            180   185   190
Ser Ser Ser Val Thr Val Thr Ser Ser Thr Trp Pro Ser Gln Ser Ile
        195   200   205
Thr Cys Asn Val Ala His Pro Ala Ser Ser Thr Lys Val Asp Lys Lys
    210   215   220
Ile Glu Pro Arg Gly Pro Thr Ile Lys Pro Cys Pro Pro Cys Lys Cys
225   230   235   240
Pro Ala Pro Asn Leu Leu Gly Gly Pro Ser Val Phe Ile Phe Pro Pro
                245   250   255
Lys Ile Lys Asp Val Leu Met Ile Ser Leu Ser Pro Ile Val Thr Cys
            260   265   270
Val Val Val Asp Val Ser Glu Asp Asp Pro Asp Val Gln Ile Ser Trp
        275   280   285
Phe Val Asn Asn Val Glu Val His Thr Ala Gln Thr Gln Thr His Arg
    290   295   300
Glu Asp Tyr Asn Ser Thr Leu Arg Val Val Ser Ala Leu Pro Ile Gln
305   310   315   320

```
His Gln Asp Trp Met Ser Gly Lys Glu Phe Lys Cys Lys Val Asn Asn
                325                 330                 335
Lys Asp Leu Pro Ala Pro Ile Glu Arg Thr Ile Ser Lys Pro Lys Gly
            340                 345                 350
Ser Val Arg Ala Pro Gln Val Tyr Val Leu Pro Pro Pro Glu Glu Glu
        355                 360                 365
Met Thr Lys Lys Gln Val Thr Leu Thr Cys Met Val Thr Asp Phe Met
    370                 375                 380
Pro Glu Asp Ile Tyr Val Glu Trp Thr Asn Asn Gly Lys Thr Glu Leu
385                 390                 395                 400
Asn Tyr Lys Asn Thr Glu Pro Val Leu Asp Ser Asp Gly Ser Tyr Phe
                405                 410                 415
Met Tyr Ser Lys Leu Arg Val Glu Lys Lys Asn Trp Val Glu Arg Asn
            420                 425                 430
Ser Tyr Ser Cys Ser Val Val His Glu Gly Leu His Asn His His Thr
        435                 440                 445
Thr Lys Ser Phe Ser Arg Thr Pro Gly Lys
    450                 455
```

<210> 104
<211> 215
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence murinized HBC24, HBC24-mu-IgG2a
- LC

<400> 104

```
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
 1               5                  10                  15
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Gly Leu Ser Ser Ser
            20                  25                  30
Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45
Ile Tyr Ser Ala Ser Thr Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60
Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80
Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Ala Tyr Ser Pro
                85                  90                  95
Arg Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Ala Asp Ala
            100                 105                 110
Ala Pro Thr Val Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Thr Ser
        115                 120                 125
Gly Gly Ala Ser Val Val Cys Phe Leu Asn Asn Phe Tyr Pro Lys Asp
    130                 135                 140
Ile Asn Val Lys Trp Lys Ile Asp Gly Ser Glu Arg Gln Asn Gly Val
145                 150                 155                 160
```

Leu Asn Ser Trp Thr Asp Gln Asp Ser Lys Asp Ser Thr Tyr Ser Met
165 170 175
Ser Ser Thr Leu Thr Leu Thr Lys Asp Glu Tyr Glu Arg His Asn Ser
180 185 190
Tyr Thr Cys Glu Ala Thr His Lys Thr Ser Thr Ser Pro Ile Val Lys
195 200 205
Ser Phe Asn Arg Asn Glu Cys
210 215

<210> 105
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic sequence chimeric hinge

<400> 105
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Pro Val
1 5 10 15
Ala Gly Pro

<210> 106
<211> 21
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic sequence siRNA3 sense strand

<400> 106
gguggacuuc ucucaauuuu a 21

<210> 107
<211> 23
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic sequence siRNA3 antisense strand

<400> 107
uaaaauugag agaaguccac cac 23

<210> 108
<211> 21
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide (siRNA3 sense strand)

<400> 108
gguggacuuc ucucaauuuu a 21

<210> 109
<211> 23
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide (siRNA3 antisense strand)

<400> 109
uaaaauugag agaaguccac cac 23